

Gerotor pumps and pump units of series 143

for SKF CircOil centralized lubrication systems

Assembly instructions acc. to EC Dir. 2006/42/EC
for partly completed machinery, with associated operating instructions

EN



Version 02



Information concerning EC Declaration of Conformity and EC Declaration of Incorporation

The products

gerotor pumps of product series:

143

are hereby confirmed to comply with the essential protection requirements stipulated by the following Directive(s) of the Council on the approximation of laws of the Member States:

- **Machinery Directive 2006/42/EC**
- **Low Voltage Devices 2014/35/EU**
- **RoHS II Directive 2011/65/EU**

Note:

- (a) This declaration certifies compliance with the aforementioned Directives but does not constitute a guarantee of characteristics.
- (b) The safety instructions in the documentation included with the product must be observed.
- (c) The commissioning of the products here certified is prohibited until the machine, vehicle, or similar in which the product is installed conforms with the provisions and requirements of the applicable Directives.
- (d) The operation of the products at non-standard supply voltage, as well as non-

adherence to the installation instructions, can negatively impact the EMC characteristics and electrical safety.

We further declare:

- The aforementioned product is, according to **EC Machinery Directive 2006/42/EC, Annex II Part B**, designed for installation in machinery / for incorporation with other machinery to form a machine. Within the scope of the EC Directive, commissioning shall be prohibited until the machinery in which this product is installed conforms with the provisions of this Directive.
- The aforementioned product may, with reference to **EC Directive 97/23/EC concerning pressure equipment**, only be used in accordance with its intended use and in conformity with the instructions provided in the documentation. The following must be observed in this regard:
The product is neither designed nor approved for use

in conjunction with fluids of Group 1 (Dangerous Fluids) as defined in Article 2, Para. 2 of Directive 67/548/EEC of June 27, 1967. The product is neither designed nor approved for use in conjunction with gases, liquefied gases, pressurized gases in solution, vapors, or such fluids whose vapor pressure exceeds normal atmospheric pressure (1013 mbar) by more than 0.5 bar at their maximum permissible temperature.

When used in conformity with their intended use, products supplied by SKF do not reach the limit values listed in Article 3, Para. 1, Clauses 1.1 to 1.3 and Para. 2 of Directive 97/23/EC. They are therefore not subject to the requirements of Annex 1 of the Directive. Consequently, they do not bear a CE marking in respect of Directive 97/23/EC. SKF classifies them according to Article 3, Para. 3 of the Directive. The Declaration of Conformity and Incorporation forms part of the product documentation and is supplied together with the product.

Masthead

These assembly instructions pursuant to EC Machinery Directive 2006/42/EC are an integral part of the product described here and must be kept for future use.

Warranty

The instructions do not contain any information on the warranty. This can be found in the General Terms and Conditions.

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The use of the contents for the purpose of integration into the documentation of the machine manufacturer in whose product it will be integrated is expressly allowed. This also includes the preparation of training documents for internal, non-commercial purposes. Any other usage of any kind without written permission of the rights holder is prohibited and constitutes a violation of copyright.

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Explanation of symbols and signs














You will find these symbols, which warn of specific dangers to persons, material assets, or the environment, next to all safety instructions in these operating instructions.

Read the instructions completely and follow all operating instructions and the warning and safety instructions.

Warning level	Consequence	Probability
 DANGER	Death / serious injury	Immediate
 WARNING	Serious injury	Possible
 CAUTION	Minor injury	Possible
NOTE	Property damage	Possible

Information symbols within the text	
Symbol	Meaning
●	Prompts an action
○	Used for itemizing
	Refers to other facts, causes, or consequences
→	Provides additional information within procedures

Possible symbols

Symbol	Meaning
	Note
	Electrical component hazard, electric shock hazard
	Slipping hazard
	Hazard from hot components Hazard from hot surface
	Risk of being drawn into machinery
	Crushing hazard
	Danger from suspended load
	Pressure injection hazard
	Explosion-proof component
	Electrostatic sensitive components
	Wear personal safety equipment (goggles)
	Secure (lock) the closing device against accidental starting of the machine
	Environmentally sound disposal

Instructions placed on a unit, machine, or equipment, such as:

○ Rotation arrows

○ Fluid connection labels

must be followed and kept in fully legible condition.

○ Warnings

Read the assembly and operating instructions thoroughly and follow the safety instructions.

Abbreviations and conversion factors

Abbreviations

°C	degrees Celsius	sq.in.	square inch
s	seconds	kp	kilopond
dB (A)	sound pressure level	cu.in.	cubic inch
i.e.	that is	mph	miles per hour
<	less than	fpsec	feet per second
±	plus or minus	°F	degrees Fahrenheit
>	greater than	fl.oz.	fluid ounce
e.g.	for example	in.	inch
∅	diameter	gal.	gallon
incl.	including		
K	Kelvin		
kg	kilogram		
rh	relative humidity		
kW	kilowatt		
l	liter		
Min.	minute		
max.	maximum		
min.	minimum		
mm	millimeter		
ml	milliliter		
N	Newton		
Nm	Newton meter		
oz.	ounce		
psi	pounds per square inch		
hp	horsepower		
lb.	pound		
sq.in.	square inch		

Conversion factors

Length	1 mm = 0.03937 in.
Area	1 cm ² = 0.155 sq.in.
Volume	1 ml = 0.0352 fl.oz.
	1 l = 2.11416 pints (US)
Mass	1 kg = 2.205 lbs
	1 g = 0.03527 oz.
Density	1 kg/cm ³ = 8.3454 lb./gal. (US)
	1 kg/cm ³ = 0.03613 lb./cu.in.
Force	1 N = 0.10197 kp
Speed	1 m/s = 3.28084 fpsec
	1 m/s = 2.23694 mph
Acceleration	1 m/s ² = 3.28084 ft./s ²
Pressure	1 bar = 14.5 psi
Temperature	°C = (°F-32) x 5/9
Power	1 kW = 1.34109 hp

1. Safety instructions

1.1 General safety instructions

The operator must ensure that the assembly instructions/operating instructions are read by all persons tasked with working on the product or who supervise or instruct such persons. The operator must also ensure that the staff fully understands the content of the instructions.

The assembly instructions/operating instructions must be kept readily available together with the product.

Note that the assembly instructions/operating instructions form part of the product and must accompany the product if sold to a new owner.

The product described here was manufactured according to the state of the art.

Risks may, however, arise from its usage and may result in harm to persons or damage to other material assets.

Any malfunctions which may affect safety must be remedied immediately. In addition to the assembly instructions/operating instructions, statutory regulations and other regulations for accident prevention and

environmental protection must be observed and applied.

1.2 General behavior when handling the product

- o The product may only be used in awareness of the potential dangers, in proper technical condition, and according to the information in this manual.
- o Technical personnel must familiarize themselves with the functions and operation of the product. The specified assembly and operating steps and their sequences must be observed.
- o Any unclear points regarding proper condition or correct assembly/operation must be clarified. Operation is prohibited until issues have been clarified.
- o Unauthorized persons must be kept away from the product.

- o All safety instructions and in-house instructions relevant to the particular activity must be observed.
- o Responsibilities for different activities must be clearly defined and observed. Uncertainty seriously endangers safety.
- o Protective and safety mechanisms cannot be removed, modified, or disabled during operation and must be checked for proper function and completeness at regular intervals.
If protective and safety mechanisms must be removed, they must be installed immediately following conclusion of work and then checked for proper function.
- o Any malfunctions that occur must be resolved according to responsibility. The operator of the system/machine must

be notified in case of malfunctions outside the scope of responsibility.

- o Wear personal protective equipment.
- o Observe the relevant safety data sheets when handling lubricants.

1.3 Qualified technical personnel

Only qualified technical personnel may install, operate, maintain, and repair the products described in the assembly instructions. Qualified technical personnel are persons who have been trained, assigned, and instructed by the operator of the final product into which the product described here is incorporated. Such persons are familiar with the relevant standards, rules, accident prevention regulations, and assembly conditions as a result of their training, experience, and instruction. They are qualified to carry out the required activities and in doing so recognize and avoid any potential hazards. The definition of qualified personnel and the prohibition against employing non-qualified personnel are laid down in DIN VDE 0105 and IEC 364.

Relevant country-specific definitions of qualified technical personnel apply for countries outside the scope of DIN VDE 0105 or IEC 364. The core principles of these country-specific qualification requirements for technical personnel cannot be below those

of the two standards mentioned above.


The operator of the final product is responsible for assigning tasks and areas of responsibility and for the responsibility and monitoring of the personnel. These areas must be precisely specified by the operator. The personnel must be trained and instructed if they do not possess the requisite knowledge.

Product training can also be performed by SKF in exchange for costs incurred.


The operator must ensure that its personnel have fully understood the content of the assembly instructions/operating instructions.

1.4 Electric shock hazard

Electrical connections for the described product may only be established by qualified and trained personnel authorized to do so by the operator, and in observance of the local electrical operating conditions and local regulations (e.g., DIN, VDE). Serious injury or death and property damage may result from improperly connected products.

	WARNING
	<p>Electric shock</p> <p>Performing work on products that have not been de-energized may result in serious injury or death. Assembly, maintenance, and repair work may only be performed on products that have been de-energized by qualified technical personnel. The supply voltage must be switched off before opening any of the product's components.</p>

1.5 System pressure or hydraulic pressure hazard

	WARNING
	<p>System pressure Hydraulic pressure</p> <p>Lubrication systems are pressurized during operation. Centralized lubrication systems must therefore be depressurized before starting assembly, maintenance, or repair work, or any system modifications or system repairs.</p>

1.6 Operation

The following must be observed during commissioning and operation.

- o All information within this manual and the information within the referenced documents
- o All laws/regulations that the operator must observe
- o The information on explosion protection according to Directive 1999/92/EC (ATEX 137), if necessary

1.7 Assembly/maintenance/malfunction/decommissioning/disposal

The following must be observed while working on the product.

- o All relevant persons (e.g., operating personnel, supervisors) must be informed of the activity prior to the start of work. Precautionary operational measures / work instructions must be observed.
- o Take appropriate measures to ensure that moving/detached parts are immobilized during the work and that no body parts can be pinched by unintended movements.
- o Assemble the product only outside the operating range of moving parts, at an adequate distance from sources of heat or cold.
- o Prior to performing work, the product and the machine/system in which the product is or will be integrated must be depressurized and secured against unauthorized activation.
- o All work on electrical components may be performed only with voltage-insulated tools.
- o Fuses must not be bridged. Always replace fuses with fuses of the same type.
- o Ensure proper grounding of the product.
- o Drill required holes only on non-critical, non-load-bearing parts.
- o Other units of the machine/the vehicle must not be damaged or impaired in their function by the installation of the centralized lubrication system.
- o No parts of the centralized lubrication device may be subjected to torsion, shear, or bending.
- o Use suitable lifting gear when working with heavy parts.
- o Avoid mixing up/incorrectly assembling disassembled parts. Label parts.

1.8 Intended use

Gerotor pumps/pump units of SKF series 143 are used to supply centralized lubrication systems with lubricant and are intended for use in centralized lubrication systems. They feed mineral and synthetic oils that are compatible with plastic and NBR elastomers or FKM (FPM). The permissible operating viscosity for the oils is 20 to 1000 mm²/s at a permissible pumped medium temperature of 0 to 80°C.

The assembly instructions in Chapter 4 of these operating instructions must be adhered to. The information in Chapter 9 of the operating instructions, "Technical data," must also be observed.

Only media approved for these gerotor pumps/pump units may be used. Unsuitable media may result in pump unit failure and potentially severe bodily injury or death and property damage. The use of synthetic and biodegradable oils requires prior approval from SKF.

Unless specially indicated otherwise, gerotor pumps/pump units of SKF series 143 are not approved for use in potentially explosive areas as defined in the ATEX Directive 94/9/EC.

Any other usage is deemed non-compliant with the intended use.

1.9 Foreseeable misuse

Any usage of the product differing from the aforementioned conditions and stated purpose is strictly prohibited. Particularly prohibited are use:

- o To feed / forward / store Group 1 dangerous fluids according to Directive 67/548/EEC
- o In another, more critical explosion protection zone, if applied as ATEX
- o To feed / forward / store Group 1 dangerous fluids according to Directive 67/548/EEC
- o To feed / forward / store gases, liquefied gases, dissolved gases, vapors, or fluids whose vapor pressure exceeds normal atmospheric pressure (1013 mbar) by more than 0.5 bar at their maximum permissible operating temperature

1. Safety instructions

1.10 Disclaimer of liability

SKF shall not be held responsible for damages:

- o Resulting from failure to comply with these instructions
- o Caused by contaminated or unsuitable lubricants
- o Caused by the installation of non-original SKF components or SKF spare parts
- o Caused by inappropriate usage
- o Resulting from improper assembly, configuration, or filling
- o Resulting from improper response to malfunctions
- o Caused by non-observance of maintenance intervals
- o Caused by independent modification of system components
- o Only media approved for these types of units may be used. Unsuitable media may result in pump unit failure and potentially severe bodily injury or death and property damage.

1.11 Referenced documents

In addition to this manual, the following documents must be observed by the respective target group:

- o Operating and assembly instructions from the coupling and motor manufacturer
- o Operational instructions / approval rules
- o Instructions from suppliers of purchased parts
- o Manual for the insulation resistance tester
- o Safety data sheet of the lubricant used
- o Project planning documents and other relevant documents, if provided

The operator must supplement these documents with applicable national regulations for the country of use. This documentation must be included if the product/machine is sold or transferred.

1.12 Warning labels on the product

A rotation arrow and (on larger pump types: 30, 40, 50 l/min) a "Hot surface" sign are affixed on the product. Before commissioning, check that these are present and intact. Immediately replace warning labels if damaged or missing. The product must not be operated until then.

Item 1 Rotation arrow



Order No.: **MS-WN 1021.038**

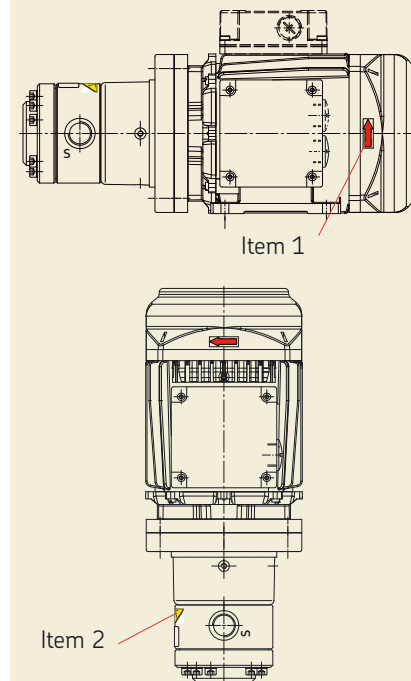
Item 2 Hot surface



Only for gerotor pumps
of type: 143-1...R...
143-1...T...
143-1...V...

Order No.: **951-111-035**

Positioning of rotation arrow, Fig. 1



1.13 Residual risks

Residual risk	Remedy
Life cycle: Assembly	
Electric shock due to defective power lead/mains plug	<ul style="list-style-type: none"> • Inspect the power lead/mains plug for damage before starting gerotor pump units of SKF series 143.
People slipping due to floor contamination with spilled/leaked lubricant	<ul style="list-style-type: none"> • Exercise caution when connecting the gerotor pump unit's hydraulic connections. • Promptly apply suitable binding agents and remove the leaked/spilled lubricant. • Follow operational instructions for handling lubricants and contaminated parts
Tearing/damage to lines when installed on moving machine components	<ul style="list-style-type: none"> • If possible, do not install on moving parts; if this cannot be avoided, use flexible hose lines.
Life cycle: Commissioning / operation	
Electric shock due to defective power lead/mains plug	<ul style="list-style-type: none"> • Before starting up gerotor pump units of SKF series 143, check the power lead/mains plug for damage.
Lubricating oil spraying out due to faulty component fitting/line connection.	<ul style="list-style-type: none"> • Securely tighten all components with a suitable tool or using the specified torques. Use hydraulic screw unions and lines suitable for the indicated pressures. These must be checked for proper connection and for damage prior to commissioning.
Life cycle: Setup, retrofit	
People slipping due to floor contamination with spilled/leaked lubricant	<ul style="list-style-type: none"> • Exercise caution when loosening or connecting the gerotor pump unit's hydraulic connections. • Promptly apply suitable binding agents and remove the leaked/spilled lubricant. • Follow operational instructions for handling lubricants and contaminated parts

Residual risk	Remedy
Life cycle: Malfunctions, fault-finding Life cycle: Maintenance, repair	
Electric shock due to defective power lead/mains plug	<ul style="list-style-type: none"> Inspect the power lead/mains plug for damage before starting gerotor pump units of SKF series 143.
Electric shock from open electric motor or active energized components	Disconnect the mains plug (cut power) before performing any work on electrical components. Exercise caution when winding and unwinding the power lead and when operating the gerotor pump unit.
Strong heating of the electric motor due to a motor jam or continuous duty	Turn off the pump motor and let it cool down. Remedy the cause
People slipping due to floor contamination with spilled/leaked lubricant	<ul style="list-style-type: none"> Exercise caution when loosening or connecting the gerotor pump unit's hydraulic connections. Promptly apply suitable binding agents and remove the leaked/spilled lubricant. Follow operational instructions for handling lubricants and contaminated parts
Life cycle: Decommissioning, disposal	
Environmental contamination by lubricants and wetted parts	<ul style="list-style-type: none"> Dispose of contaminated parts according to the applicable legal/company rules
People slipping due to floor contamination with spilled/leaked lubricant	<ul style="list-style-type: none"> Exercise caution when loosening the gerotor pump unit's hydraulic connections. Promptly apply suitable binding agents and remove the leaked/spilled lubricant. Follow operational instructions for handling lubricants and contaminated parts
Environmental contamination by lubricants and wetted parts	<ul style="list-style-type: none"> Dispose of contaminated parts according to the applicable legal/company rules

2. Lubricants

2.1 General information

NOTE

All products from SKF Lubrication Systems may be used only for their intended purpose and in accordance with the information in the product's operating instructions.

Intended use is the use of the products for the purpose of providing centralized lubrication/lubrication of bearings and friction points using lubricants within the physical usage limits which can be found in the documentation for the devices, e.g., operating instructions and the product descriptions, e.g., technical drawings and catalogs. Particular attention is called to the fact that hazardous materials of any kind, especially those materials classified as hazardous by EC Directive 67/548/EEC, Article 2, Para. 2, may only be filled into SKF centralized lubrication systems and components and delivered and/or distributed with such systems and components after consulting

with and obtaining written approval from SKF Lubrication Systems.

No products manufactured by SKF Lubrication Systems are approved for use in conjunction with gases, liquefied gases, pressurized gases in solution, vapors, or such fluids whose vapor pressure exceeds normal atmospheric pressure (1013 mbar) by more than 0.5 bar at their maximum permissible temperature.

Other media which are neither lubricant nor hazardous substance may only be fed after consultation with and written approval from SKF Lubrication Systems.

SKF Lubrication Systems considers lubricants to be an element of system design that must always be factored into the selection of components and the design of centralized lubrication systems. The lubricating properties of the lubricants are critically important in making these selections.

2.2 Selection of lubricants

NOTE

Observe the instructions from the machine manufacturer regarding the lubricants that are to be used. The amount of lubricant required at a lubrication point is specified by the bearing or machine manufacturer. It must be ensured that the required quantity of lubricant is provided to the lubrication point. The lubrication point may otherwise not receive adequate lubrication, which can lead to damage and failure of the bearing.

Selection of a lubricant suitable for the lubrication task is made by the machine/system manufacturer and/or the operator of the machine/system in cooperation with the lubricant supplier.

When selecting a lubricant, the type of bearings/friction points, the expected load during operation, and the anticipated ambient conditions must be taken into account. All economic and environmental aspects must also be considered.

2.3 Approved lubricants

NOTE

If necessary, SKF Lubrication Systems can help customers to select suitable components for feeding the selected lubricant and to plan and design their centralized lubrication system.

Please contact SKF Lubrication Systems if you have further questions regarding lubricants. It is possible for lubricants to be tested in the company's laboratory for their suitability for pumping in centralized lubrication systems (e.g., "bleeding"). You can request an overview of the lubricant tests offered by SKF Lubrication Systems from the company's Service department.

NOTE

Only lubricants approved for the product may be used. Unsuitable lubricants can lead to failure of the product and to property damage.

NOTE

Different lubricants must not be mixed together. Doing so can cause damage and require costly and complicated cleaning of the product/lubrication system. It is recommended that an indication of the lubricant in use be attached to the lubricant reservoir in order to prevent accidental mixing of lubricants.

The product described here can be operated using lubricants that meet the specifications in the technical data. Depending on the product design, these lubricants may be oils, fluid greases, or greases.

Mineral, synthetic, and/or rapidly biodegradable oils and base oils can be used. Consistency agents and additives may be added depending on the operating conditions.

Note that in rare cases, there may be lubricants whose properties are within the permissible limits values but whose other characteristics render them unsuitable for use in centralized lubrication systems. For example, synthetic lubricants may be incompatible with elastomers.

2.4 Lubricants and the environment



NOTE

Lubricants can contaminate soil and waterways. Lubricants must be properly used and disposed of. Observe the local regulations and laws regarding the disposal of lubricants.

It is important to note that lubricants are environmentally hazardous, flammable substances which require special precautionary measures during transport, storage, and processing. Consult the safety data sheet from the lubricant manufacturer for information regarding transport, storage, processing, and environmental hazards of the lubricant that will be used.

The safety data sheet for a lubricant can be requested from the lubricant manufacturer.

2.5 Lubricant hazards

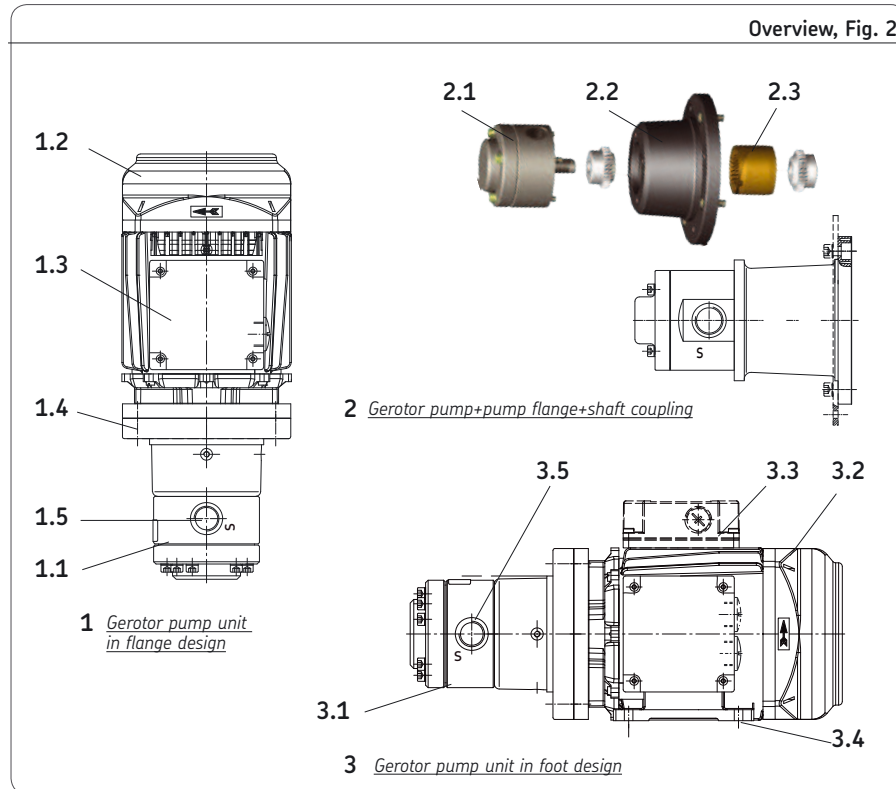
		WARNING
	<p>Lubricants Gerotor pumps must always be free of leaks. Leaking lubricant is hazardous due to the risk of slipping and injury. Beware of any lubricant leaking out during assembly, operation, maintenance, or repair of centralized lubrication systems. Leaks must be sealed off without delay.</p>	

Lubricant leaking from centralized lubrication systems is a serious hazard. Leaking lubricant can create risks that may result in physical harm to persons or damage to other material assets.

NOTE

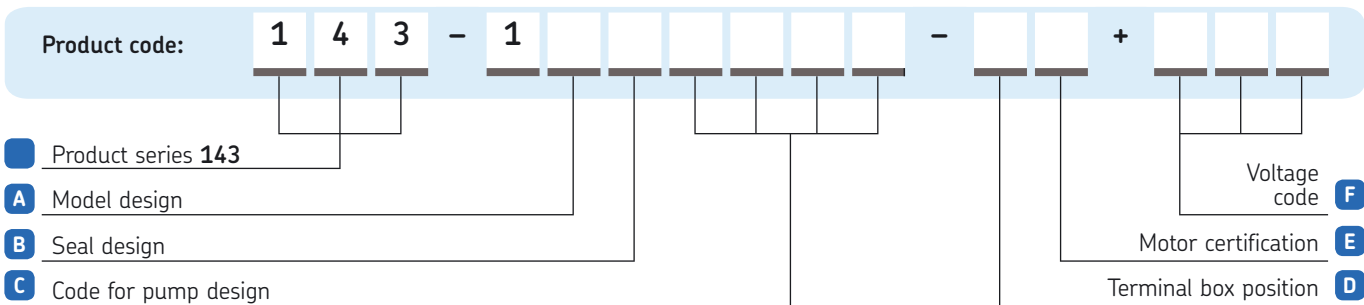
Follow the safety instructions on the lubricant's safety data sheet.

3. Overview



Item	Description
1	Gerotor pump unit in flange design
1.1	Gerotor pump
1.2	Electric motor
1.3	Electric motor terminal box
1.4	Pump flange
1.5	Suction port (S), opposite pressure port (P)
2	Gerotor pump
2.1	Gerotor pump
2.2	Pump flange
2.3	Shaft coupling
3	Gerotor pump unit in foot design
3.1	Gerotor pump
3.2	Electric motor
3.3	Electric motor terminal box
3.4	Pump foot
3.5	Suction port (S), opposite pressure port (P)

3.1 Product codes



Model design

- | | |
|------------|--|
| A 1 | Motor in foot design (IMB34) |
| 2 | Motor in flange design (IMB14) |
| 3 | Gerotor pump+pump flange+ shaft coupling (without motor) |
| 4 | Only gerotor pump (without motor) |

Seal design

- | | |
|------------|-----------|
| B N | NBR |
| F | FKM (FPM) |

Code for pump design

- | | |
|----------|-------------------------|
| C | - see following page 22 |
|----------|-------------------------|

Terminal box position as seen from shaft extension of drive side (not applicable on design without motor)

- | | |
|------------|---|
| D R | Right (standard, not on motor 1.1; 1.5, and 4 kW) |
| O | Top (standard on motor 1.1, 1.5, and 4 kW), right not supported |
| X | On motor in flange design (IMB14), terminal box position on suction port side of pump |

(other designs available on request)

Motor certification

Not applicable on design without motor

- | | |
|------------|---------------------|
| E A | CE (Europe) |
| B | UL/CSA (USA/Canada) |

(other designs available on request)

Voltage code

Not applicable on designs without motor

- | | |
|----------|-----|
| F | XXX |
|----------|-----|

- see page 23 and operating instructions, Chapter 11, page 74

Code for pump design

C	Nominal delivery rate ¹⁾	Back pressure, max.	Motor drive power	Permiss. operating viscosity range	Frame size	Number of poles
	[l/min]	[bar]	[kW]	[mm ² /s]		
B03C	0.85	30	0.18	20–1000	63	4
D03E	1.7	30	0.37	20–1000	71	2
F02D	2.5	20	0.25	20–1000	71	4
F05F	2.5	50	0.55	20–1000	80	4
H02F	5.25	20	0.55	20–1000	80	4
H05J	5.25	50	1.1	20–1000	90	4
K02H	9	20	0.75	20–1000	80	4
K05J	9	50	1.1	20–1000	90	4
M02H	12.5	20	0.75	20–1000	80	4
M05K	12.5	50	1.5	20–1000	90	4
P02K	19	20	1.5	20–1000	90	4
R02M	30	20	3	20–1000	100	2
R03M	30	30	3	20–750	100	2
R03N	30	30	4	20–1000	112	2
T02M	40	20	3	20–750	100	2
T03N	40	30	4	20–1000	112	2
V02N	50	20	4	20–1000	112	2
V03N	50	30	4	20–750	112	2
V03P	50	30	5.5	20–1000	132	2

¹⁾ Nominal delivery rate at motor speed 1400/2800 rpm acc. to number of motor poles.

Voltage code			
Voltage code texts - see operating instructions, Chapter 11.1.2., page 72 for further data			
+1GP	220/380 V, 50 Hz; 255/440 V, 60 Hz (±10%)	+1GL	415/720 V, 50 Hz; 480 V, 60 Hz (±10%)
+1GD	230/400 V, 50 Hz; 265/460 V, 60 Hz (±10%)	+1KG	400 V, 50 Hz; 460 V, 60 Hz (±10%)
+1GQ	240/415 V, 50 Hz; 280/480 V, 60 Hz (±10%)	+1GF	220/345 V, 50 Hz (±10%)
+1HQ	290/500 V, 50 Hz; 330/575 V, 60 Hz (±10%)	+1GG	200/345 V, 60 Hz (±10%)
+1GH	380/660 V, 50 Hz; 440 V 60 Hz (±10%)	+MDP	220/380 V, 60 Hz (±10%)
+1GK	400/690 V, 50 Hz; 460 V, 60 Hz (±10%)	+1GR	230/400 V, 60 Hz (±10%)
		+MMP	305/525 V, 50 Hz (±10%)
		+1FX	220–240 V / 380–420 V, 50 Hz (±5%) 254–280 V / 440–480 V, 60 Hz (±5%)
		+1HM	220–240 V / 380–420 V, 50 Hz (±5%) 254–280 V / 440–480 V, 60 Hz (±5%)

3.2 Order example

143-11ND03E-RA+1FX

- o Gerotor pump unit of product series 143
- o Motor in foot design
- o Sealing NBR
- o Nominal delivery rate 1.7 l/min
- o Back pressure 30 bar
- o Motor index 0.37 kW
- o Terminal box on right
- o Motor certification CE
- o 220–240 V / 380–420 V, 50 Hz
254–280 V / 440–480 V, 60 Hz

If ordering gerotor pump+ pump flange+ shaft coupling (model design 3), the following is not applicable: **D - F**
- Example: 143-13ND03E

If ordering the gerotor pump (model design 4), **D - F** and item 4 of the code for the pump design are not applicable.
- Example: 143-14ND03

4. Assembly

4.1 General information

Only qualified technical personnel may install, operate, maintain, and repair the gerotor pumps of pump series 143 described in the assembly instructions. Qualified technical personnel are persons who have been trained, assigned and instructed by the operator of the final product into which the gerotor pumps described here are incorporated.

Such persons are familiar with the relevant standards, rules, accident prevention regulations, and operating conditions as a result of their training, experience, and instruction. They are qualified to carry out the required activities and in doing so recognize and avoid potential hazards.



The definition of qualified personnel and the prohibition against employing non-qualified personnel are laid down in DIN VDE 0105 and IEC 364.

Before assembling/setting up the product, the packaging material and any shipping braces (e.g., plugs) must be removed. The packaging material must be preserved until any discrepancies are resolved.

- Check the gerotor pump/pump unit for any shipping damages and for completeness.

NOTE

The gerotor pump must be installed in a stress-free position and it must be ensured it is not subject to any radial or axial forces.

	 CAUTION
	<p>Slipping hazard</p> <p>Centralized lubrication systems must always be free of leaks. Leaking lubricant is hazardous due to the risk of slipping and injury. Beware of any lubricant leaking out during assembly, operation, maintenance, or repair of centralized lubrication systems. Leaks must be sealed off without delay.</p>

4.2 Setup and attachment

The product should be protected from humidity and vibration, and should be mounted so that it is easily accessible, allowing all further installation work to be done without difficulty.

Ensure that there is sufficient air circulation to prevent the product from overheating. For the maximum permissible ambient temperature, see the "Technical data" Chapter. The mounting position of the product is as shown in the assembly drawing.

SKF gerotor pump units of product series 143 can be installed horizontally as well as vertically, depending on the design. The gerotor pump units are available in a foot or flange design. Depending on the model, they can be mounted separately from the lubricant reservoir or flanged to a lubricant reservoir. When set up separately, the suction port

of the pump may be connected to a lubricant reservoir that is situated higher (max. 2000 mm).

To flange the gerotor pump unit to a lubricant reservoir horizontally below the oil level, use a sealed pump in a special design. Consult SKF's Service department.

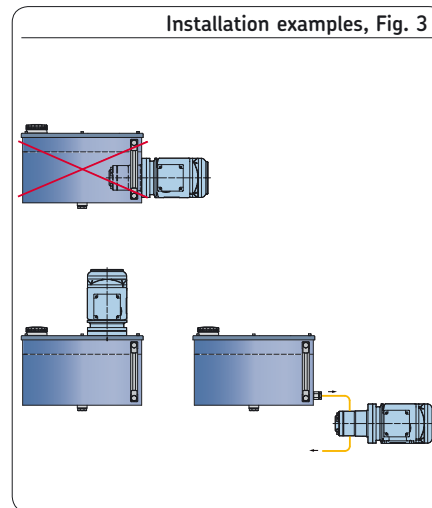
A customer-specific electric motor can be connected to the "pump with flange and coupling" design.

The flange allows for the installation of all IEC standard motors with flange according to DIN EN 5034, design FT (with threaded holes). See the drawings for the geometric dimensions of the flange.

When installing gerotor pumps without a motor, for example as an integrated/attached pump on a machine housing, ensure that no radial or axial load is applied to its drive shaft.

The pumps can be installed in any position.

Installation examples, Fig. 3



4.2.1 Installation instructions

If the pumps are used in systems lacking open delivery lines, pressure-regulating valves must be provided to limit the maximum system pressure. The selected cross-section of the intake tube must be equal to or greater than the cross-section of the pump's suction port. SKF recommends the use of filters for trouble-free operation of the pump/pump unit. Effective filtration prevents malfunctions while also increasing the service life of the pump.

A pumped medium of at least the purity class 20/17/14 according to ISO 4406(c) is recommended. This corresponds to the U.S. standard NAS code (1638) class 8 and SAW AS 4059 class 8.

A filter rating of approx. 5 to 10 µm meets this requirement.



The filter rating used is always based on the most sensitive component in the entire system. This is not necessarily the pump.

The following applies in general:

- o Prior to beginning installation, ensure that the scope of delivery for the gerotor pump is complete and inspect for any damage or corrosion.
- o The maximum permissible operating temperature (lubricant temperature) must not be exceeded. Install a heat exchanger if necessary.
- o Carefully clean screw unions and tubing prior to beginning installation.
- o Lubricant exiting from the return line must not be immediately resuctioned under any circumstances.
- o The intake and return lines in the lubricant reservoir must be below the minimum lubricant level in all operating states. This prevents air and foam from being suctioned.
- o It must be ensured that screw unions, connections, and connection elements are leak-free.
- o SKF recommends the installation of return line or pressure filters. However, suction filters should only be used in conjunction with electric negative pressure switches or contamination indicators.
- o Different lubricants must not be mixed together.
- o No radial or axial forces on the pump driveshaft are allowed.
- o The motor and pump shafts must be aligned exactly (see instructions from coupling manufacturer).
- o Use only couplings suitable for compensating for shaft displacements.
- o Connect the gerotor pump as indicated by the rotation arrow (gerotor pump = > see Fig. 11; gerotor pump unit => see Fig. 1).
- o The gerotor pump may only be commissioned and operated with an oil supply; the gerotor pump must not run dry.

- o Ensure cleanliness; components must be installed without contamination.
- o Do not use any cleaning wipes containing lint.
- o Existing supply lines must not be damaged by assembly work.
- o Other units must not be damaged by assembly work.
- o The product must not be installed within range of moving parts.
- o The product must be installed at an adequate distance from sources of heat.
- o Maintain safety clearances and comply with local regulations for assembly and accident prevention.

4.2.2 Information on assembly holes

	 WARNING
	<p>Personal injury / property damage</p> <p>Drill assembly holes in such a way that no lines, units, or moving parts are damaged or their function impaired. Maintain safety clearances and comply with regulations for assembly and accident prevention.</p>

NOTE

Observe the technical data (Chapter 9).

4.2.3 Minimum mounting dimensions

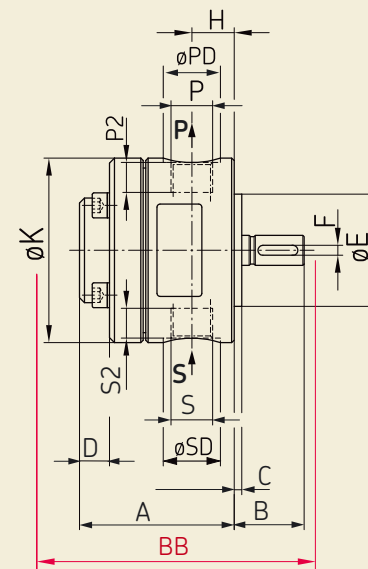
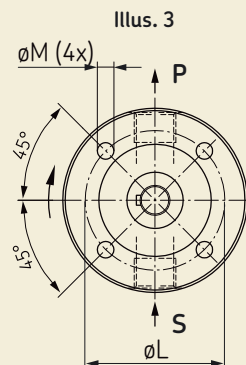
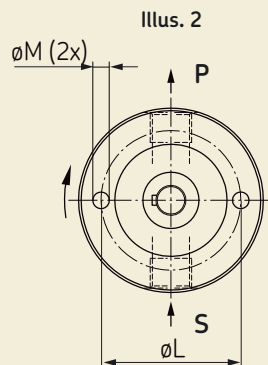
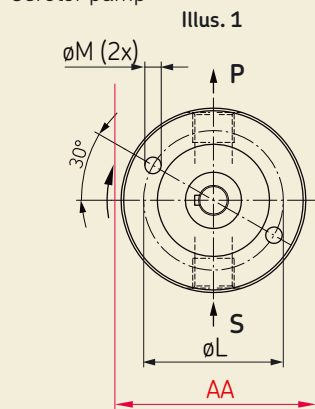
To ensure enough space for maintenance work and for any disassembly of the product, ensure that the minimum mounting dimensions (Figs. 4 and 7) are maintained.

4.3 Gerotor pump

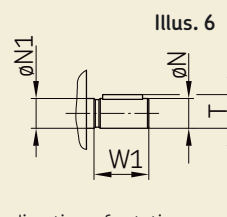
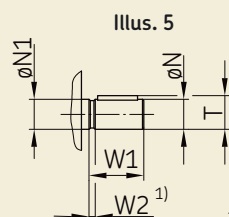
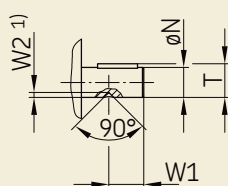
4.3.1 Gerotor pump design, assembly holes and minimum mounting dimensions

Assembly drawing for gerotor pump, Fig. 4

Gerotor pump



Shaft extension Illus. 4



↺ = direction of rotation

1) For securing the coupling boss in axial direction

Minimum mounting dimensions

AA = Diameter: $\varnothing K + 20$ mm

BB = Depth: $A + B + 20$ mm

For technical data, see page 30

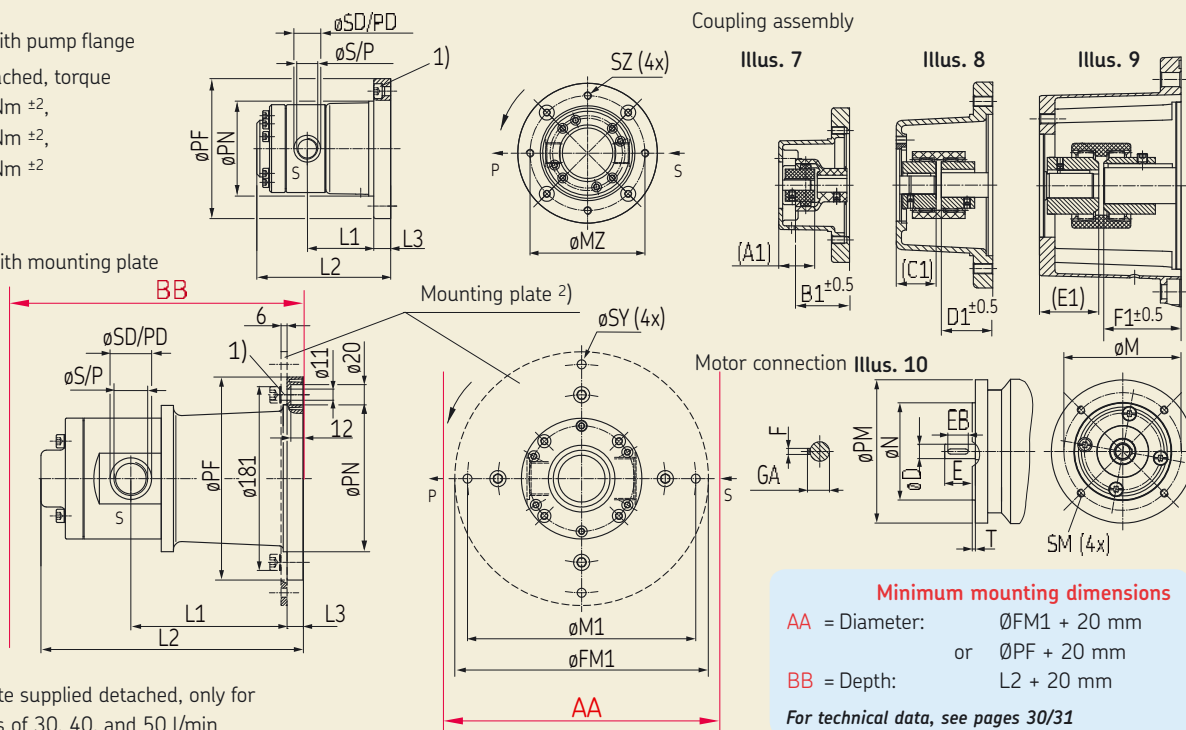
4.3.2 Gerotor pump with pump flange and shaft coupling design, assembly holes and minimum mounting dimensions

Assembly drawing for gerotor pump with pump flange and shaft coupling, Fig. 5

Gerotor pump with pump flange

- 1) Supplied detached, torque
 for M6 = 10 Nm ± 2 ,
 for M8 = 18 Nm ± 2 ,
 for M10 = 30 Nm ± 2

Gerotor pump with mounting plate



- 2) Mounting plate supplied detached, only for
 delivery volumes of 30, 40, and 50 l/min

4.3.3 Technical data

Gerotor pump (see Figure 4)

Nominal delivery rate [l/min]	Back pressure, max. [bar]	Permis. oper. viscosity range [mm ² /s]	Char. curve No.	Nominal delivery volume [cm ³ /rev.]	Speed [rpm]	Required drive power [kW]	Intake port S ¹⁾	Pressure port P ¹⁾	Design N(NBR) F(FKM(FPM) Order No. ⁴⁾	Dimensions [mm]																	
										øPD øSD	A	B	C	D	øE	F	H	øK	øL	øM	øN	P2		W1	W2	Illus.	
0.85	30	20–1000	1	0.61	1400	0.18	G1/4	G1/4	19	143-14...B03	49	25	3	9	36 _{h7}	2	12.5	60	48	6.6	8 _{h5}	–	12	8.8	14	2	1/4
1.7	30	20–1000	2	0.61	2800	0.37	G1/4	G1/4	19	143-14...D03	49	25	3	9	36 _{h7}	2	12.5	60	48	6.6	8 _{h5}	–	12	8.8	14	2	1/4
2.5	20	20–1000	3	1.79	1400	0.25	G3/8	G3/8	23	143-14...F02	62	28	3	12	45 _{h7}	4	17	74	56	6.6	12 _{g5}	12 _{g5}	12	13.5	18.5	2.5	2/5
2.5	50	20–1000	3	1.79	1400	0.55	G3/8	G3/8	23	143-14...F05	62	28	3	12	45 _{h7}	4	17	74	56	6.6	12 _{g5}	12 _{g5}	12	13.5	18.5	2.5	2/5
5.25	20	20–1000	4	3.75	1400	0.55	G1/2	G1/2	27	143-14...H02	69	30	3	12.7	56 _{h7}	5	18.5	88	70	6.6	14 _{g5}	14 _{g5}	14.5	16	20.5	2.5	3/5
5.25	50	20–1000	4	3.75	1400	1.1	G1/2	G1/2	27	143-14...H05	69	30	3	12.7	56 _{h7}	5	18.5	88	70	6.6	14 _{g5}	14 _{g5}	14.5	16	20.5	2.5	3/5
9	20	20–1000	5	6.44	1400	0.75	G1/2	G1/2	27	143-14...K02	77	30	3	12.7	56 _{h7}	5	20	88	70	6.6	14 _{g5}	14 _{g5}	14.5	16	20.5	2.5	3/5
9	50	20–1000	5	6.44	1400	1.1	G1/2	G1/2	27	143-14...K05	77	30	3	12.7	56 _{h7}	5	20	88	70	6.6	14 _{g5}	14 _{g5}	14.5	16	20.5	2.5	3/5
12.5	20	20–1000	6	8.93	1400	0.75	G3/4	G3/4	33	143-14...M02	89	30	3	12.7	56 _{h7}	5	22	88	70	6.6	14 _{g5}	14 _{g5}	16	16	20.5	2.5	3/5
12.5	50	20–1000	6	8.93	1400	1.5	G3/4	G3/4	33	143-14...M05	89	30	3	12.7	56 _{h7}	5	22	88	70	6.6	14 _{g5}	14 _{g5}	16	16	20.5	2.5	3/5
19	20	20–1000	7	13.6	1400	1.5	G1	G1	40	143-14...P02	100	30	3	21.5	56 _{h7}	5	25	98	80	8.5	16 _{g5}	16 _{g5}	18	18	21.5	2.5	3/5
30	20	20–1000	8	10.74	2800	3	G1	G1	41	143-14...R02	108	42	4	23.5	80 _{h7}	6	30	119	104	8.5	19 _{g6}	22	18.5	21.5	36.5	–	3/6
30	30	20–750	8	10.74	2800	3	G1	G1	41	143-14...R03	108	42	4	23.5	80 _{h7}	6	30	119	104	8.5	19 _{g6}	22	18.5	21.5	36.5	–	3/6
30	30	20–1000	8	10.74	2800	4	G1	G1	41	143-14...R03	108	42	4	23.5	80 _{h7}	6	30	119	104	8.5	19 _{g6}	22	18.5	21.5	36.5	–	3/6
40	20	20–750	9	14.36	2800	3	G1	G1	41	143-14...T02	108	42	4	23.5	80 _{h7}	6	30	119	104	8.5	19 _{g6}	22	18.5	21.5	36.5	–	3/6
40	30	20–1000	9	14.36	2800	4	G1	G1	41	143-14...T03	108	42	4	23.5	80 _{h7}	6	30	119	104	8.5	19 _{g6}	22	18.5	21.5	36.5	–	3/6
50	20	20–1000	10	17.87	2800	4	G11/4	G1	41	143-14...V02	111	42	4	23.5	80 _{h7}	6	30	119	104	8.5	19 _{g6}	22	18.5 20.5	21.5	36.5	–	3/6
50	30	20–750	10	17.87	2800	4	G11/4	G1	41 51	143-14...V03	111	42	4	23.5	80 _{h7}	6	30	119	104	8.5	19 _{g6}	22	18.5 20.5	21.5	36.5	–	3/6
50	30	20–1000	10	17.87	2800	5.5	G11/4	G1	41 51	143-14...V03	111	42	4	23.5	80 _{h7}	6	30	119	104	8.5	19 _{g6}	22	18.5 20.5	21.5	36.5	–	3/6

1) See P2 / S2 for thread depth for intake port S or pressure port P.

4. Assembly

Gerotor pump+pump flange (see Figure 5)												Coupling assembly (see Fig. 5)						Motor connection (see Fig. 5)								
Design N (NBR) / F (FKM (FPM)) Order No. ²⁾	Dimensions [mm]											Dimensions [mm]						Dimensions [mm]								
	øPF		L1	L2	L3	øFM1	øM1	øSV	øMZ	SZ	Illus. 7		Illus. 8		Illus. 9		Size	øN	T	øM	SM	øD	E	EB	GA	F
	øPM	øPN									(A1)	B1	(C1)	D1	(E1)	F1										
143-13...B03C	120	72	53.5	104	14	-	-	-	85	M6	28	42	-	-	-	-	63	80	3	100	M ₈ _{12 deep}	11 _{js}	23	18	12.5	4
143-13...D03E	140	95	55.5	109	12	-	-	-	115	M8	28	42	-	-	-	-	71	95	3	115	M ₈ _{12 deep}	14 _{js}	30	25	16	5
143-13...F02D	140	95	65	127	17	-	-	-	115	M8	31	51	-	-	-	-	71	95	3	115	M ₈ _{12 deep}	14 _{js}	30	25	16	5
143-13...F05F	160	110	77	137	15	-	-	-	130	M8	-	-	31	40	-	-	80	110	3.5	130	M ₈ _{12 deep}	19 _{js}	40	32	21.5	6
143-13...H02F	160	110	78.5	144	15	-	-	-	130	M8	-	-	31	40	-	-	80	110	3.5	130	M ₈ _{12 deep}	19 _{js}	40	32	21.5	6
143-13...H05J	160	110	85.5	153	17	-	-	-	130	M8	-	-	31	49	-	-	90	110	3.5	130	M ₈ _{13 deep}	24 _{js}	50	40	27	8
143-13...K02H	160	110	80	152	15	-	-	-	130	M8	-	-	31	40	-	-	80	110	3.5	130	M ₈ _{12 deep}	19 _{js}	40	32	21.5	6
143-13...K05J	160	110	87	161	17	-	-	-	130	M8	-	-	31	49	-	-	90	110	3.5	130	M ₈ _{13 deep}	24 _{js}	50	40	27	8
143-13...M02H	160	110	82	164	15	-	-	-	130	M8	-	-	31	40	-	-	80	110	3.5	130	M ₈ _{12 deep}	19 _{js}	40	32	21.5	6
143-13...M05K	160	110	89	173	17	-	-	-	130	M8	-	-	31	49	-	-	90	110	3.5	130	M ₈ _{13 deep}	24 _{js}	50	40	27	8
143-13...P02K	160	110	92	184	17	-	-	-	130	M8	-	-	30	50	-	-	90	110	3.5	130	M ₈ _{13 deep}	24 _{js}	50	40	27	8
143-13...R02M	200	144.6	124	218	16	250	225	9	165	-	-	-	-	-	46	60	100	130	3.5	165	M10 _{12 deep}	28 _{js}	60	50	31	8
143-13...R03M	200	144.6	124	218	16	250	225	9	165	-	-	-	-	-	46	60	100	130	3.5	165	M10 _{12 deep}	28 _{js}	60	50	31	8
143-13...R03N	200	144.6	124	218	16	250	225	9	165	-	-	-	-	-	46	60	100	130	3.5	165	M10 _{12 deep}	28 _{js}	60	50	31	8
143-13...T02M	200	144.6	124	218	16	250	225	9	165	-	-	-	-	-	46	60	100	130	3.5	165	M10 _{12 deep}	28 _{js}	60	50	31	8
143-13...T03N	200	144.6	124	218	16	250	225	9	165	-	-	-	-	-	46	60	100	130	3.5	165	M10 _{12 deep}	28 _{js}	60	50	31	8
143-13...V02N	200	144.6	124	221	16	250	225	9	165	-	-	-	-	-	46	60	112	130	3.5	165	M10 _{12 deep}	28 _{js}	60	50	31	8
143-13...V03N	200	144.6	124	221	16	250	225	9	165	-	-	-	-	-	46	60	112	130	3.5	165	M10 _{12 deep}	28 _{js}	60	50	31	8
143-13...V03P	200	145	154	251	16	250	225	9	165	-	-	-	-	-	48	88	132	130	3.5	165	M10 _{12 deep}	38 _{ks}	80	70	41	10

2) Supplement the order No. with the code letter for the desired seal design. Seal design NBR (N) or FKM (FPM) (F).

4.3.4 Installation of the gerotor pump

☞ see Chapter 4.3.1, Figure 4 as well as Chapter 4.3.3, Dimensions and Technical Data, pages 30 and 31

The mounting surface for the gerotor pump must be free of dust particles, machining chips, rust, and paint residue. If necessary, clean this surface prior to flanging.

NOTE

No radial or axial active forces may occur at the shaft extension of the gerotor pump. The gerotor pump may only be commissioned and operated with an oil supply; the gerotor pump must not run dry.

- Set up the flanging surface and mounting threads (M6, M8, or M10) according to the gerotor pump (Fig. 4, illus. 1 to 3).

- Set up the adapter (provided by customer) according to the shaft extension of the gerotor pump (Fig. 4, illus. 4 to 6).

- Clean the flanging surface.

Fastening material provided by customer in corrosion-protected design:

- o Cheese-head screws with hexagon socket
Illus. 1 to 2 = 2x, illus. 3 = 4x, acc. to DIN EN ISO 4762, M6 or M8, strength class 8.8 (10.9)
- o Washers, illus. 1 to 2 = 2x
illus. 3 = 4x, acc. to ISO 7090, ID 6 or 8 mm, strength class 200-HV

☞ During subsequent assembly, it must be possible to fit the shaft extension of the pump into the coupling part (provided by customer) without difficulty.

- If necessary, rotate the shaft extension of the gerotor pump again according to the position of the drive slot.

- Carefully place and align the gerotor pump on the flanging surface.
- Insert cheese-head screws into the gerotor pump, apply the pump to the installation surface and tighten gently.
- Align the gerotor pump, tighten the cheese-head screws crosswise with the following tightening torque

Torque	M6	10 ±2 Nm
	M8	18 ±2 Nm
	M10	30 ±2 Nm

- Remove protective plugs (inlet/outlet).
- ☞ Consult the table of torques from the fitting manufacturer (suction and delivery screw union).
- Apply the suction and delivery screw union to the gerotor pump and tighten with the torque specified by the fitting manufacturer.
- Check to make sure that the gerotor pump runs smoothly by rotating the drive shaft several times (if possible, turn the drive train by hand).

4.3.5 Installation of the gerotor pump with pump flange and shaft coupling

☞ see Chapter 4.3.2, Figure 5 as well as Chapter 4.3.3, Dimensions and Technical Data, pages 30 and 31

The mounting surface for the gerotor pump with pump flange must be free of dust particles, machining chips, rust, and paint residue.

NOTE

No radial or axial active forces may occur at the shaft extension of the gerotor pump. The gerotor pump may only be commissioned and operated with an oil supply; the gerotor pump must not run dry.

- Set up the flanging surface and mounting threads (M6, M8, or M10) according to the gerotor pump (Fig. 5, illus. 1 to 3).
- Set up the adapter (provided by customer) according to the coupling assembly of the gerotor pump (Fig. 5, illus. 7 to 9) and the motor connection (illustration 10) as well as Chapter 11.1.3, Figure 11.

- Clean the flanging surface.

Fastening material in corrosion-protected design:

- o Cheese-head screws with hexagon socket 4x acc. to DIN EN ISO 4762, M6, M8, or M10, strength class 8.8
- o Washers 4x acc. to ISO 7090, ID 6, 8, or 10 mm, strength class 200-HV

☞ During subsequent assembly, it must be possible to fit the shaft extension of the pump into the coupling part without difficulty.

- If necessary, rotate the shaft extension of the gerotor pump again according to the position of the drive slot.
- Carefully place and align the gerotor pump with pump flange on the flanging surface.
- Insert cheese-head screws into the pump flange, apply the flange to the installation surface and tighten gently.

- Align the pump flange and tighten the cheese-head screws crosswise with the following tightening torque

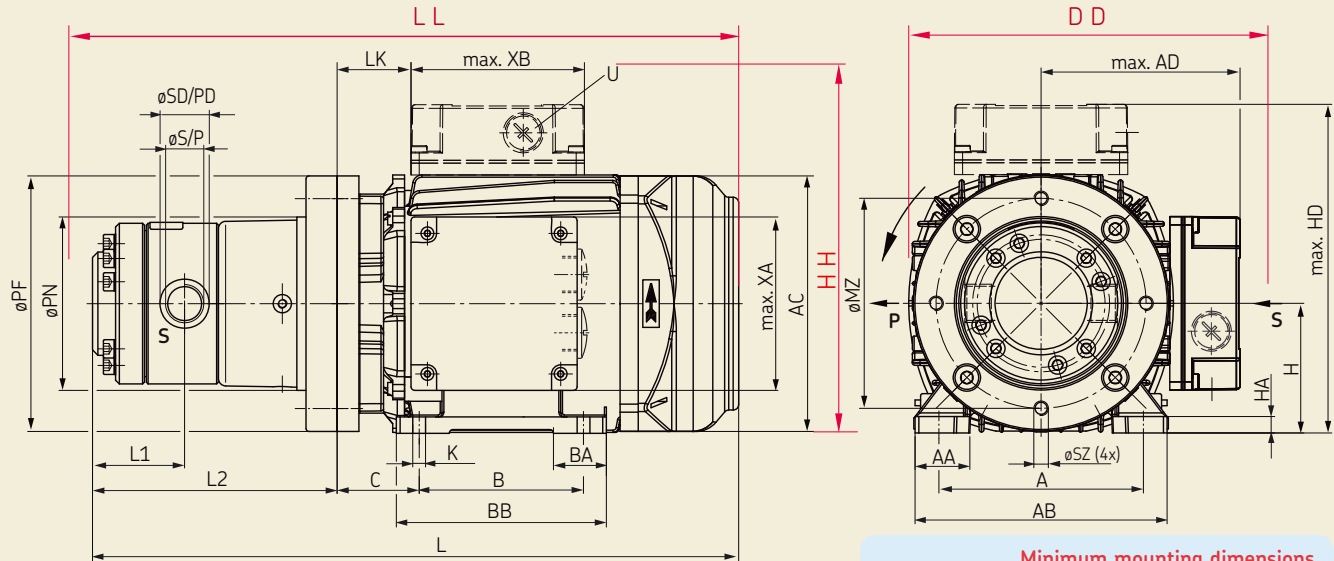
Torque	M6	10 \pm2 Nm
	M8	18 \pm2 Nm
	M10	30 \pm2 Nm

- Remove protective plugs (inlet/outlet).
- ☞ Consult the table of torques from the fitting manufacturer (suction and delivery screw union).
- Apply the suction and delivery screw union to the gerotor pump and tighten with the torque specified by the fitting manufacturer.
- Check to make sure that the gerotor pump runs smoothly by rotating the drive shaft several times (if possible, turn the drive train by hand).

4.4 Gerotor pump unit

4.4.1 Foot design, type IM B34, assembly holes and minimum mounting dimensions

Assembly drawing for gerotor pump, Fig. 6



Minimum mounting dimensions

DD = Width: AB (or AB/2 + AD) + 20 mm

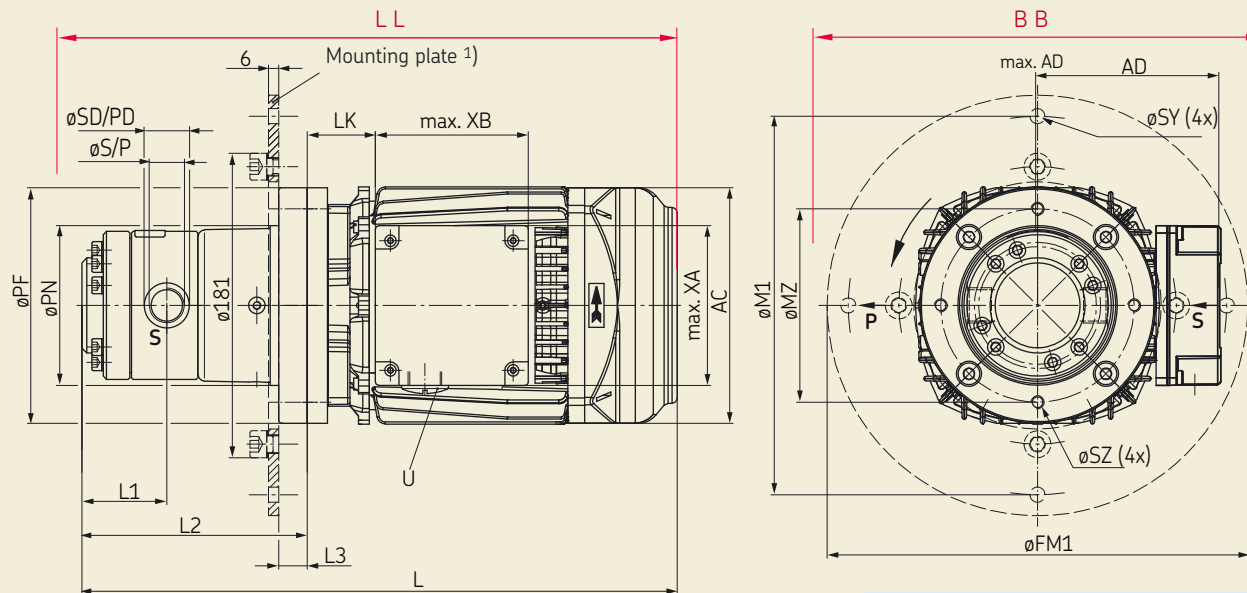
HH = Height: AC (or max. HD) + 20 mm

LL = Length: L + 20 mm

For technical data, see pages 36/37

4.4.2 Flange design, type IM B14, assembly holes and minimum mounting dimensions

Assembly drawing for gerotor pump, Fig. 7



1) Mounting plate only for delivery rates 30, 40, and 50 l/min.

Minimum mounting dimensions

BB = Width: $\text{ØFM1} + 20$ mm

LL = Length: $L + 20$ mm

For technical data, see pages 36/37

4.4.3 Technical data

Nominal delivery rate [l/min]	Back pressure, max. [bar]	Permis. oper. viscosity range [mm ² /s]	Char. curve No.	Foot design N (NBR) F (FKM (FPM)) Order No. ^{1) 2)}	Flange design N (NBR) F (FKM (FPM)) Order No. ^{1) 2)}	Nominal delivery volume [cm ³ /rev.]	Intake port S	Pressure port P	Dimensions [mm] (Figures 6/7)					
									øPD øSD	øPN	øPF	øFM1	øMZ	øM1
0.85	30	20-1000	1	143-11...B03C-R...	143-12...B03C-X...	0.61	G1/4 _{12 deep}	G1/4 _{12 deep}	19	72	120	-	100	-
1.7	30	20-1000	2	143-11...D03E-R...	143-12...D03E-X...	0.61	G1/4 _{12 deep}	G1/4 _{12 deep}	19	95	140	-	115	-
2.5	20	20-1000	3	143-11...F02D-R...	143-12...F02D-X...	1.79	G3/8 _{12 deep}	G3/8 _{12 deep}	23	95	140	-	115	-
2.5	50	20-1000	3	143-11...F05F-R...	143-12...F05F-X...	1.79	G3/8 _{12 deep}	G3/8 _{12 deep}	23	110	160	-	130	-
5.25	20	20-1000	4	143-11...H02F-R...	143-12...H02F-X...	3.75	G1/2 _{14.5 deep}	G1/2 _{14.5 deep}	27	110	160	-	130	-
5.25	50	20-1000	4	143-11...H05J-O...	143-12...H05J-X...	3.75	G1/2 _{14.5 deep}	G1/2 _{14.5 deep}	27	110	160	-	130	-
9	20	20-1000	5	143-11...K02H-R...	143-12...K02H-X...	6.44	G1/2 _{14.5 deep}	G1/2 _{14.5 deep}	27	110	160	-	130	-
9	50	20-1000	5	143-11...K05J-O...	143-12...K05J-X...	6.44	G1/2 _{14.5 deep}	G1/2 _{14.5 deep}	27	110	160	-	130	-
12.5	20	20-1000	6	143-11...M02H-R...	143-12...M02H-X...	8.93	G3/4 _{16 deep}	G3/4 _{16 deep}	33	110	160	-	130	-
12.5	50	20-1000	6	143-11...M05K-O...	143-12...M05K-X...	8.93	G3/4 _{16 deep}	G3/4 _{16 deep}	33	110	160	-	130	-
19	20	20-1000	7	143-11...P02K-O...	143-12...P02K-X...	13.6	G1 _{18 deep}	G1 _{18 deep}	40	110	160	-	130	-
30	20	20-1000	8	143-11...R02M-R...	143-12...R02M-X...	10.74	G1 _{18.5 deep}	G1 _{18.5 deep}	41	144.6	200	250	165	225
30	30	20-750	8	143-11...R03M-R...	143-12...R03M-X...	10.74	G1 _{18.5 deep}	G1 _{18.5 deep}	41	144.6	200	250	165	225
30	30	20-1000	8	143-11...R03N-O...	143-12...R03N-X...	10.74	G1 _{18.5 deep}	G1 _{18.5 deep}	41	144.6	200	250	165	225
40	20	20-750	9	143-11...T02M-R...	143-12...T02M-X...	14.36	G1 _{18.5 deep}	G1 _{18.5 deep}	41	144.6	200	250	165	225
40	30	20-1000	9	143-11...T03N-O...	143-12...T03N-X...	14.36	G1 _{18.5 deep}	G1 _{18.5 deep}	41	144.6	200	250	165	225
50	20	20-1000	10	143-11...V02N-O...	143-12...V02N-X...	17.87	G1 1/4 _{20.5 deep}	G1 _{18.5 deep}	41	144.6	200	250	165	225
50	30	20-750	10	143-11...V03N-O...	143-12...V03N-X...	17.87	G1 1/4 _{20.5 deep}	G1 _{18.5 deep}	41	144.6	200	250	165	225
50	30	20-1000	10	143-11...V03P-R...	143-12...V03P-X...	17.87	G1 1/4 _{20.5 deep}	G1 _{18.5 deep}	41 51	145	200	250	165	225

1) Supplement the order No. with the code letter for the desired seal design. Seal design NBR (N) or FKM (FPM) (F).

2) Supplement the order No. with the code letter for the desired motor certification and the voltage code.

3) Only standard terminal box position on top is supported, right is not possible.

Dimensions [mm] (Figures 6/7)

SZ	øSY	L1	L2	L3	A	AA	AB	AC	AD _{max.}	B	BA	BB	C	H	HA	HD _{max.}	³⁾ K	U	X _{Amax.}	X _{Bmax.}	LK	L
M6	-	36.5	104	14	100	29.5	124.5	124	122.5	80	25	100	40	63	8	-	7	1x M20×1.5	100	116	19.5	289
M8	-	36.5	109	12	112	30	138	141	109.5	90	29	115	45	71	9	-	7	1x M20×1.5	95	95	40.5	329
M8	-	45	127	17	112	30	138	141	109.5	90	29	115	45	71	9	-	7	1x M20×1.5	95	95	40.5	347
M8	-	45	137	15	125	33.5	153	159	118.5	100	32	125	50	80	10	-	10	1x M20×1.5	95	95	43.5	392
M8	-	50.5	144	15	125	33.5	153	159	118.5	100	32	125	50	80	10	-	10	1x M20×1.5	95	95	43.5	399
M8	-	50.5	153	17	140	35	170	176	118.5	125	33.5	155	56	90	11	240	10	1x M20×1.5	100	116	31	432.5
M8	-	57	152	15	125	33.5	153	159	118.5	100	32	125	50	80	10	-	10	1x M20×1.5	95	95	43.5	407
M8	-	57	161	17	140	35	170	176	118.5	125	33.5	155	56	90	11	240	10	1x M20×1.5	100	116	31	440.5
M8	-	67	164	15	125	33.5	153	159	118.5	100	32	125	50	80	10	-	10	1x M20×1.5	95	95	43.5	419
M8	-	67	173	17	140	35	170	176	148.5	125	33.5	155	56	90	11	240	10	1x M20×1.5	100	116	31	452.5
M8	-	75	184	17	140	35	170	176	148.5	125	33.5	155	56	90	11	240	10	1x M20×1.5	100	116	31	463.5
ø11	9	78	218	16	160	38	195	196	155	140	43	176	63	100	13	-	12	2x M25×1.5	100	116	116	521
ø11	9	78	218	16	160	38	195	196	155	140	43	176	63	100	13	-	12	2x M25×1.5	100	116	116	521
ø11	9	78	218	16	190	44	225	220	168	140	45	176	70	112	15	280	12	2x M25×1.5	100	116	52	538
ø11	9	78	218	16	160	38	195	196	155	140	43	176	63	100	13	-	12	2x M25×1.5	100	116	116	521
ø11	9	78	218	16	190	44	225	220	168	140	45	176	70	112	15	280	12	2x M25×1.5	100	116	52	538
ø11	9	81	221	16	190	44	225	220	168	140	45	176	70	112	15	280	12	2x M25×1.5	100	116	52	541
ø11	9	81	221	16	190	44	225	220	168	140	45	176	70	112	15	280	12	2x M25×1.5	100	116	52	541
ø11	9	81	251	16	216	55	256	246	188	140	88	218	89	132	18	-	12	2x M32×1.5	117	142	183	656

For associated motor data, see the assembly instructions, Chapter 11.1, "Technical data."

4.4.4 Assembly of gerotor pump unit in foot design, type IM B34

☞ see Chapter 4.4.1, Figure 6 as well as Chapter 4.4.3, Dimensions and Technical Data, pages 36 and 37

NOTE

The gerotor pump may only be commissioned and operated with an oil supply; the gerotor pump must not run dry.

The mounting surface for the gerotor pump unit must be free of dust particles, machining chips, rust, and paint residue. If necessary, clean this surface prior to flanging.

Set up the flanging surface and mounting threads (M6, M8, or 10) according to the gerotor pump unit.

- Clean the flanging surface.
Fastening material provided by customer in corrosion-protected design:

- o Hexagon head screws, 4x acc. to DIN EN ISO 4017, M6, M8, or M10, strength class 8.8
- o Washers, 4x acc. to ISO 7090, ID 6, 8 or 10 mm, strength class 200-HV
- Carefully place and align the gerotor pump unit on the flanging surface.
- Insert hexagon head screws into the pump feet, apply the feet to the installation surface and tighten gently.
- Align the gerotor pump unit, tighten hexagon head screws with the following tightening torque

Torque

$$M6 = 10 \pm 2 \text{ Nm}$$

$$M8 = 18 \pm 2 \text{ Nm}$$

$$M10 = 30 \pm 2 \text{ Nm}$$

- Remove protective plugs (inlet/outlet).

☞ Consult the table of torques from the fitting manufacturer (suction and delivery screw union).

- Apply the suction and delivery screw union to the gerotor pump and tighten with the torque specified by the fitting manufacturer.
- Check to make sure that the gerotor pump runs smoothly.

Gerotor pump unit in foot design, Fig. 8



4.4.5 Assembly of gerotor pump unit in flange design, type IM B14

☞ see Chapter 4.4.2, Figure 7 as well as Chapter 4.4.3, Dimensions and Technical data, pages 36 and 37

NOTE

The gerotor pump may only be commissioned and operated with an oil supply; the gerotor pump must not run dry.

The mounting surface for the gerotor pump unit must be free of dust particles, machining chips, rust, and paint residue. If necessary, clean this surface prior to flanging.

- Set up the flanging surface and mounting threads (M6, M8, or 10) according to the gerotor pump unit.
- Clean the flanging surface.
Fastening material provided by customer in corrosion-protected design.

- o Cheese-head screws with hexagon socket 4x acc. to DIN EN ISO 4762, M6, M8, or M10, strength class 8.8
- o Washers, 4x acc. to ISO 7090, ID 6, 8, or 10 mm, strength class 200-HV
- Carefully place and align the gerotor pump unit on the flanging surface.
- Insert cheese-head screws into the flange/mounting plate, apply the plate to the installation surface and tighten gently.
- Align the gerotor pump unit, tighten cheese-head screws crosswise with the following tightening torque
Torque
 $M6 = 10 \pm 2 \text{ Nm}$
 $M8 = 18 \pm 2 \text{ Nm}$
 $M10 = 30 \pm 2 \text{ Nm}$
- Remove protective plugs (inlet/outlet).



☞ Consult the table of torques from the fitting manufacturer (suction and delivery screw union).

- Apply the suction and delivery screw union to the gerotor pump and tighten with the torque specified by the fitting manufacturer.
- Check to make sure that the gerotor pump runs smoothly.

Gerotor pump units in flange design, Fig. 9



4.4.6 Electrical motor connection



	 WARNING
	<p>Electric shock</p> <p>Electrical connections for the product may only be established by qualified and personnel authorized to do so by the operator. The local electrical operating conditions and local regulations (e.g., DIN, VDE) must be observed.</p>



Consult the motor's rating plate for the electrical characteristics of the motor, such as rated voltage, rated frequency, and rated current (see operating instructions, Chapter 11.1). Observe the guidelines in EN 60034-1 (VDE 0530-1) for operation at the limits of the ranges A (combination of $\pm 5\%$ voltage deviation and $\pm 2\%$ frequency deviation) and B (combination of $\pm 10\%$ voltage deviation and $+3/-5\%$ frequency deviation).

This applies especially with regard to heating and deviations in operating parameters from the ratings on the motor's rating plate. The limits must never be exceeded.

Be sure to connect the motor so as to guarantee a continuously safe electrical connection (no protruding wire ends); use the assigned cable end fittings (e.g. cable lugs, wire end ferrules). Select connecting cables conforming to DIN VDE 0100 taking into account the rated current and the conditions of the specific system (e.g. ambient temperature, type of routing etc. in accordance with DIN VDE 0298 or EC / EN 60204-1).

Details regarding electrical connection of the motor to the power supply, especially terminal and connector pin assignment, can be taken from the following motor data table or customer drawing (if available).

	 WARNING
	<p>Electric shock / damage to pump motor</p> <p>The available mains voltage (supply voltage) must match the specifications on the rating plate of the motor or of the electrical components. Check the fuse protection of the electrical circuit. Use only fuses with the prescribed amperage,</p>

	WARNING
	<p>Damage to pump motor/pump</p> <p> When establishing the electrical connection of the pump motor, be mindful of the correct direction of rotation. The direction of rotation must match the arrow on the motor.</p>

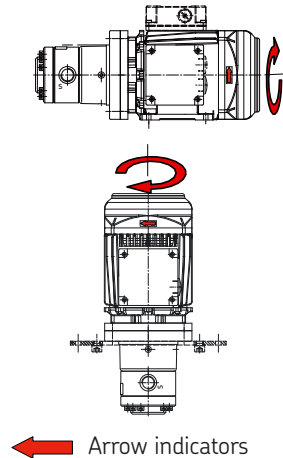
- Connect the pump unit motor according to the specifications on the motor rating plate and the motor characteristics.
- Connect a suitable motor circuit breaker (provided by customer).
- Check the direction of motor rotation based on the rotation arrow and the direction of motor fan impeller rotation.

NOTE

A detailed explanation of the motor rating plates and IEC cage motors is contained in Chapter 11.1 of the enclosed operating instructions.

3~ Mot 63		H 0001	
AF 63/4B-7 /0805		361079	
YΔ 400/230 V	0,69/1,04 A	0,18 kW	
cos φ 0,69	1360 /min	50 Hz	
Th.Cl. 155 (F)		IP55	IMB34 EN 60034
		4,4 kg	
YΔ 380-420/220-240 V	0,63/1,09 A	0,18 kW	
cos φ 0,69	1380 /min	50 Hz	
YΔ 440-480/254-280 V	0,60/1,04 A	0,215 kW	
cos φ 0,69	1675 /min	60 Hz	CE

Direction of motor rotation, Fig. 10



4.5 Lubrication line arrangement

When arranging the main lubricant lines and lubrication point lines, observe the following instructions in order to ensure that the entire centralized lubrication system functions smoothly.

The main lubricant line must be dimensioned in accordance with the maximum operating pressure occurring in the gerotor unit used and the displacement of that lubrication unit. If possible, the main lubricant line should rise upward from the gerotor pump unit and be ventable at the highest point on the lubrication line system. Lubricant distributors at the end of the main lubricant line must be installed such that their outlets point upwards. If the system configuration requires that the lubricant feeders be arranged below the main lubricant line, they should not be placed at the end of the main lubricant line.

The tubes, hoses, shutoff valves, directional control valves, fittings, etc. that will be used

must be designed for the maximum operating pressure of the gerotor unit, the permissible temperatures, and the lubricants that will be delivered. The lubrication line system also needs to be protected from excessive pressure by means of a pressure-limiting valve.



All components of the lubrication line system such as tubes, hoses, shutoff valves, directional control valves, fittings, etc. must be carefully cleaned before assembly. No seals in the lubrication line system should protrude inwards in a way that disrupts the flow of the lubricant and could allow contaminants to enter the lubrication line system.

Lubrication lines should always be arranged so that air pockets cannot form anywhere. Avoid changes in the cross-section of the lubrication line from small to large cross-sections in the direction of flow of the lubricant. When the cross-section does change, the transition should be gentle.

The flow of lubricant in the lubrication lines should not be hindered by the installation of sharp bends, angle valves, or flap valves. Unavoidable changes in the cross-section in lubrication lines must have smooth transitions. Sudden changes of direction should be avoided if possible.

NOTE

Follow the safety instructions on the lubricant's safety data sheet.

		WARNING
	<p>Environmental pollution</p> <p>Lubrication lines must always be free of leaks. Lubricants can contaminate soil and waterways. Lubricants must be properly used and disposed of. Observe the local regulations and laws regarding the disposal of lubricants.</p>	

4.6 Note on the rating plate

The rating plate provides important data such as type designation, order number, barcode, and serial number.

To avoid loss of this data in case the rating plate becomes illegible, these characteristics should be entered in the following table.

- Enter key data from rating plate in the following table.

Key data from rating plate, Fig. 11

NOTE

During installation and commissioning, check the direction of gerotor pump rotation based on the rotation arrow (see rating plate).

SKF Lubrication Systems Germany GmbH

SKF

S → P

Made in Germany

Gerotor pumps and pump units of series 143

for SKF CircOil centralized lubrication systems

**Operating instructions associated
with assembly instructions**

1. Safety instructions

2. Lubricants

1.1 General information

NOTE

The operator of the product described here must ensure that the operating instructions are read and understood by all persons responsible for assembly, operation, maintenance, and repair of the product. In addition to the operating instructions, general statutory regulations and other regulations for accident prevention and environmental protection must be observed and applied.

NOTE

The lubricant notes listed in Chapter 2 "Lubricants" of the assembly instructions also apply without restriction to these operating instructions.

The operator of the product described here must ensure that the operating instructions are read and understood by all persons responsible for assembly, operation, maintenance, and repair of the product. In addition to the operating instructions, general statutory regulations and other regulations for accident prevention and environmental protection must be observed and applied.

3. Delivery, returns, and storage

SKF Lubrication Systems Germany GmbH products are packaged in accordance with standard commercial practice according to the regulations of the recipient's country and DIN ISO 9001. During transport, safe handling must be ensured and the product must be protected from mechanical effects such as impacts. The transport packaging must be marked "Do not drop!"

3.1 Checking the delivery


Immediately after receipt, the delivery must be checked for completeness according to the shipping documents. Any transport damage must be reported to the transport company immediately. The packaging material should be preserved until any discrepancies are resolved.

3.2 Returns

All parts must be cleaned and properly packed before return shipment (i.e., according to the requirements of the recipient country).

There are no restrictions for land, air, or sea transport.

The following must be marked on the packaging of return shipments:

	Do not top load / This side up
	Keep dry
	Handle with care, Do not drop

3.3 Lubrication units

- o Ambient conditions: dry and dust-free surroundings, storage in well ventilated dry area
- o Storage time: Max. 24 months
- o Permissible humidity: < 65%
- o Storage temperature: + 10 to +40°C
- o Light: Avoid direct sun or UV exposure and shield nearby sources of heat

3.4 General notes

- o The product(s) can be enveloped in plastic film to provide low-dust storage.
- o Protect against ground moisture by storing on a shelf or wooden pallet.
- o Bright-finished metallic surfaces, especially wearing parts and assembly surfaces, must be protected using long-term anti-corrosive agents before storage.
- o At approx. 6-month intervals:
- o Check for corrosion. If there are signs of corrosion, reapply anti-corrosive agents.
- o Drives must be protected from mechanical damage.

4. Assembly

4.1 Information on assembly

The assembly procedure for the product is described in detail in the assembly instructions (Chapter 4) associated with these operating instructions.

5. Functional description

5.1 General system description

SKF gerotor pump units of product series 143 are used in circulating-oil and total-loss lubrication systems in a flow rate range of 0.85 to 50 l/min.

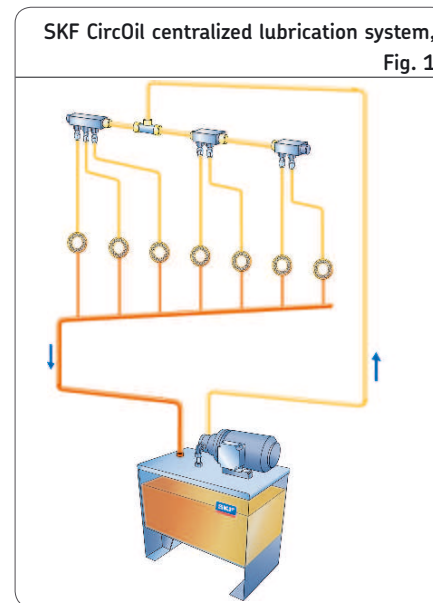
The standard permissible ambient temperature is between 0 and +40°C. Higher ambient temperatures are possible, though they lead to a reduction in motor performance and thus the delivery rate. The permissible temperature of the pumped medium is between 0 to +80°C.

The gerotor pumps are available in NBR and FKM (FPM) designs.

SKF gerotor pump units feed lubricating and hydraulic oils from a reservoir and into the pipe system of a centralized lubrication system. In doing so, they increase the energy of the pumped medium (pressure increase) to overcome flow resistance in the pipelines (pressure loss), the components (filters, valves, distributors) and the bearings and friction points.

SKF gerotor pump units are used in various designs and at various performance levels, depending on the type and size of the

centralized lubrication system and the lubricant (see assembly instructions, Chapters 4.3.3 and 4.4.3).



5.2 Gerotor (annular gear) pumps

SKF gerotor pump units of product series 143 have a constant displacement volume and one delivery circuit.

The annular-toothed feeding element, also referred to as the gerotor, is equipped with a cycloid contour, which creates a large tooth meshing length. This yields a low volumetric flow pulsation and thus very smooth running, low noise production, and good suction characteristics.

SKF gerotor pumps consist primarily of pump housing (1), the shaft (2), the displacement elements toothed rotor (3) and annular gear (4), and the lid (5).

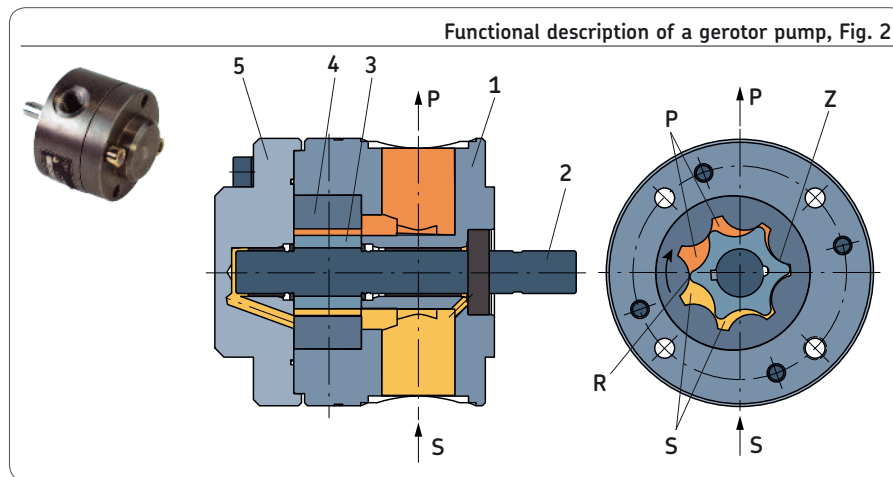
Suction and displacement process

☞ see Figure 2

The shaft drives the centrally mounted toothed rotor in the indicated direction of rotation via a feather key. The toothed rotor meshes with the outer, eccentrically mounted annular gear and rotates with it.

The openings between teeth arising in the suction area (S) draw the pumped medium in. The suction and pressure area is separated from the tooth meshing area (Z) by a radial gap (R) formed by the tooth profiles of the annular gear and the toothed rotor as

they slide onto one another. In the pressurized area (P), the fluid is fed to the pressure port through increasingly small chambers.



5.3 Gerotor (annular gear) pump units

The gerotor pumps installed in SKF gerotor pump units of series 143 are identical with those described in Chapter 5.2. However, they are driven by an attached IEC squirrel cage motor of frame size 63 to 132.

The motors are designed for a rated motor voltage of 230/400 V or 400/690 V for 50 Hz networks according to DIN IEC 60038. The normal coils used here in motors with performance < 0.75 kW are designed for the wide voltage range. The normal coils in motors with performance ≥ 0.75 kW are tailor-made and meet the IE2 efficiency level according to EU Directive 2009/125/EC. Special voltage versions with special coils for 50 Hz and 60 Hz networks are available for order.

The standard design of the motors comes with a terminal box. Motors with UL/CSA certification are available. Further certifications are available on request.

Gerotor pump units, Fig. 3

Foot design





Flange design



NOTE

A detailed explanation of the motor rating plates and IEC cage motors is contained in Chapter 11.1 of the enclosed operating instructions.

		3~ Mot 63	H 0001
AF 63/4B-7		/0805	361079
YΔ 400/230 V	0,69/1,04 A	0,18 kW	
cos φ 0,69	1360'/min	50 Hz	
Th.Cl. 155 (F)		IP55	IMB34 EN 60034
		4,4 kg	
YΔ 380-420/220-240 V	0,63/1,09 A	0,18 kW	
cos φ 0,69	1380'/min	50 Hz	
YΔ 440-480/254-280 V	0,60/1,04 A	0,215 kW	
cos φ 0,69	1675'/min	60 Hz	

6. Operation/decommissioning and disposal

6.1 Operation

NOTE

The gerotor pump may only be commissioned and operated with an oil supply; the gerotor pump must not run dry.

NOTE

Only fill using clean lubricant and an appropriate device. Contaminated lubricants lead to system malfunctions. The customer's lubricant reservoir must be filled without introducing bubbles.



6.1.1 General

The described product functions automatically. The lubricant transport in the lubrication lines should, however, be subjected to regular visual inspection.

The lubricant fill level in the lubricant reservoir should be subjected to visual inspection on a regular basis.

An excessively low lubricant fill level can lead to a low delivery rate and possible destruction of the pump. Therefore, do not let the lubricant fall below the minimum fill level.

6.2 Commissioning

		WARNING
Hazard due to excessively low or no lubricant		
<p>The lubricant fill level in the lubricant reservoir should be subjected to visual inspection on a regular basis. SKF recommends the attachment of a fill level switch to the customer's system.</p>		

Inspect all electrical and hydraulic connections before commissioning the gerotor pump or gerotor pump unit.

The intake and return lines in the lubricant reservoir must be below the minimum lubricant level in all operating states.

- Check the direction of pump rotation based on the rotation arrow.
- Place an oil tray under the gerotor pump unit.
- ☞ **See the operating instructions from the system manufacturer.**
- Prefill the pump with filtered lubricant via the suction or pressure port.
- Vent the pump according to the operating instructions from the system manufacturer.

If switchable or automatic venting is not available, the gerotor pump unit must be manually vented as described below.

- Switch the centralized lubrication system to pressureless circulation mode according to the operating instructions from the system manufacturer.

- Prefill the gerotor pump unit with oil and briefly switch the unit on and off (jogging).
- Repeat the procedure until bubble-free lubricant discharges.
- Firmly reattach the suction or pressure port.

The process of venting the centralized lubrication system can be facilitated by:

- Filling long pipe sections before connecting to the lubrication points.
- Filling the lubricant lines
- Allowing the gerotor pump unit to run until bubble-free and foam-free lubricant discharges at the end of the lubricant lines
- Switching off the gerotor pump unit, if necessary

6.3 Recommissioning after downtime

- Disconnect the delivery line (provided by customer) and prefill the gerotor pump unit.
 - Establish the electrical motor connection as described in Chapter 4.4.6 of the assembly instructions.
 - Check the direction of motor rotation based on the rotation arrow.
 - Check the fill level of the lubricant.
 - Switch on the gerotor pump unit and recheck the lubricant fill level.
- ☞ A low fill level (=leakage) indicates that there is leakage below the lubricant fill level, while an elevated fill level indicates leakage above the fill level.
- If the pump/lubrication system are intact => system approval.

6.4 Temporary shutdown

The product described here can be shut down temporarily by relieving pressure in the system/the gerotor pump and disconnecting the electrical supply connection and/or the mechanical drive.

The instructions in Chapter 4 of the assembly instructions must be observed when doing so.

If the product is to be shut down for an extended period of time, follow the instructions in chapter "Transport, delivery, and storage" of these operating instructions.

Corrosion protection must be applied to the gerotor pump if it is to be removed and stored.


SKF recommends the following procedure:

- Empty and clean the gerotor pump.
- Seal the pressure bore air-tight using plugs.
- Fill the gerotor pump with new lubricant via the intake bore.
- Seal the intake bore air-tight using plugs.

6.5 Decommissioning and disposal


- Clean the exterior of the gerotor pump and spray it with a suitable anti-corrosive agent.
- Package the gerotor pump together with suitable desiccant air-tight in an anti-corrosive film.

To recommission the product, follow the instructions in Chapter 4 "Assembly" of the assembly instructions.

	WARNING
	<p>System pressure Hydraulic pressure</p> <p>Lubrication systems are pressurized during operation. Centralized lubrication systems must therefore be depressurized before starting assembly, maintenance, or repair work, or any system modifications or system repairs.</p>

- Place an oil tray under the gerotor pump/unit.
- Depressurize the centralized lubrication system as described in the system's operating instructions.
- Loosen and remove the intake and delivery tubing.
- Loosen and remove the fastening screws on the gerotor pump/unit.
- Remove the gerotor pump/unit.



If the product will be permanently shut down, the local regulations and laws regarding the disposal of contaminated equipment must be observed.

	WARNING
	<p>Environmental pollution</p> <p>Lubricants can contaminate soil and waterways. Lubricants must be properly used and disposed of. Observe the local regulations and laws regarding the disposal of lubricants.</p>

The product can also be returned to SKF Lubrication Systems Germany GmbH for disposal, in which case the customer is responsible for reimbursing the costs incurred. The parts are recyclable.

7. Maintenance

7.1 General information

	 WARNING
	<p>Electric shock Assembly, maintenance and repair work may only be performed on products that have been de-energized by qualified technical personnel. The supply voltage must be switched off before opening any of the product's components.</p>

SKF products are low-maintenance. All connections and fittings must be regularly inspected for proper seating to ensure proper function. If necessary, the product can be cleaned using mild cleaning agents that are compatible with the product's materials (non-alkaline, non-soap).

For safety reasons, the product must be disconnected from the power supply. Do not allow any cleaning agent to enter the interior of the product during cleaning. The interior of the product does not need to be cleaned. The interior of the product must be cleaned if incorrect or contaminated lubricant is accidentally filled into the product. Contact the SKF Service department if this occurs.

NOTE

Dismantling of the product or individual parts thereof within the statutory warranty period is prohibited and voids any claims.

NOTE

Only original SKF spare parts may be used. Unauthorized alterations to products and the use of non-original spare parts and accessories are prohibited and nullify the statutory warranty.

SKF shall not be held liable for damages resulting from improperly performed assembly, maintenance, or repair work on the product.

NOTE

Only fill using clean lubricant. The purity of the lubricants used is the decisive factor in the service life of the pump and the lubricated machinery elements.

7.2 Maintenance schedule

The maintenance intervals are system-specific and affected by environmental influences such as dust and heat, among other factors.

The maintenance intervals are therefore defined by the system manufacturer.

A maintenance schedule must be drawn up for the safe operation and long service life of gerotor pumps/units. This schedule must ensure that the intended or permissible operating conditions and parameters of the gerotor pump are observed during its service life.

Changes in these parameters indicate wear, for example to the electric motor, the coupling, or the pump.

The cause must be immediately determined and remedied.

SKF recommends continuous monitoring of the parameters listed in Table 1 to provide high dependability of the gerotor pump/unit. The system/gerotor pump must be switched off in case of changes beyond normal fluctuations in the intended operating range.

Plastic components of the drive couplings must be checked according to manufacturer specifications (see the manufacturer's operating and assembly instructions) on a regular basis. Coupling parts should be replaced at least every 5 years.

The manufacturer's specifications should be given priority.

Maintenance items, Table 1

Centralized lubrication system operating parameters

- o Lubricant purity
- o Operating temperature range
- o Lubricant fill level

Gerotor pump/pump unit operating parameters

- o Vibration
- o Noise
- o Pressure differential pump vs. lubricant reservoir
- o Foaming in lubricant reservoir
- o Leak tightness
- o Contamination
- o (Cooling fins on electric motor)

Replacement (every 5 years)

- o Plastic housing drive couplings

8. Malfunctions, causes, and remedies



The following tables provide an overview of possible malfunctions and their causes. Contact the SKF Service department if you cannot remedy the malfunction.



NOTE



Dismantling of the product or individual parts thereof within the statutory warranty period is prohibited and voids any claims.

NOTE

Only original SKF spare parts may be used. Unauthorized alterations to products and the use of non-original spare parts and accessories are prohibited.

	WARNING
	 <p>System pressure Lubrication systems are pressurized during operation. Lubrication systems must therefore be depressurized before starting assembly, maintenance or repair work, or any system modifications or system repairs.</p>

	WARNING
	 <p>Hot surface The hot surface of the pump or motor may cause burns. Motor and pump surfaces may only be touched with appropriate gloves or after the motor has been shut off for an extended time.</p>

	WARNING
	 <p>Electric shock Performing work on products that have not been de-energized may result in serious injury or death. Assembly, maintenance, and repair work may only be performed on products that have been de-energized by qualified technical personnel. The supply voltage must be switched off before opening any of the product's components.</p>

8.1 Gerotor pumps and gerotor pump units

Malfunction	Cause	Remedy
Gerotor pump/ gerotor pump unit does not convey or draw lubricant	<ul style="list-style-type: none"> o Air inlet/lubricant below the intake manifold o Pump not vented o Non-approved lubricant o Coupling loose or defective o Incorrect direction of pump rotation 	<ul style="list-style-type: none"> • Refill lubricant, vent gerotor pump/unit as described in Chapter 6.2. • Vent gerotor pump/unit as described in Chapter 6.2. • Select the lubricant in accordance with the Technical Data section. • Check the coupling and adjust or replace if necessary • Check direction of rotation, correct if necessary
Gerotor pump/ gerotor pump unit runs too loud	<ul style="list-style-type: none"> o Incorrect direction of pump rotation o Air entering through defective screw unions, tubes, or seals o Vortex in the suction area of the lubricant reservoir o Lubricant temperature is below -20°C o Incorrect viscosity range of lubricant 	<ul style="list-style-type: none"> • Check direction of rotation, correct if necessary • Check the centralized lubrication system and gerotor pump/unit for leaks, replace any defective components, vent the gerotor pump/unit as described in Chapter 6.2 • Refill lubricant, vent gerotor pump/unit as described in Chapter 6.2. • Establish an appropriate lubricant temperature (heat if necessary) • Use approved lubricant
Interfaces are leaky	<ul style="list-style-type: none"> o Sealing face is contaminated or damaged o Defective screw union o O-ring on gerotor pump is defective 	<ul style="list-style-type: none"> • Clean the sealing face and ensure that it is intact. • Retighten the screw union, replace if necessary. • Replace the gerotor pump/unit.

Malfunction	Cause	Remedy
Interfaces are leaky	<ul style="list-style-type: none"> o Improper assembly o Incorrect mounting screws 	<ul style="list-style-type: none"> • Remove and reinstall the gerotor pump/unit. • Check the length of assembly screws, replace with shorter screws if necessary.
Pumped medium is too hot	<ul style="list-style-type: none"> o Incorrect viscosity < 20 mm²/s o Aged lubricant 	<ul style="list-style-type: none"> • Use only approved lubricant; see operating instructions, Chapter 9 Technical Data and Chapter 11.1 for viscosity tables.
Lubricant temperature is too low	<ul style="list-style-type: none"> o Incorrect viscosity > 1000 mm²/s o Refilling with different lubricants 	
Volumetric or mechanical efficiency is not achieved	<ul style="list-style-type: none"> o Incorrect viscosity 	
Gerotor pump units		
Motor circuit breaker flips	<ul style="list-style-type: none"> o Incorrect drive motor used o Fan slots on drive motor clogged o Gerotor pump jammed 	<ul style="list-style-type: none"> • Replace the drive motor • Clean the fan slots • Replace the gerotor pump

9. Technical data

9.1 Technical data

The technical data for the gerotor pumps/units can be found in the assembly instructions, Chapter 4.3.3, pages 30/31.

The technical data for the gerotor pump units can be found in the assembly instructions, Chapter 4.4.3, pages 36/37.

For connection with a frequency of 60 Hz, the speed and the volumetric flow are increased by 20% (compared to the table specifications, basis 50 Hz).

Delivery rates and characteristic curves

The indicated nominal delivery rates refer to the nominal output multiplied by the speed 1400 or 2800 rpm. The actual delivery rate changes with operating viscosity and back pressure and can be found in the following characteristic curve diagrams. These diagrams are based on viscosity data in the range between 20 and 1000 mm²/s in increments of 20, 140, 750, and 1000 mm²/s. Each gerotor pump has a characteristic curve represented as a function of the delivery rate above the delivery pressure (back pressure).

It is important to note that temperature influences can render lubricating and hydraulic oils extremely thin or viscous. Please consult with SKF in advance if you will use lubricating and hydraulic oils with an operating viscosity outside the specified range.

Technical data

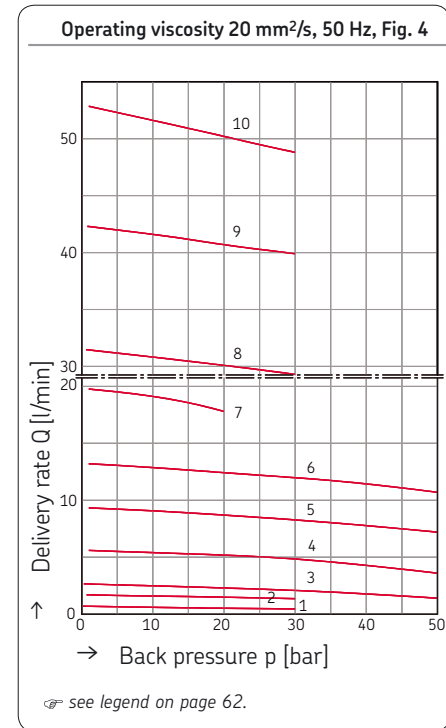
Flow rate range	0.85 to 50 l/min
Pressure, max.	50 bar
Pumped medium	Lubricating and hydraulic oils with a minimum purity class acc. to ISO 4406 (c) 20/17/14 or US standard NAS code (1638) class 8 or SAE AS 4059 class 8
Operating viscosity	20 to 1000 mm ² /s
Drive speed depending on design . . .	1400 and 2800 rpm
Protection class acc. to DIN 40050 ¹⁾	IP54
Duty type per VDE 0530 ¹⁾	S1
Ambient temperature range	0 to +40 °C
Pumped medium temperature range . .	0 to +80 °C
Sealing material	NBR, FKM (FPM)
Suction head, max.	1000 mm
Operating noise level	Max. 60 dBA
Varnishing	RAL 7024 graphite gray, special varnish available on customer request

Materials

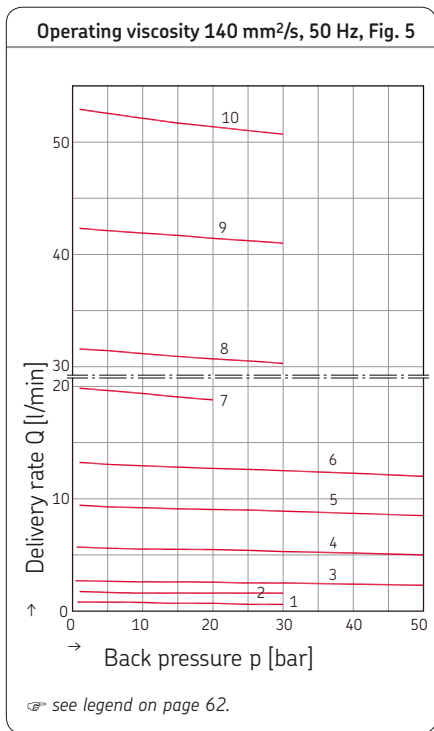
Pump housing	Hydraulic cast (pressure-tight) with good wear and antifriction properties
Gerotor insert	Sintered material
Shafts	Low-deformation case-hardened steels
Bearing	SKF plain bearing

¹⁾ Technical data of a gerotor pump unit.

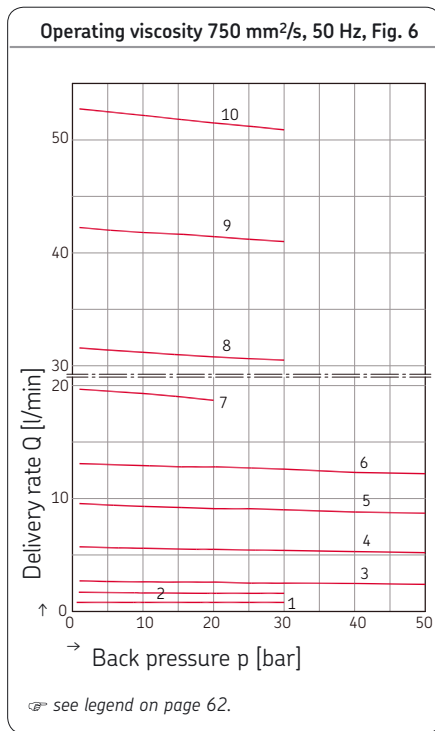
9.2 Operating viscosity, characteristics 20 mm²/s, 50 Hz



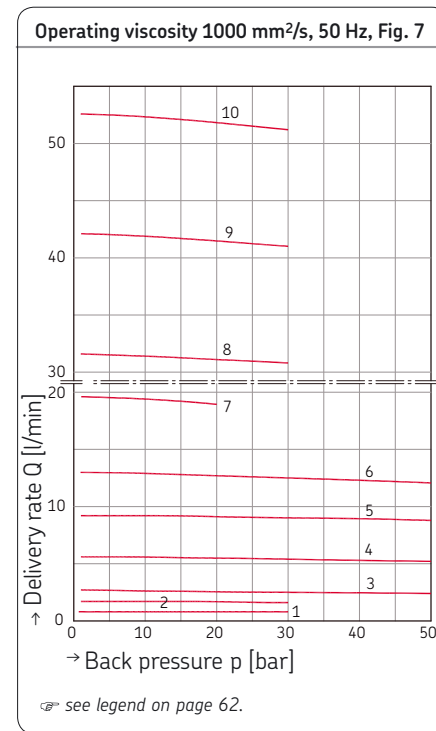
9.3 Operating viscosity, characteristics
140 mm²/s, 50 Hz



9.4 Operating viscosity, characteristics
750 mm²/s, 50 Hz



9.5 Operating viscosity, characteristics
1000 mm²/s, 50 Hz



9.6 Viscosity-temperature relationship of oils with different rated viscosity

Legend to Figs. 4 to 7

Characteristic curve	Delivery volume ¹⁾ [l/min]
1	0.85
2	1.70
3	2.50
4	5.25
5	9.00
6	12.50
7	19.00
8	30.00
9	40.00
10	50.00

1) Tolerances: VDMA 24284-II

☞ see Chapters 9.6.1 and 9.6.2

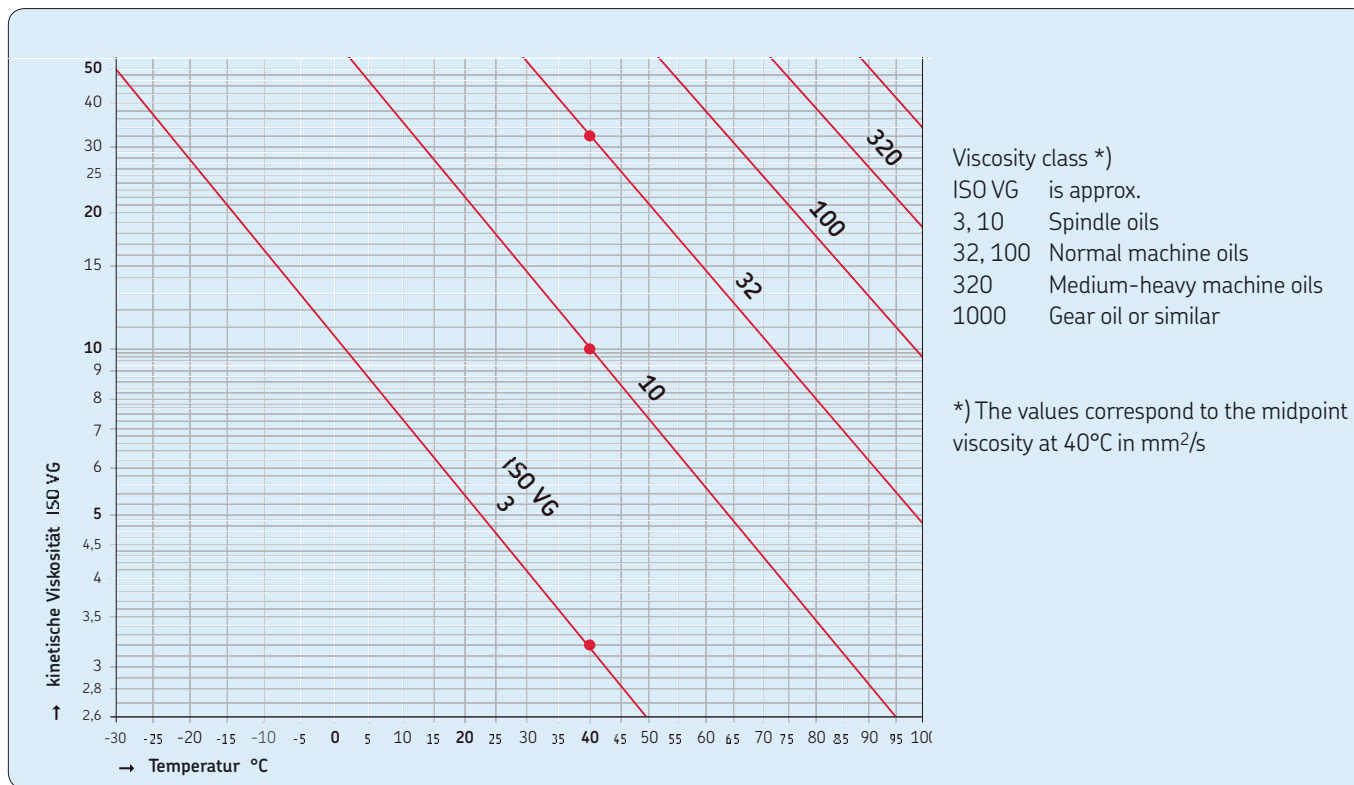
The curves shown in both figures are based on a viscosity index (VI) of VI ~ 95, approximately corresponding to standard mineral oil.

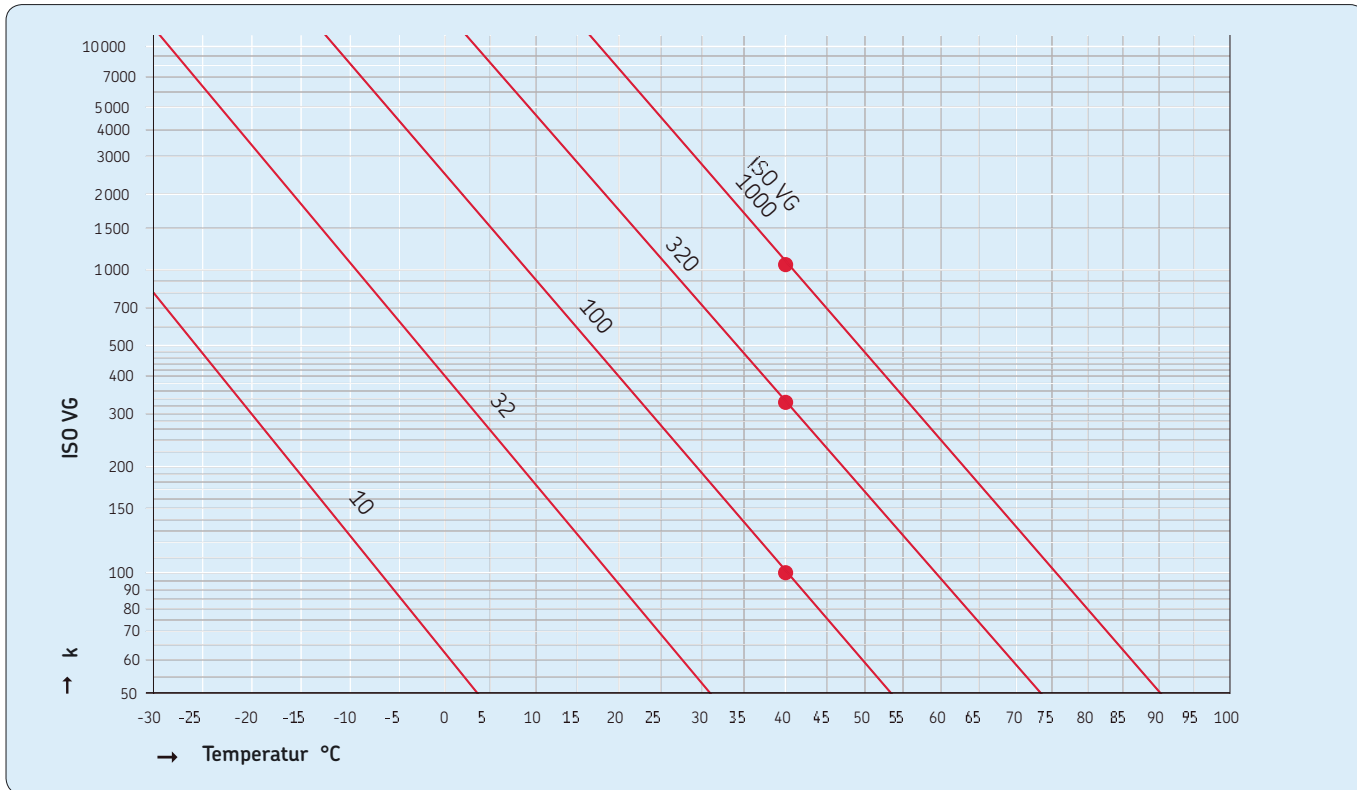
The viscosity index describes the slope of the curve and thus the viscosity-temperature relationship at temperatures other than +40°C.

The lines appear straight because a logarithmic scale was selected for the ordinate so that the slope of the curves can be determined easily based on 2 measuring points.

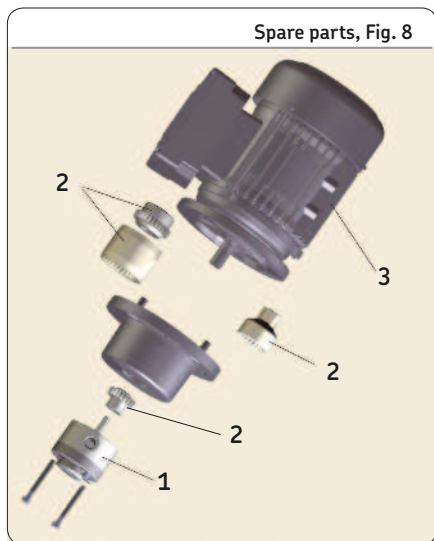
Important note: The change in the viscosity of oils is disproportionately greater in lower temperature ranges than in higher temperature ranges. For example, an oil with a rated viscosity of 100 undergoes the following viscosity change in different temperature ranges at the same temperature difference:

at +80°C = 18 mm²/s
 at +10°C = 875 mm²/s
 versus:
 at +75°C = 21 mm²/s
 change of 3 mm²/s
 at + 5°C = 1450 mm²/s
 change of 575 mm²/s

9.6.1 Viscosity range from 2.6 to 50 mm²/s

9.6.2 Viscosity range from 50 to 2000 mm²/s

10. Spare parts



Gerotor pump unit ¹⁾	Item 1 Pump ¹⁾	Item 2 Coupling, complete ²⁾	Item 3 Motor
143-11...B03C-RA+1FX	143-14...B03	995-000-350	178-AA12C-AMRA+1FX
143-12...B03C-XA+1FX	143-14...B03	995-000-350	178-AA22C-AMXA+1FX
143-11...D03E-RA+1FX	143-14...D03	995-000-351	178-AA11E-AMRA+1FX
143-12...D03E-XA+1FX	143-14...D03	995-000-351	178-AA21E-AMXA+1FX
143-11...F02D-RA+1FX	143-14...F02	995-000-353	178-AA12D-AMRA+1FX
143-12...F02D-XA+1FX	143-14...F02	995-000-353	178-AA22D-AMXA+1FX
143-11...F05F-RA+1FX	143-14...F05	995-000-354	178-AA12F-AMRA+1FX
143-12...F05F-XA+1FX	143-14...F05	995-000-354	178-AA22F-AMXA+1FX
143-11...H02F-RA+1FX	143-14...H02	995-000-356	178-AA12F-AMRA+1FX
143-12...H02F-XA+1FX	143-14...H02	995-000-356	178-AA22F-AMXA+1FX
143-11...H05J-OA+1GD	143-14...H05	995-000-357	178-AA12J-AMOA+1GD
143-12...H05J-XA+1GD	143-14...H05	995-000-357	178-AA22J-AMXA+1GD
143-11...K02H-RA+1GD	143-14...K02	995-000-356	178-AA12H-AMRA+1GD
143-12...K02H-XA+1GD	143-14...K02	995-000-356	178-AA22H-AMXA+1GD

1) Supplement the order No. with the code letter for the desired seal. Design NBR (N) or FKM (FPM) (F).

2) It is recommended that coupling parts always be replaced completely.

Gerotor pump unit ¹⁾	Item 1 Pump ¹⁾	Item 2 Coupling, complete ²⁾	Item 3 Motor	Designation	Order No.
143-11...K05J-OA+1GD	143-14...K05	995-000-357	178-AA12J-AMOA+1GD		
143-12...K05J-XA+1GD	143-14...K05	995-000-357	178-AA22J-AMXA+1GD		
143-11...M02H-RA+1GD	143-14...M02	995-000-356	178-AA12H-AMRA+1GD	Document package	995-810-002
143-12...M02H-XA+1GD	143-14...M02	995-000-356	178-AA22H-AMXA+1GD	Rotation arrow	760-072
143-11...M05K-OA+1GD	143-14...M05	995-000-357	178-AA12K-AMOA+1GD		
143-12...M05K-XA+1GD	143-14...M05	995-000-357	178-AA22K-AMXA+1GD		
143-11...P02K-OA+1GD	143-14...P02	995-000-358	178-AA12K-AMOA+1GD		
143-12...P02K-XA+1GD	143-14...P02	995-000-358	178-AA22K-AMXA+1GD		
143-11...R02M-RA+1GD	143-14...R02	995-000-359	178-AA11M-AMRA+1GD		
143-12...R02M-XA+1GD	143-14...R02	995-000-359	178-AA21M-AMXA+1GD		
143-11...R03M-RA+1GD	143-14...R03	995-000-359	178-AA11M-AMRA+1GD		
143-12...R03M-XA+1GD	143-14...R03	995-000-359	178-AA21M-AMXA+1GD		
143-11...R03N-OA+1GD	143-14...R03	995-000-359	178-AA11N-AMOA+1GD		
143-12...R03N-XA+1GD	143-14...R03	995-000-359	178-AA21N-AMXA+1GD		
143-11...T02M-RA+1GD	143-14...T02	995-000-359	178-AA11M-AMRA+1GD		
143-12...T02M-XA+1GD	143-14...T02	995-000-359	178-AA21M-AMXA+1GD		
143-11...T03N-OA+1GD	143-14...T03	995-000-359	178-AA11N-AMOA+1GD		
143-12...T03N-XA+1GD	143-14...T03	995-000-359	178-AA21N-AMXA+1GD		
143-11...V02N-OA+1GD	143-14...V02	995-000-359	178-AA11N-AMOA+1GD		
143-12...V02N-XA+1GD	143-14...V02	995-000-359	178-AA21N-AMXA+1GD		
143-11...V03N-OA+1GD	143-14...V03	995-000-359	178-AA11N-AMOA+1GD		
143-12...V03N-XA+1GD	143-14...V03	995-000-359	178-AA21N-AMXA+1GD		
143-11...V03P-RA+1GK	143-14...V03	995-000-360	178-AA11P-AMRA+1GK		
143-12...V03P-XA+1GK	143-14...V03	995-000-360	178-AA21P-AMXA+1GK		

1) Supplement the order No. with the code letter for the desired seal. Design NBR (N) or FKM (FPM) (F).

2) It is recommended that coupling parts always be replaced completely.

11. Appendix

11.1 IEC squirrel cage motors

11.1.1 Principles

General information

The standard design of SKF gerotor pump units of product series 143 is driven by IEC squirrel cage motors. The motors are used in frame sizes 63 to 132, in 2-pole and 4-pole designs.

They meet the relevant IEC/EN standards both mechanically and electrically.

The standard design of the motors comes with a terminal box. The motors bear a CE marking in accordance with Low Voltage Directive 2006/95/EC.

There is no CE marking with respect to Machinery Directive 2006/42/EC and EMC Directive 2004/108/EC because three-phase motors do not fall under the scope of these Directives.

Special provisions

The motors can be ordered in a UL- and CSA-compliant design and are approved as a "recognized component" by UL (Underwriter Laboratories).

These motors have an electrical design according to NEMA MG1-12.

CSA BG56-80 File No.: LR 88093
(listed under Master Contract No. 150227)

CSA BG90-132 File No.: LR 12638
(listed under Master Contract No. 150227)

UL BG56-80 File No.: E123665
(combined acceptance per UL 1004 and CSA 22.2.100)

UL BG90-132 File No.: E125750
(combined acceptance per UL 1004 and CSA 22.2.100)

Further certifications are available on request.

Types

The motors are used exclusively in the types IM B34 and IM B14. The type is indicated according to Code I, DIN EN 60034-7 on the rating plate.

IM B34: Shaft horizontal, feet on floor

IM B14: Shaft horizontal, no feet

Rated voltage, frequency, and power

The motors are designed standard for a rated motor voltage of 230 V, 400 V, or 690 V for 50 Hz networks (normal coils) according to DIN IEC 60038. Motors for other voltages and frequencies (special coils) are available on request.

The permissible operating voltage deviation in the specified rated motor voltages and special voltages per DIN EN 60034-1 is $\pm 10\%$ and the permissible frequency deviation is $-5/+3\%$.

The tolerances according to DIN EN 60034-1 are maintained at supply voltages on the order of 95% or 105% of the rated motor voltage.

Further, motor heating may exceed the permissible temperature limit by 10 K. Higher heating is permissible, though continuous operation (duty) of the motors at higher temperatures is not recommended.

Motors for a rated motor voltage of 230 V or 400 V for 50 Hz networks (normal coil) and

with performance < 0.75 kW are designed for the wide voltage range for 50 and 60 Hz networks. The motors can be used in continuous duty (S1) within this wide voltage range. The wide voltage range is indicated on the motor's rating plate.

Wide voltage range:

50 Hz: 220–240 V / 380–420 V,
voltage tolerance $\pm 5\%$

60 Hz: 254–280 V / 440–480 V,
voltage tolerance $\pm 5\%$

The use of the wide voltage range is permitted because these motors are not subject to EU Directive 2005/32/EC (Energy Using Products) and therefore do not need to comply with EU Regulation No. 640/2009 with regard to adherence to efficiency classes.

These motors do not bear an IE2 marking on the rating plate.

Motors for special voltages with performance < 0.75 kW contain special coils that are optimized for one voltage/frequency point (such motors are also referred to as tailor-made motors).

Special voltage designs for 50 Hz and 60 Hz networks are available and must be indicated when ordering.

Motors with performance ≥ 0.75 kW are optimized for one voltage/frequency point and are designed solely on a tailor-made basis. They are designed standard for a rated motor voltage of 230 V, 400 V, or 690 V for 50 Hz networks (normal coils) according to DIN IEC 60038. They meet efficiency class IE2 according to EU Directive 2005/32/EC (Energy Using Products). These motors bear an IE2 marking on the rating plate.

Motors for special voltages with performance ≥ 0.75 kW contain special coils that are optimized for one voltage/frequency point.

Special voltage designs for 50 and 60 Hz networks are available for all rated motor voltages commonly used worldwide and must be indicated when ordering.

The stated performance ratings and operating values are valid for duty type S1 according to DIN EN 60034-1 at the indicated rated frequency, rated voltage, a coolant

temperature of max. 40 °C, and a site altitude of up to 1000 m above sea level.

Motors for operating conditions other than those indicated are available on request.

Circuit

The phase belts of the motor that are laid out on the terminal board can be interconnected in two different connection systems.

Star connection

In the star connection, the coil ends U2, V2, and W2 are interconnected on the terminal board, creating the neutral point.

Mains power is connected on the free connection ports of the coil ends U1, V1, and W1 on the terminal board.

Delta connection

In the delta connection, the end of the phase belt is interconnected with the beginning of the next phase belt.

(U2 to V1, V2 to W1, W2 to U1).

Mains power is connected at the connection points on the terminal board.

Cooling method

The motors are designed for cooling method IC 411 (surface cooling).

Temperature class

The insulation on the motor coils is designed for temperature class 155 (F). When utilized at their performance rating, the motors meet temperature class 130 (B). Given a coolant temperature of 40°C, the power reserve is thus approx. +10%; when operated at their performance rating, the temperature reserve is approx. +20 K.

Terminal box

The terminal boxes have a protection class of IP55. The terminal box is positioned on the right when viewed from the drive side. An exception are 4-pole motors of frame size 90 (1.1 and 1.5 kW), in which the terminal box is installed on the top for design reasons. Special motors with the terminal box positioned on the left as viewed from the drive side are available on request. The position of the openings for cable entry can be adjusted to the available connections by turning the terminal box by 90° each

time (terminal box design 95×95 mm). Terminal boxes with dimensions 120×115 mm can only be turned by 180°. The threads on the cable inlets have a metric thread of M20×1.5. The terminal board has a 6-pole design.

Protection class

The motors are designed for protection class IP55 according to DIN EN 60034-5.

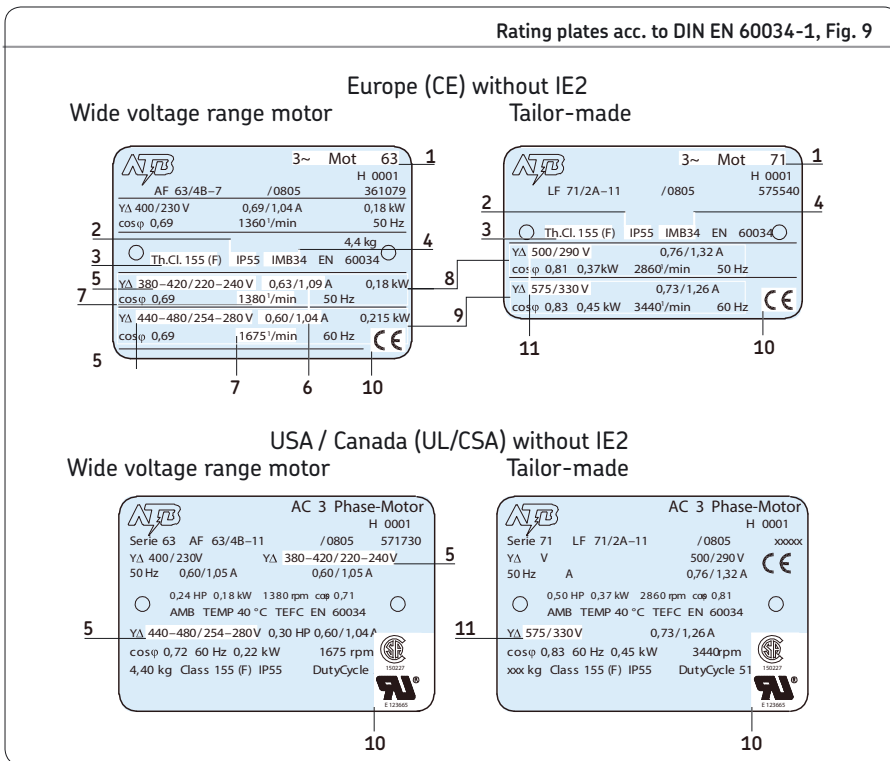
Touch and foreign object protection:

Complete protection against contacting live components and against approaching such parts, as well as against touching moving parts within the housing. Protection against the ingress of damaging amounts of dust deposits.

Water protection:

A jet of water that is emanating from a nozzle and aimed at the motor from all directions has no adverse effect.

Rating plates acc. to DIN EN 60034-1, Fig. 9



Legend to Figures 9 and 10

Item	Designation
1	Frame size
2	Protection class
3	Temperature class
4	Type
5	Rated voltage range
6	Rated current
7	Rated speed
8	Data for 50 Hz
9	Data for 60 Hz
10	Certification
11	Rated voltage
12	Efficiency (only IE2 motors)

Rating plates acc. to DIN EN 60034-1, Fig. 10

USA / Canada (UL/CSA) with IE2 1)

Tailor-made

Tailor-made

NB		CE	
3 ~Mot AF 90 L/4M-13L+E2 / 0805			
S1	IMB34	-0001 571260 H	
IP55		Th.Cl. 155 (F)	
○			
kW	V	Hz	A
1,50	YΔ400/230	50	3,30/5,70
			0,79
			1440
			IE2-82,8%
1,80	YΔ460/265	60	3,30/5,70
			0,81
			1730
			IE2-84,0%
+/-10%			
IE75%/50% 81,3/78,7 18,6kg EN60034 IE2			

NB		UL/CSA		UL	
AC 3 Mot AF 90 L/4M-13L+E2 / 0805					
Series90	TEFC	-0001 571260 H			
IP55		Class 155 (F)		IMB34 DutyCycle51	
AMB TEMP 40 °C					
○					
kW	V	Hz	A	cosφ	RPM
1,50	YΔ400/230	50	3,30/5,70	0,79	1440
1,80	YΔ460/265	60	3,30/5,70	0,81	1730
+/-10%					
IE75%/50% 18,6kg					

12

Legend to Figures 9 and 10

- | | |
|-------------|------------------------------|
| Item | Designation |
| 1 | Frame size |
| 2 | Protection class |
| 3 | Temperature class |
| 4 | Type |
| 5 | Rated voltage range |
| 6 | Rated current |
| 7 | Rated speed |
| 8 | Data for 50 Hz |
| 9 | Data for 60 Hz |
| 10 | Certification |
| 11 | Rated voltage |
| 12 | Efficiency (only IE2 motors) |

1) In the UL/CSA design, the motor is also supplied with a rating plate for CE.

11.1.2 Voltage code, motor design 50 /60 Hz

Voltages and frequencies of different countries

	Voltage [V]	Voltage tolerance [%]	Design with terminal box				Country code
			Without IE2 (P <0.75 kW)		With IE2 (P ≥0.75 kW)		
			CE	UL/CSA	CE	UL/CSA	
50 Hz	200 / 345	±10	+1GF	+1GF	+1GF	+1GF	JP, HK
	220 / 380	±5	+1FX	+1HM	–	–	CN, RU, TR, IQ, IR, ID, IN, TH, VN, AR, CL
	220 / 380	±10	+1GP	+1GP	+1GP	+1GP	CN, RU, TR, IQ, IR, ID, IN, TH, VN, AR, CL
	230 / 400	±10	+1FX	+1HM	+1GD	+1GD	EU, IL, NZ, PK, ZA, AE
	240 / 415	±5	+1FX	+1HM	–	–	UK, IN, IQ, MY, AU, SG
	240 / 415	±10	+1GQ	+1GQ	+1GQ	+1GQ	UK, IN, IQ, MY, AU, SG
	255 / 440	±10	+MFN	+MFN	+MFN	+MFN	
	290 / 500	±10	+1HQ	+1HQ	+1HQ	+1HQ	
	305 / 525	±10	+MMP	–	+MMP	–	ZA
	380 / 660	±10	–	–	+1GH ¹⁾	–	CN, RU, TR, IQ, IR, ID, IN, TH, VN, AR, CL
	400 / 690	±10	–	–	+1GK ¹⁾	–	EU, IL, NZ, PK, ZA, AE
	415 / 720	±10	–	–	+1GL ¹⁾	–	UK, IN, IQ, MY, AU, SG, AE

Voltages and frequencies of different countries

	Voltage [V]	Voltage tolerance [%]	Design with terminal box				Country code
			Without IE2 (P < 0.75 kW)		With IE2 (P ≥ 0.75 kW)		
			CE	UL/CSA	CE	UL/CSA	
60 Hz	200 / 345	±10	+1GG	+1GG	+1GG	+1GG	JP
	220 / 380	±10	+MDP	+MDP	+MDP	+MDP	BR, KR, PE, MX, SA, TW, VE, BO
	230 / 400	±10	+1GR	+1GR	+1GR	+1GR	
	255 / 440	±5	+1FX	+1HM	–	–	PA, MX, PH
	255 / 440	±10	+1GP	+1GP	+1GP	+1GP	PA, MX, PH
	400	±10	–	–	+1GH ¹⁾	–	PA, MX, PH
	265 / 460	±10	+1FX	+1HM	+1GD	+1GD	US, CA, MX
	460	±10	–	–	+1GK ¹⁾	–	US, CA, MX
	460 delta	±10	–	–	–	+1KG ²⁾	US, CA, MX
	280 / 480	±5	+1FX	+1HM	–	–	US, CN, PA
	280 / 480	±10	+1GQ	+1GQ	+1GQ	+1GQ	US, CN, PA
	480	±10	–	–	+1GL ¹⁾	–	US, CN, PA
	330 / 575	±10	+1HQ	+1HQ	+1HQ	+1HQ	CA

AE = United Arab Emirates	EU = Europe	MY = Malaysia	TW = Taiwan
AR = Argentina	HK = Hong Kong	NZ = New Zealand	TH = Thailand
AU = Australia	ID = Indonesia	PA = Panama	TR = Turkey
BO = Bolivia	IL = Israel	PE = Peru	UK = United Kingdom
BR = Brazil	IN = India	PH = Philippines	US = USA
CA = Canada	IQ = Iraq	PK = Pakistan	VE = Venezuela
KR = Korea	IR = Iran	SA = Saudi Arabia	VN = Vietnam
CL = Chile	JP = Japan	SG = Singapore	ZA = South Africa
CN = China	MX = Mexico	RU = Russia	

Note: Motors with a performance rating of ≥ 0.75 kW must be designed for efficiency class IE2 (other designs available on request).

- 1) $P \geq 5.5$ kW not for UL/CSA
 2) $P \geq 5.5$ kW only for UL/CSA

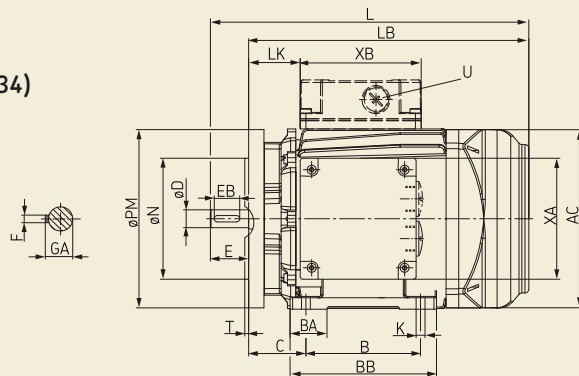
Voltage code texts

+1GP 220/380 V, 50 Hz; 255/440 V, 60 Hz ($\pm 10\%$)	+1GL 415/720 V, 50 Hz; 480 V, 60 Hz ($\pm 10\%$)	+MMP 305/525 V, 50 Hz ($\pm 10\%$)
+1GD 230/400 V, 50 Hz; 265/460 V, 60 Hz ($\pm 10\%$)	+1KG 400 V, 50 Hz; 460 V, 60 Hz ($\pm 10\%$)	+1FX 220–240 V / 380–420 V, 50 Hz ($\pm 5\%$) 254–280 V / 440–480 V, 60 Hz ($\pm 5\%$)
+1GQ 240/415 V, 50 Hz; 280/480 V, 60 Hz ($\pm 10\%$)	+1GF 220/345 V, 50 Hz ($\pm 10\%$)	+1HM 220–240 V / 380–420 V, 50 Hz ($\pm 5\%$) 254–280 V / 440–480 V, 60 Hz ($\pm 5\%$)
+1HQ 290/500 V, 50 Hz; 330/575 V, 60 Hz ($\pm 10\%$)	+1GG 200/345 V, 60 Hz ($\pm 10\%$)	
+1GH 380/660 V, 50 Hz; 440 V 60 Hz ($\pm 10\%$)	+MDP 220/380 V, 60 Hz ($\pm 10\%$)	
+1GK 400/690 V, 50 Hz; 460 V, 60 Hz ($\pm 10\%$)	+1GR 230/400 V, 60 Hz ($\pm 10\%$)	

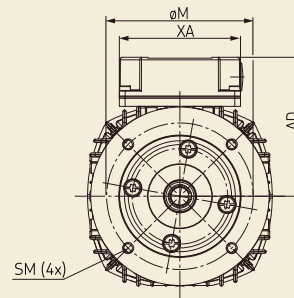
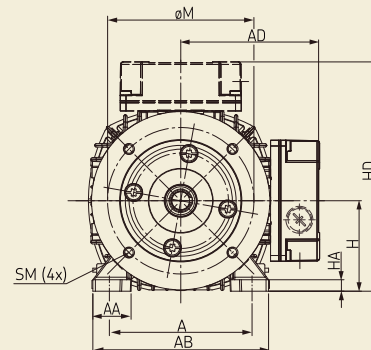
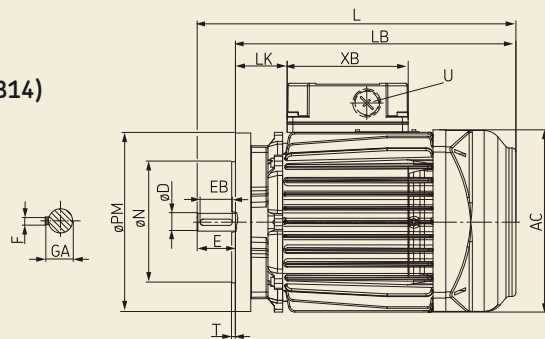
11.1.3 Installation drawing and dimensions

Assembly drawing for three-phase motor, Fig. 11

Foot design (IM B34)



Flange design (IM B14)



Dimensions [mm]

Serial No.	Size [Frame size]	No. of poles	øM	øN	øPM ¹⁾	SM	T	A	AA	AB	AC	AD _{max.}	B	BA	BB	C
1	63	4	100	80	120	M6 _{ødeep}	3	100	29.5	124.5	124	101.5 122.5	80	25	100	40
2	71	2.4	115	95	140	M8 _{12 deep}	3	112	30	138	141	109.5	90	29	115	45
3	80	4	130	110	160	M8 _{12 deep}	3.5	125	33.5	153	159	118.5	100	32	125	50
4	90	4	130	110	160	M8 _{13 deep}	3.5	140	35	170	176	148.5	125	33.5	155	56
5	100	2	165	130	200	M10 _{12 deep}	3.5	160	38	195	196	155	140	43	176	63
6	112	2	165	130	200	M10 _{12 deep}	3.5	190	44	225	220	168	140	45	176	70
7	132	2	165	130	200	M10 _{12 deep}	3.5	216	55	256	246	188	140	88	218	89

Serial No.	H	HA	HD _{max.}	K	U	XA	XB	LK	LB	L	øD	E	EB	F	GA
1	63	8	–	7	1x M20x1.5	61 100	61 116	43.5 19.5	185	208	11 _{J6}	23	18	4	12.5
2	71	9	–	7	1x M20x1.5	95	95	40.5	220	250	14 _{J6}	30	25	5	16
3	80	10	–	10	1x M20x1.5	95	95	43.5	255	295	19 _{J6}	40	32	6	21.5
4	90	11	240 ²⁾	9	1x M20x1.5	100	116	31	280	330	24 _{J6}	50	40	8	27
5	100	13	255	12	2x M25x1.5	100	116	116	303	363	28 _{J6}	60	50	8	31
6	112	15	280 ²⁾	12	2x M25x1.5	100	116	52	320	380	28 _{J6}	60	50	8	31
7	132	18	320	12	2x M32x1.5	117	142	183	405	485	38 _{k6}	80	70	10	41

¹⁾ Mounting flange acc. to DIN EN 50347.

²⁾ Only standard terminal box position on top is supported, right is not possible.

11.1.4 Technical data

IEC squirrel cage motors

Type	Foot design IM B34, flange design IM B14
Protection class	IP55
Temperature class	155 (F) utilized according to B
Duty type	S1
Temperature range	-20 to +40°C
Max. site altitude	1000 m above sea level
Cooling method	IC 41 (surface cooling with fan)
Temperature monitoring	None
Frequency converter operation	According to DIN IEC / TS 60034-17 (VDE 0530 Part 17) 2004, suitable for converter operation for supply voltages up to and including 480 V
Terminal box material	Metal

Size [Frame size]	Certi- fication	No. of poles	Flange- design (with threaded hole) ¹⁾	Weight [kg]	50 Hz			60 Hz				
					Rated voltage ²⁾ Δ / Y [V]	Perfor- mance rating ³⁾ [kW]	Speed [rpm]	Rated current Δ / Y [A]	Rated voltage ²⁾ Δ / Y [V]	Perfor- mance rating ³⁾ [kW]	Speed [rpm]	Rated current Δ / Y [A]
63	CE UL/CSA	4	FT100 (C120)	5	230 / 400	0.18	1380	1.15 / 0.65	265 / 460	0.22	1670	1.05 / 0.65
71	CE UL/CSA	2	FT115 (C140)	8	230 / 400	0.37	2880	1.86 / 1.08	265 / 460	0.44	3470	1.75 / 1.00
71	CE UL/CSA	4	FT115 (C140)	8	230 / 400	0.25	1420	0.90	265 / 460	0.30	1710	0.90
71	CE UL/CSA	4	FT115 (C140)	8	230 / 400	0.37	1430	1.80 / 1.00	265 / 460	0.44	1735	1.75 / 1.00
80	CE UL/CSA	4	FT130 (C160)	10	230 / 400	0.55	1410	2.90 / 1.70	265 / 460	0.62	1720	2.70 / 1.50
80	CE	4	FT130 (C160)	10	230 / 400	0.75	1440	2.96 / 1.71	265 / 460	0.90	1740	2.98 / 1.72
80	UL/CSA	4	FT130 (C160)	10	–	–	–	–	265 / 460	0.90	1740	2.98 / 1.72
90	CE	4	FT130 (C160)	20	230 / 400	1.10	1435	4.33 / 2.50	265 / 460	1.30	1740	4.23 / 2.44
90	UL/CSA	4	FT130 (C160)	20	–	–	–	–	265 / 460	1.30	1740	4.23 / 2.44
90	CE	4	FT130 (C160)	20	230 / 400	1.50	1440	5.70 / 3.30	265 / 460	1.80	1730	5.70 / 3.30
90	UL/CSA	4	FT130 (C160)	20	–	–	–	–	265 / 460	1.80	1730	5.70 / 3.30

1) Flange with threaded hole acc. to DIN EN 50347 (FT).

2) Beyond a performance rating of 0.75 kW, the motors come with tailor-made coils. Wide voltage range motors only for performance ratings < 0.75 kW.

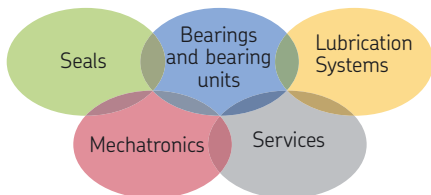
3) Beyond a performance rating of 0.75 kW, the motors are designed for efficiency class IE2.

Size [Frame size]	Certi- fication	No. of poles	Flange- design (with threaded hole) ¹⁾	Weight [kg]	50 Hz			60 Hz				
					Rated voltage ²⁾ Δ/Y [V]	Perfor- mance rating ³⁾ [kW]	Speed [rpm]	Rated current Δ/Y [A]	Rated voltage ²⁾ Δ/Y [V]	Perfor- mance rating ³⁾ [kW]	Speed [rpm]	Rated current Δ/Y [A]
100	CE	2	FT165 (C200)	25	230 / 400	3.00	2900	9.90 / 5.70	460	3.60	3485	5.80
100	UL/CSA	2	FT165 (C200)	25	–	–	–	–	460	3.60	3485	5.80
112	CE	2	FT165 (C200)	35	230 / 400	4.00	2880	12.4 / 7.15	460	4.80	3475	7.35
112	UL/CSA	2	FT165 (C200)	35	–	–	–	–	460	4.80	3475	7.35
132	CE	2	FT165 (C200)	45	400 / 690	5.50	2910	10.0 / 5.75	460	6.60	3500	10.30
132	UL/CSA	2	FT165 (C200)	45	400	5.50	2910	10.0	460	6.60	3500	10.30

1) Flange with threaded hole acc. to DIN EN 50347 (FT).

2) Beyond a performance rating of 0.75 kW, the motors come with tailor-made coils. Wide voltage range motors only for performance ratings < 0.75 kW.

3) Beyond a performance rating of 0.75 kW, the motors are designed for efficiency class IE2.



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