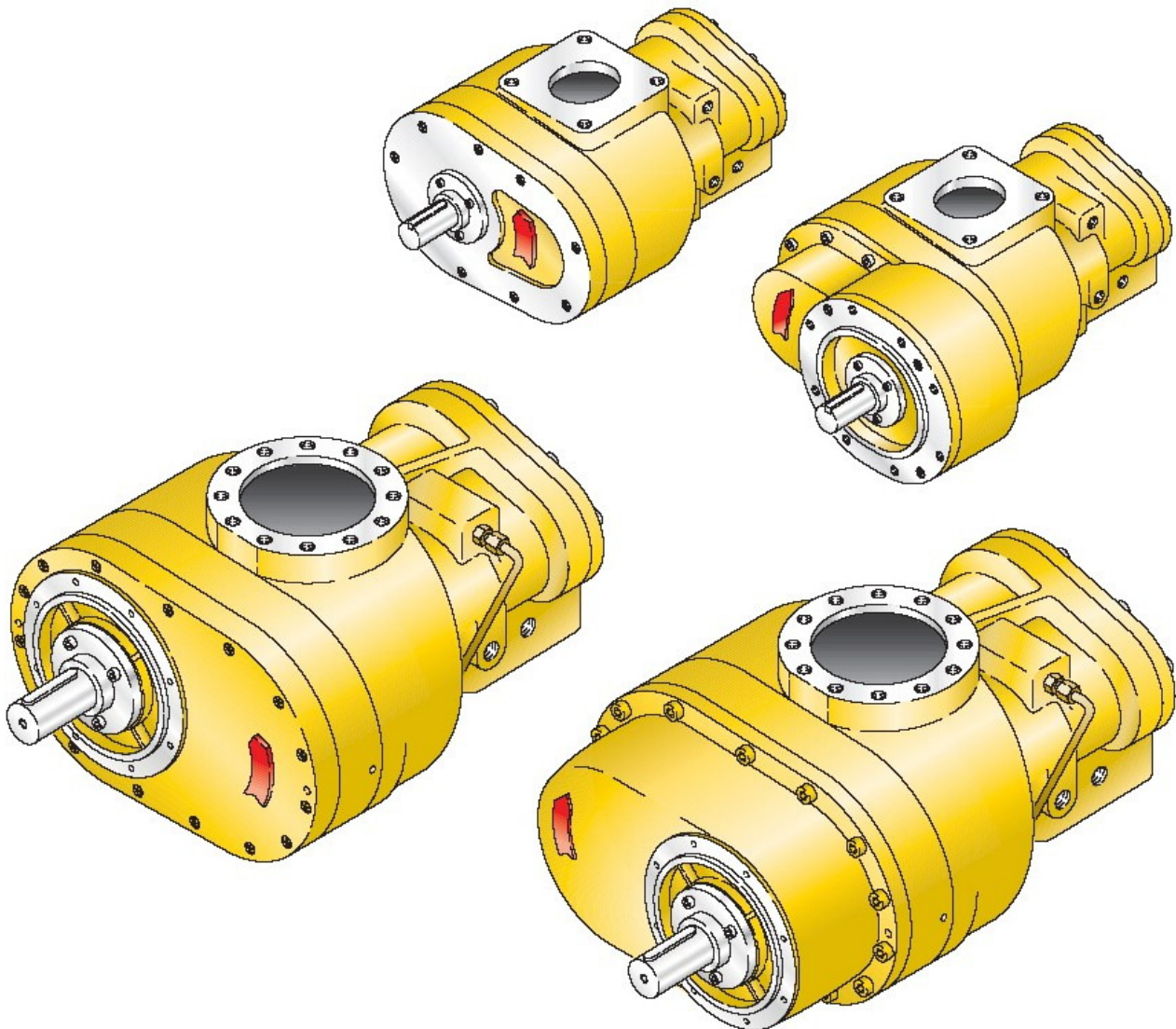


Screw Compressor with Oil Injection

## Series CF (excluding encapsulated screw compressors)



## Introduction

The purpose of this installation manual is to provide assistance when fitting the Series CF compressor elements into compressor systems or groups. All information and specifically data relating to safety contained in this manual should be incorporated into the operating company's operation manual.

Content of this installation manual is property of GHH RAND. Reprint and reproduction are prohibited without previous written consent from GHH RAND.

The details of this installation manual do not entitle to any claims concerning the specified GHH RAND products. All warranties, other agreements as well as terms and conditions are in conformance with the general sales and delivery conditions of GHH RAND copies available on request.

**Service and maintenance is only permitted to be carried out by a GHH RAND authorized service bureau.**

GHH RAND reserves the right to modify and improve their products without advance notice. GHH RAND is not obligated to do these modifications or improvements on already sold and delivered products subsequently.

This series is only constructed for operation under following conditions and use:

**„Air compression, not containing common or perceptible added gases, vapours or impurity“!**

Operation of this compressor under conditions as listed under chart 1

- is not permitted by GHH RAND,
- can impact on safety of the operator or other persons and
- can interfere with warranty claims.

### CHART 1

1)	directly aerated respiration for persons
2)	indirectly aerated respiration for persons
3)	operation of compressor in areas beyond

	specified temperature range (see Annex 1 Technical data)
4)	operation of compressor in areas of consisting or predictable risks caused by flammable gases or vapours

**THIS COMPRESSOR IS NOT BUILT FOR OPERATION IN POTENTIALLY EXPLOSIVE AREAS AND IS NOT ON ANY ACCOUNT PERMITTED TO BE USED IN THESE AREAS.**

In case of utilization of spare parts not specified in the GHH RAND spare parts list, GHH RAND will not accept responsibilities for consequential damages.

### **WARNING!**

**Utilisation of incorrect coolants can damage rotary screw compressor stages. We recommend the use of coolant „PrimeCool“ or „PrimeCool Plus“. Please contact GHH RAND for further information!**

### **RECEPTION**

The compressor has to be carefully inspected after receipt. Indications of careless handling on the part of the freight carrier has to be noted upon receipt, particularly if the compressor will not be unpacked immediately. A declaration of consent signed by the freight carrier regarding damages detected will simplify the processing of any subsequent insurance claims.

### **IMPORTANT INFORMATION**

**THE GOODS HAVE TO BE IMMEDIATELY INSPECTED AFTER RECEPTION. GHH RAND ARE ABSOLVED FROM RESPONSIBILITY FOR DAMAGE CAUSED IN SHIPMENT TO THE GOODS AFTER SIGNATURE OF WAYBILL BY FREIGHT CARRIER.**

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## 1 General

### 1.1 Intended purpose

GHH RAND manufacture and supply the Series CF compressor stages as built-in elements for compressed air generation systems or packages.

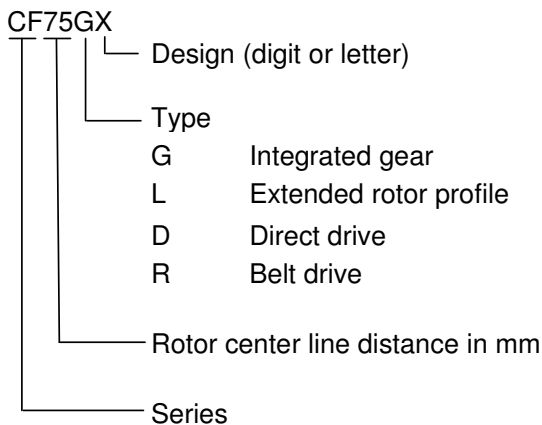
The compressors are exclusively intended to compress air within the scope of the specified technical applications limits.

Any other utilization of compressor beyond these applications is not usual. The manufacturer is not liable for resulting defects! The operator is responsible for the risk only!

**For differing utilisation the approval of the manufacturer is required.**

### 1.2 Type designation

Designation is structured as follows:



### 1.3 Marking

The type designation is to found on the compressor's nameplate.

#### NOTE

The whole marking has documentary value and shall not be removed, modified or made illegible.

### 1.4 Information required for inquiries and orders

When inquiring about and ordering spare parts and accessories, please state the exact type designation and the machine number of the compressor.

Required wear- and tear part kits for maintenance in chapter 7.

#### NOTE

Original spare parts and accessories approved by the manufacturer contribute to safety.

The use of non GHH RAND spare parts and or non-approved accessories will result in the loss of any liability for the consequences arising therefrom.

### 1.5 Sale and service point

Addresses of the sale and service points are to be found at the end of this installation manual (section 7).

## 2 Safety

### 2.1 General

This installation manual contains basic instructions to be observed during installation, operation and maintenance and where necessary shall be taken over into operating company's operation manual of the machine/system into which the compressor elements are fitted.

Prior to utilization and putting into operation the compressor personnel shall read these instructions and those in the operating manual of the machine/system into which the compressor stage is fitted. The operating manual must always be accessible to the personnel.

Not only should the general safety instructions under this main section „Safety“ be followed, but also those particular safety instructions added to the other main sections.

**Non-observance of safety instructions will lead to loss of any claims for indemnity!**

### 2.2 Marking of instructions in the installation manual

The safety instructions contained in this installation manual and likely to cause personal hazard if not observed, have been highlighted by the general danger sign



In case of safety instructions likely to endanger the machine and its function if not observed, the word

**WARNING**

has been inserted.

Notices are highlighted as follows:

**NOTE**

### 2.3 Qualification and training of personnel

Work on the compressor like operation and maintenance shall only be carried out by authorized, instructed and qualified personnel who are familiar with the safety regulations in force.

The operating company shall precisely define the scope of responsibilities, the competence and the supervision of the personnel. If the personnel do not have the necessary knowledge, they shall be trained and instructed accordingly.

Repairs or conversions shall only be carried out by authorized personnel which are always available from GHH RAND.

### 2.4 Safety conscious operation

The essential technical safety provisions applicable to the installation, operation and maintenance of air compressors are contained in the following publications:

- Provisions issued by the craft association (BGV), in particular:
  - BGV A1: General provisions
  - BGV A2: Electric systems and working stock
  - BGR 500: Operation of work equipment, Part 1, Chapter. 2.11-Part 2: Compressor and vacuum pumps
- Standards, in particular:
  - ISO 12100: Safety of machines
  - EN 1012-1: Compressors and vacuum pumps, safety requirements; Part 1: Compressors
  - ISO 5388 Stationary air compressors - safety rules and code of practice
- Regulations, in particular:
  - Pressure Equipment Directive
  - Regulation on pressure vessels, pressure gas vessels and filling systems

The last revision of these provisions shall always be applicable.

Local condition rules & regulations and especially safety regulations must be adhered to in full. In the event of concurrent regulations, please always comply with the most stringent.

## **2.5 Safety instructions for the operating company/operator**

The operating company is responsible that the compressor is always in safe operating condition. Damaged or non-operating compressors shall be replaced without delay.

## **2.6 Safety instructions for maintenance, inspection and mounting work**

Service and maintenance is only permitted to be carried out by a GHH RAND authorized service bureau

The machine/system should only be worked on whilst shut down and isolated. Following the machine/system shutdown procedure described in the operating manual is imperative.

Disposal of oils and greases in accordance with local legislation is mandatory.

After completion of work, immediately reinstall and reset into operation all safety and protection devices.

Before resuming operation, the points mentioned in section "Putting into operation" (section 5) shall be observed.

## **2.7 Unauthorised conversion and manufacturing of spare parts**

Conversions or modifications of the compressor are not permitted unless agreed in writing by GHH RAND.

Original spare parts and accessories approved by the manufacturer contribute to safety.

The use of other spare parts and non-approved accessories may result in the loss of liability!

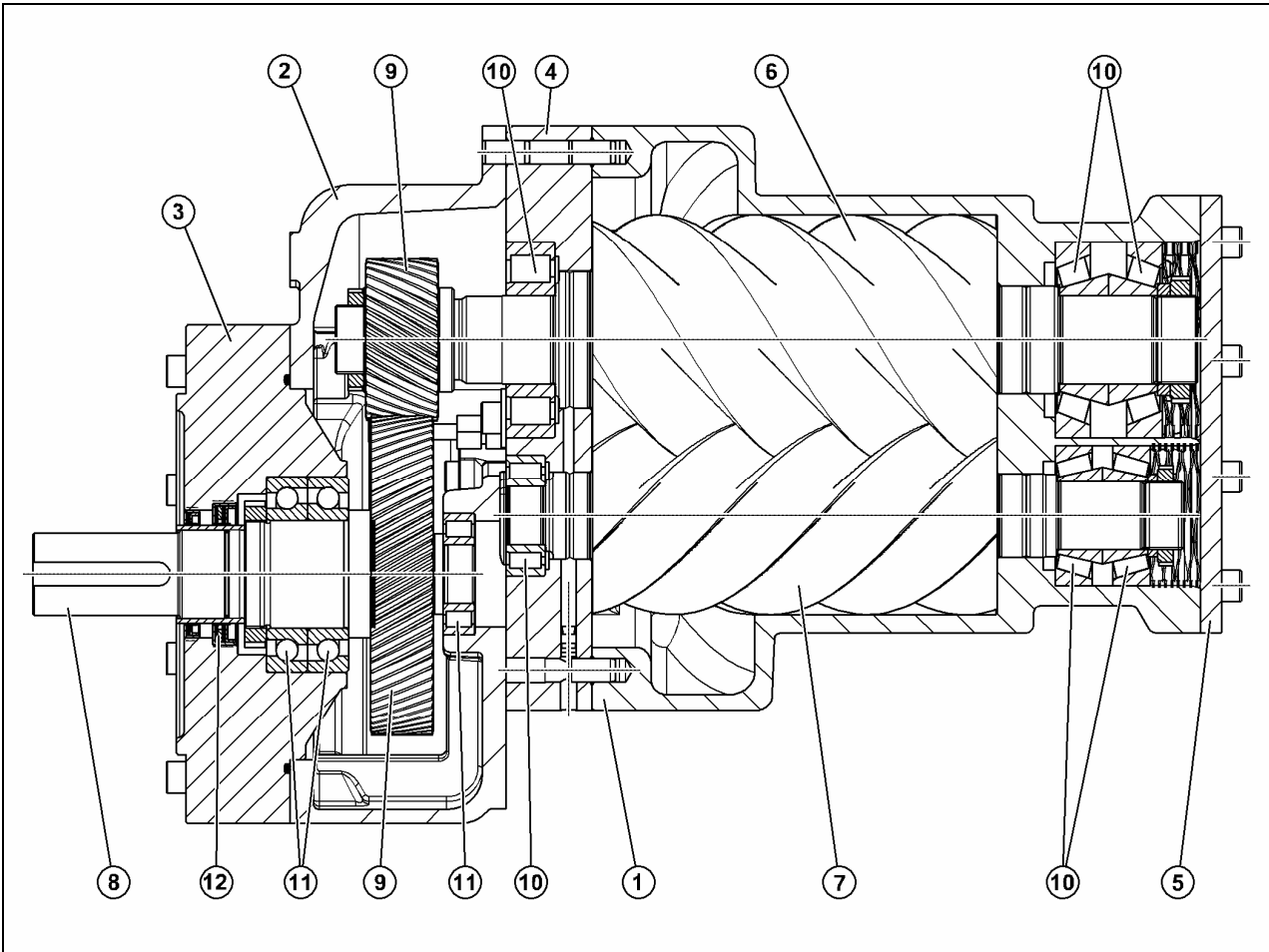
## **2.8 Unauthorized operation modes**

Without written consent of GHH RAND, the compressor shall not be operated under other conditions than those described in annex "Technical data".



## 3 Description of product and accessories

### 3.1 Main assemblies of the compressor



### Sectional drawing of a screw compressor as an example

#### Main components:

- 1 Rotor casing
- 2 Gear casing
- 3 Gear case cover
- 4 Bearing casing
- 5 Cover
- 6 + 7 Rotor pairs (Male + Female)
- 8 + 9 Set of wheels (driving wheel with shaft + pinion)

#### Rotors:

- 10 Rotor bearing
- 11 Drive shaft bearing

#### Seals:

- 12 Shaft seal

## 3.2 Direct drive

The compressor can be directly driven by a motor, at the motors operating speed, via a coupling which is directly mounted on the male motor shaft.

Installing and fastening with threaded bores on the underside of the compressor.

A correct alignment of motor/coupling/compressor is absolutely necessary.

## 3.3 Belt drive

Adapting the motor speed to the required operating speed of the compressor is possible means on an intermediate belt drive.

Application of reference as per Annex, section 8 „Technical data“.

Installing and fastening with threaded bores on the underside of the compressor.

A correct alignment of motor/belt pulleys/compressor is absolutely necessary.

## 3.4 Gear drive

Driving takes place by means of an integrated gear that increase or decreases the motor speed to the required operating speed of the compressor.

The compressor can either be directly flanged by flange connection to the driving motor using a coupling casing, or be installed or fastened using threaded bores on the underside of the compressor.

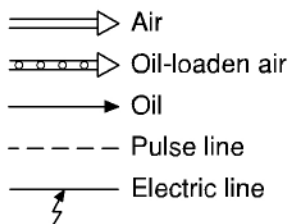
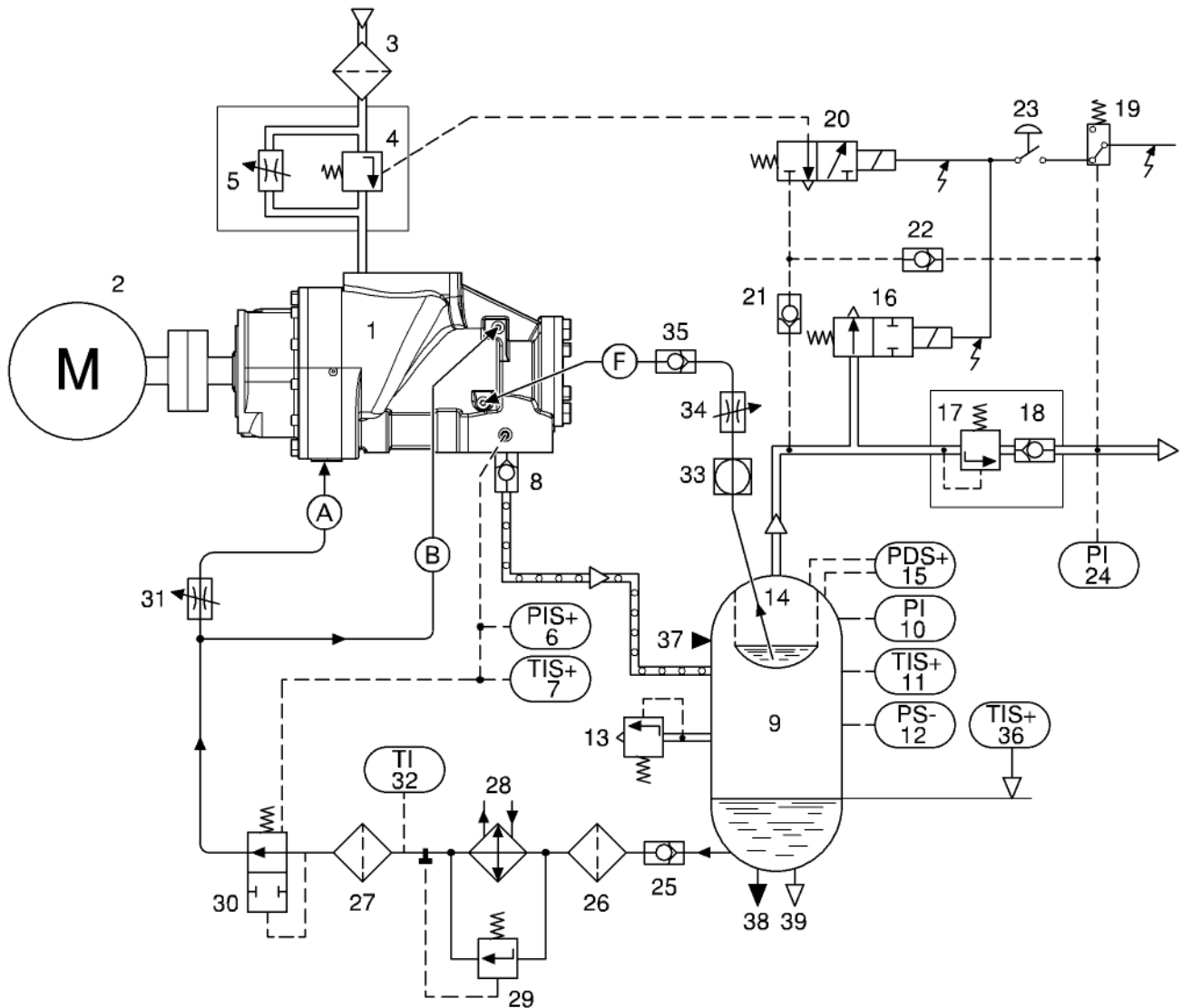


## 4 Recommendation for plant construction

### NOTE

The following piping diagram and descriptions are non-committal examples and provide information on possible forms of execution. They do not dispense from the liability to consider the actual operating conditions. Existing safety regulations (see also section 2 "Safety") shall be observed. GHH RAND does not assume any liability or warranty for the represented circuits, descriptions and other information.

### 4.1 Electromotor drive piping diagram



#### Compressor connections

- (A) Oil injection
- (B) Bearing lubrication Pressure side
- (F) Oil return from fine separator

## List of equipment

		29	Thermostatic valve
1	Screw compressor	30	Oil stop valve
2	Drive motor with coupling / belt	31	Adjustable throttle valve
3	Suction filter	32	Oil temperature thermometer
4	Suction valve	33	Sight glass
5	Adjustable throttle valve	34	Adjustable throttle valve
6	Contact manometer for compressor discharge pressure	35	Non-return valve
7	Quick-action temperature controller for the discharge temperature *)	36	Oil level indicator – Oil reservoir
8	Non-return valve	37	Oil filler – Oil reservoir
9	Oil reservoir and coarse separator	38	Oil drain – Oil reservoir
10	Manometer oil reservoir pressure	39	Condensate drain – Oil reservoir
11	Quick-action temperature controller for temperature in the oil reservoir *)		
12	Pressure controller (relief pressure)		
13	Safety Valve (discharge pressure)		
14	Fine separator		
15	Difference pressure controller for fine separator		
16	Relief valve		
17	Minimum pressure valve		
18	Non-return valve		
19	Pressure controller (mains pressure)		
20	Electromagnetic 3/2 way valve		
21	Non-return valve		
22	Non-return valve		
23	Hand switch Load / No-load		
24	Manometer for the mains pressure		
25	Non-return valve		
26	Oil filter	*)	typical response time max. 10 seconds; in the switch-off range, a temperature jump of 10 °C must entail switching within 1 second.
27	Oil filter		
28	Oil cooler		

## 4.2 Explanations to the electromotor drive tubing plan

### NOTE

The pressures stated are absolute pressures.

### 4.2.1 Start-up

- Suction valve [4] is closed as no control pressure is applied yet.  
To allow for intake of a small amount of air for pressure build-up, the throttle valve [5] is set as to provide for a pressure of > 0.1 bar ahead of the compressor.  
An incorrect construction/design of suction valve might lead to problems/damages with/of compressor.

### NOTE

Throttle valve [5] is required only if suction valve [4] does not have an adjusting possibility for directed leakage (e.g. provision of bores in a throttle).

- Hand switch [23] is closed.  
Load position: Electric circuit for relief valve [16] and the 2/3 way valve [20] is closed.
- At the start of the motor, relief valve [16] closes (idle: open), the 3/2 way valve [20] opens.
- Minimum pressure valve [17] is closed, thus separating the compressor system from the mains. Minimum pressure valve must be adjusted to a minimum pressure of 4.5 bar.
- To protect motor [2] and coupling, starting the motor should only be possible if there is a pressure maximum of 2 bar behind the compressor.

### 4.2.2 Operation under load

- When required control pressure has been reached, the suction valve [4] opens.
- Minimum pressure valve [17] opens only after a pressure of approx. 4.5 bar has built-up in the compressor system. This pressure ensures a sufficient oil supply to the compressor during operating under load.  
The compressor boosts into the mains as soon as the system pressure ahead of non-return valve [18] exceeds the pressure of the mains.

### 4.2.3 No-load operation

No-load operation is possible:

1. Automatically in case of mains pressure is higher than the upper switch-point of pressure controller [19].
2. Upon actuation of hand switch [23].  
(No-load position: Power supply for relief valve [16] and 3/2 way valve [20] is interrupted).

The sequence is identical:

3/2 way valve [20] closes because of the absence of current, and suction valve [4] closes because of the absence of control pressure.

- At the same time, the absence of current opens relief valve [16], the pressure in the compressor system drops.
- Non-return valve [18] separates the compressor system from the mains.  
(In addition, minimum pressure valve [17] closes at a pressure of approx. 4.5 bar.)
- As the mains pressure drops and reaches the lower switch-point, pressure controller [19] again closes the electric circuit.  
This makes relief valve [16] close and 3/2 way valve [20] open. The control pressure from the mains opens immediately suction valve [4] by means of non-return valve [22]. Further sequence as described under "Operation under load".

## 4.2.4 Switch-off

- Switch-off takes place intentionally upon actuation of the motor circuit breaker or by means of safety cut out in the event of:
  - A pressure behind the compressor of more than  $p_2 + 0.3$  bar by contact manometer [6],
  - A temperature behind the compressor of more than 110 °C by quick-action temperature controller [7],
  - a temperature in oil reservoir [9] of more than 110 °C by quick-action temperature controller [11].



Switch-off must be initiated at a temperature of not more than 120 °C.

- For safety reasons the motor should be switched-off from No-load position.
- If the motor comes to standstill before the system is completely relieved, non-return valve [8] prevents reverse motion caused by backward pressure drop.
- Oil stop valve [30] is generally open. If at switching-off, the motor comes to standstill before the system has been relieved, a pressure difference occurs between the pressure side of the compressor and the oil line of oil stop valve [30] and closes oil stop valve [30]. This ensures that the compressor cannot be filled with oil from the oil system due to the pressure drop (risk of a liquid hammer when starting-up again).

## 4.2.5 Oil system

Utilizing the pressure difference, the oil collected in the oil reservoir/coarse separator is used to supply the compressor with oil.

- By means of adjustable throttle valve [31], the oil injection amount into the compression chamber (connection A) is adjusted in a way to provide for the desired discharge temperature (between the dew point temperature and 110 °C).
- By means of the thermostatic valve [29], the oil intake temperature for the compressor

stage is kept approximately constant depending on operating condition and dew point.

- Connection F is used to return the oil collected in fine separator [14] into compression chamber of the compressor. With minimum discharge pressure, adjust throttle valve [34] in a way that (visible on sight glass [33]) only a small amount of air is returned with the oil.
- Non-return-valve [35] prevents, that during relief, oil from the compression chamber is blown into the open through the fine separator and relief valve [16].
- Non-return valve [25] prevents that oil flows back from compressor and oil system into the oil reservoir if, when switching from No-load to Load, a pressure has already built-up in the compressor whilst oil reservoir [9] is still relieved.

## 4.3 Explanations to the diesel engine drive tubing plan

### NOTE

The pressures stated are absolute pressures.

### 4.3.1 Start-up

- Suction valve [4] is on idle position (minimum discharge) as no control pressure is applied yet.

To allow for intake of a small amount of air for pressure built-up, the throttle valve [5] is set as to provide for a pressure of > 0.1 bar ahead of the compressor. An incorrect construction/design of suction valve might cause problems/damages with/of compressor.

### NOTE

Throttle valve [5] is required only if suction valve [4] does not have an adjusting possibility for directed leakage (e.g. provision of bores in a throttle).

- Hand switch [23] is closed.  
Load position: Electric circuit for relief valve [16] and the 3/2 way valve [20] is closed.
- At the start of the motor, relief valve [16] (idle: open), the 3/2 way valve [20]. The diesel engine is running with minimum speed.
- Minimum pressure valve [17] is closed, thus separating the compressor system from the mains. Minimum pressure valve must be adjusted to a minimum pressure of 4.5 bar.
- To protect motor and coupling [2], starting the motor should only be possible if there is a maximum pressure of 2 bar behind the compressor.

### 4.3.2 Operation under load

- When required control pressure has been reached, control cylinder [40] regulates the diesel engine to maximum speed and suction valve [4] opens at the same time.
- Minimum pressure valve [17] opens only after a pressure of approx. 4.5 bar has built-up in the compressor system. This pressure ensures a sufficient oil supply of the compressor during operation under load.  
The compressor boosts into the mains as soon as the system pressure ahead of non-

return valve [18] exceeds the pressure of the mains.

### 4.3.3 No-load operation

No-load operation is possible:

1. Automatically in case of mains pressure is higher than the upper switch-point of pressure controller [19].
2. Upon actuation of hand switch [23]. (No-load position: Power supply for relief valve [16] and 3/2 way valve [20] is interrupted).

The sequence is identical:

- 3/2 way valve [20] closes because of the absence of current. The absence of control pressure regulates the diesel engine to minimum speed and opens suction valve [4] at the same time.
- At the same time, the absence of current opens relief valve [16], the pressure in the compressor system drops.
- Non-return valve [18] separates the compressor system from the mains.  
(In addition, minimum pressure valve [17] closes at a pressure of approx. 4.5 bar).
- As the mains pressure drops and reaches the lower switch-point, pressure controller [19] again closes the electric circuit.  
This makes relief valve [16] close and 3/2 way valve [20] open.  
The control pressure from the mains immediately regulates the diesel engine to maximum speed and opens suction valve [4] at the same time by means of non-return valve [22] and control cylinder [40]. Further sequence as described under "Operation under load".

## 4.3.4 Switch-off

- Switch-off takes place intentionally upon actuation of the motor circuit breaker or by means of safety cut out in the event of:
  - A pressure behind a compressor of more than  $p_2 + 0.3$  bar by contact manometer [6],
  - A temperature behind the compressor of more than 110 °C by quick-action temperature controller [7],
  - A temperature in oil reservoir [9] of more than 110 °C by quick-action temperature controller [11].



Switch-off must be initiated at a temperature of not more than 120°C.

- For safety reasons the motor should be switched-off from No-load position. The 3/2 way valve [20] closes and relief valve [16] opens, because of the absence of current. The absence of control pressure regulates the diesel engine to minimum speed and closes suction valve [4] at the same time. Subsequently the diesel engine can be switched-off.
- If the motor comes to standstill before the system is completely relieved, non-return valve [8] prevents reverse motion caused by backward pressure drop.
- Oil stop valve [30] is generally open. If at switching-off, the motor comes to standstill before the system has been relieved, a pressure difference occurs between the pressure side of the compressor and the oil line of oil stop valve [30] and closes oil stop valve [30]. This ensures that the compressor cannot be filled with oil from the oil system due to the pressure drop (risk of a liquid hammer when starting-up again).

## 4.3.5 Oil system

Utilizing the pressure difference, the oil collected in the oil reservoir/coarse separator is used to supply the compressor with oil.

- By means of adjustable throttle valve [31], the oil injection amount into the compression chamber (connection A) is adjusted in a way to provide for the desired discharge temperature (between dew point temperature and 110°C).
- By means of the thermostatic valve [29], the oil intake temperature for the compressor stage is kept approximately constant depending on operating condition and dew point.
- Connection F is used to return the oil collected in fine separator [14] into compression chamber of the compressor. With minimum discharge pressure, adjust throttle valve [34] in a way that (visible on sight glass [33]) only a small amount of air is returned with the oil.
- Non-return valve [35] prevents, that during relief, oil from the compressor chamber is blown into the open through the fine separator and relief valve [16].
- Non-return valve [25] prevents that oil flows back from compressor and oil system into the oil reservoir if, when switching from No-load to Load, a pressure has already built-up in the compressor whilst oil reservoir [9] is still relieved.



## 4.4 Recommendations for plant protection

- Maximum permissible discharge temperature: 110 °C. Temperature monitoring is prescribed.
- Minimum permissible discharge pressure: 6 bar (with opened suction valve)
- Maximum permissible discharge pressure, see technical data sheets.
- The minimum discharge temperature should be above the dew point temperature. If this is not the case, the water vapour contained in the air condenses. The water accumulating in the oil affects the lubricant and may lead to bearing damages.
- Existing adjustment possibility for the oil injection amount to influence on the discharge temperature.
- The system must be designed so that, when the motor is at standstill, any still existing pressure cannot relieve backward through the compressor unit (reverse motion of compressor) or through oil system (compressor fills with oil; risk of liquid hammer when starting-up again).
- Generally, the unit does not require an oil pump. It is sufficiently supplied with oil due to the pressure differences between the oil reservoir that is under discharge pressure, and the individual connection points. For particular operating conditions (e.g. extremely low temperatures or pressures <6 bar), sufficient oil supply must be ensured by means of an external oil pump.
- The size of the oil reservoir/coarse separator is decisive for the degree of preliminary separation of the oil from the compressed air. A large reservoir means a low flow speed and thus a good oil separation. The build up the required lubrication oil pressure as rapidly as possible at start-up, a minimum pressure valve should be fitted behind the separator ahead of the mains.
- At every stage of run-up, the starting torque of the motor must be higher than the starting torque of the compressor. The run-up time of the motor should not be less than 2 seconds.

### WARNING

Drive motor has to be designed that no axial force can affect jackshaft of compressor. To compensate magnetic forces and forces caused by heat expansion the motor bearing on the coupling side has to be designed as fix bearing. Axial forces can damage gears in a gear box driven airend!

Short interruption of operation caused by voltage break-downs of the electric power create dynamic processes within the drive train with high loads exceeding several times the nominal loads which causes overheating of the drive train and its damage. Warranty claims caused by this kind of damages will definitively be rejected!

Motor, coupling, gear box/belts and airend combination, could create a situation resulting in a package susceptible to damaging vibration frequencies. To ensure safe and free of vibration operation of the system, torsional vibration analysis must be undertaken. The motor and airend frequencies have to be considered in this calculation.

### Airend Installation

When loading or transporting airends ensure that the specified lifting and tie down points are used. It is recommended that the machine be moved using the fork lift slots in the airend. The airend has to be installed without any restraints. Because of acoustic reasons vibration-free installation has to be considered (avoidance of structure-borne noise)

### WARNING

Synthetic components in compressed air units might be corroded by synthetic lubricants or additives contained in mineral lubricants. Compatibility has to be checked regarding utilisation of lubricant. We recommend coolant „PrimeCool“ or „PrimeCool Plus“.

### Compressed Air Piping

The compressed air piping should have at least the same diameter as the discharge port of the compressor. All pipes and fittings have to be designed and built according to the max. discharge

pressure under consideration of Safety Regulations mention according to chapter 2.4

Do not load any additional forces on the flanges of the airend. Heat expansion and vibrations are to compensated by usage of appropriate devices.

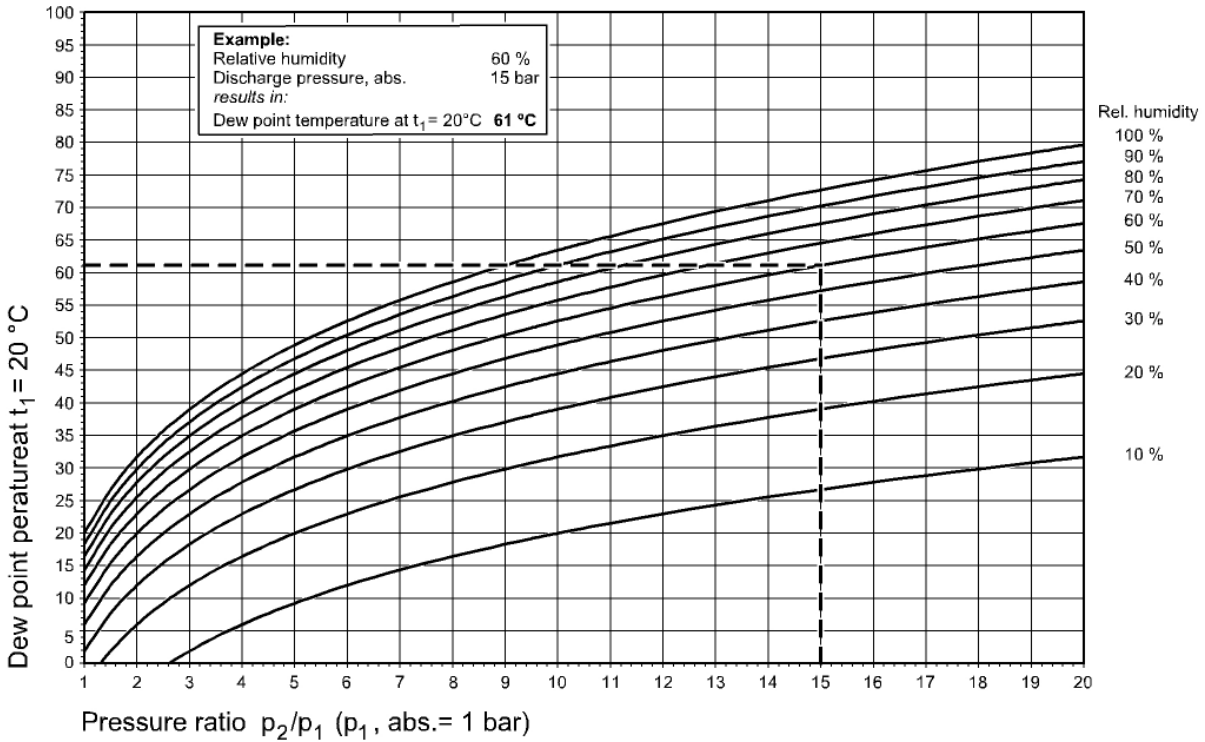
## **WARNING**

Screw compressors and piston compressors should not be installed at the same air network without the installation of an appropriate pressure compensating gas pulsation vessel.

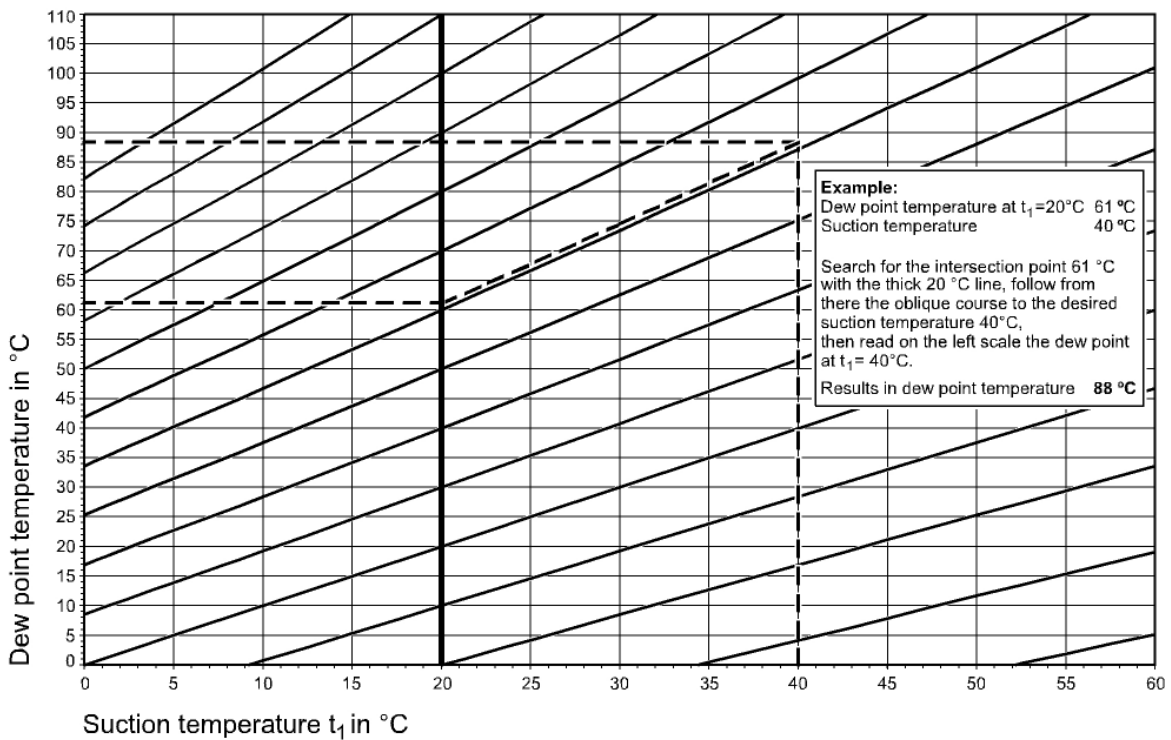
## 4.5 Dew point diagram

### Dew point diagram

Dew point diagram for  $t_1 = 20\text{ °C}$



Dew point Conversion from  $t_1 = 20\text{ °C}$  to any  $t_1$



## 4.6 Recommendations for Lubricants

### 4.6.1 Type of lubricants

In consideration of the high stresses to which lubricants are subjected in screw compressors with oil injected cooler, it is recommended to exclusively use non-aging and anti-corrosive oil grades with a low foaming tendency that have been demonstrated to be suitable for application.

GHH RAND recommend stable and proven characteristic lubricants:

*„PrimeCool“ on mineral basis & „PrimeCool Plus“ on synthetic basis.*

In case of utilisation of another lubricant, it is mandatory that oil specification as follows must be observed.

Technical specification of PrimeCool (mineral lubricant)

Properties	Unit		Test method
Density at 15 °C	kg/m <sup>3</sup>	874	DIN 51 757
Kinematic viscosity at 40 °C	mm <sup>2</sup> /s	46	DIN 51 550 & DIN 51 562-1
at 100 °C		6,8	
Viscosity index		101	DIN ISO 2909
Flashpoint	°C	230	DIN ISO 2592
Pourpoint	°C	-31	DIN ISO 3016
Neutralization number TAN	mgKOH/g	0,2	DIN 51 558-2
Demulsification at 54 °C	min	15	DIN 51 599
Foaming			
Seq. I: 24 °C	ml/ml	0/0	ASTM D 892
Seq. II: 93,5 °C	ml/ml	20/0	ASTM D 892
Seq. III: after 93,5 °C	ml/ml	0/5/0	ASTM D 892
Air release at 50 °C	min	3	DIN 51 381

Technical specification of PrimeCool Plus (synthetic lubricant)

Properties	Unit		Test method
Density at 15 °C	kg/m <sup>3</sup>	837	DIN 51 757
Kinematic viscosity Bei 40 °C	mm <sup>2</sup> /s	46	DIN 51 550 & DIN 51 562-1
Bei 100 °C		7,8	
Viscosity index		139	DIN ISO 2909
Flashpoint	°C	278	DIN ISO 2592
Pourpoint	°C	<-60	DIN ISO 3016
Neutralization number TAN	mgKOH/g	0,4	DIN 51 558-2
Demulsification at 54 °C	min	15	DIN 51 599
Foaming			
Seq. I: 24 °C	ml/ml	5/0	ASTM D 892
Seq. II: 93,5 °C	ml/ml	20/0	ASTM D 892
Seq. III: after 93,5 °C	ml/ml	5/0	ASTM D 892
Air release at 50 °C	min	3	DIN 51 381

**Different specifications will lead to non-warranty!**

As deterioration of lubricant strongly depends on conditions of the airborne area and the operating

method of the compressor, regular checks of the oil quality have to be carried out and documented. In either case the interval of oil change has to be observed according to maintenance instructions.

### WARNING

In case of utilisation of synthetic lubricants, compatibility with compressor component material has to be ensured. Furthermore oil additives within the oil must not chemically react to the condensate which is unavoidably developed at start-up of compressor unit.

Authorisation for other lubricants other than PrimeCool / PrimeCool Plus will not be given!

### 4.6.2 Lubricant selection

Viscosity is the most important criterion of any lubricant. To avoid damage to the bearings, a minimum viscosity of 15 mm<sup>2</sup>/s (cSt) is required for the selected oil injection temperature. As viscosity changes with temperatures, the recommendations as per the following table are applicable depending on respective injection temperatures:

Injection temperature °C	up to 50	up to 60	up to 70
ISO-Viscosity class	VG 32	VG 46	VG 68
Viscosity at 40 °C mm <sup>2</sup> /s	28.8-35.2	41.4-50.6	61.2-74.8
Flashpoint COC °C	>200	>210	>220

The pour point is min. 5 °C below the lowest ambient temperature.

On machinery which is continuously operated at very low speeds (male-rotor tip speed less than 15 m/s), the respective next higher viscosity class is to be used in accordance with the above table.

To avoid wearing effects on antifriction bearings and driving gears to the greatest possible extent, only those oil grades are accepted which contain wear-reduction additives to provide FZG load stage no. 10 as a minimum.

\*) The stated flow rates are valid for the usual viscosities of 32 – 68 cSt in the normal temperature range between 40 °C and 80 °C

## 4.6.3 Admixtures, impurities

### ➤ Water

Water within the lubricant can lead to penetration of lubricating film. Therefore final temperature should always be beyond the dew point in so far as no water can precipitate in oil circuit.

### ➤ Dirt

Abrasive impurities, such as grinding or blast-cleaning residues, as a rule will create profile damages and major bearing damage. Therefore, best-possible filtration of the lubricant is necessary (recommended filter fineness  $\beta_{25} = 75$  according to DIN ISO 4572).

When using oil filters with an internal bypass as specified for instance in the implementing regulations of German accident prevention codes for avoidance of excessive temperatures, it must further be ensured that this is never activated. Particular attention has to be paid to the fact that the bypass is not even opened in the event of a machine cold start if the pressure loss rises through the higher viscosity. Such an effect is particularly dangerous as in such a case any previously filtered-out residues would be washed into the compressor range as well as into the bearings at a great concentration together with the oil.

### ➤ Foreign material in suction air

When installed in a marine atmosphere, a high air humidity accompanied by chlorine (salt) or a chemical atmosphere with gas admixtures in the intake air may greatly affect the normal properties of lubricants.

It is not possible in these cases to make any general recommendation.

## 4.7 Permissible flow rates

The following values are recommended as maximum flow rates in pipes:

### Air pipe

Suction side	15.0 – 20.0 m/s
Pressure side (air only)	20.0 – 25.0 m/s
(air/oil mixture)	6.0 – 8.0 m/s

### Oil pipe \*)

Pressure line	1.0 – 2.5 m/s
“Free” Oil drain	0.1 – 0.2 m/s

## 4.8 Filter fineness

### 4.8.1 Oil filter fineness

**Mesh width max. 0.010 mm (10 µm)**

For normal operating conditions, filters with a fineness according to DIN ISO 4572:

$$\beta_{25} = 75$$

are recommended.

It is recommended to filter the oil while filling the oil reservoir, even when filling with fresh clean oil to prevent any contamination entering the system

In this connection, a fineness according to DIN ISO 4572:

$$\beta_6 = 100$$

is recommended (see chapter 4.6.3).

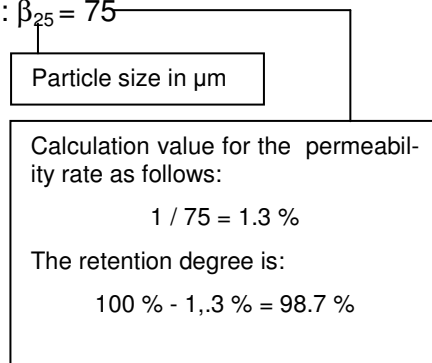
The same applies for preservation oils and rinsing oils to clean the lubrication system.

### 4.8.2 Suction air filter fineness

**Mesh width max. 0,020 mm for normal industrial air**

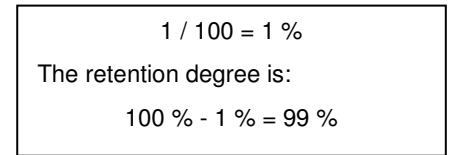
### 4.8.3 Explanations to the filter fineness according to ISO 4572:

- 1. Example:  $\beta_{25} = 75$



98.7 % of the 25 µm particles are filtered out of the oil.

- 2. Example:  $\beta_6 = 100$



99 % of 6 µm particles are filtered out of the oil.



## 4.9 Fitting instructions

### 4.9.1 Coupling

The connection element between compressor and driving motor shall be a well aligned flexible coupling that should be balanced according to following balancing grade.

Couplings should be used with a balancing grade of G 2.5 to DIN ISO 1940 respectively Q 2.5 to VDI 2060, balanced according to the "half-key convention" to DIN ISO 8821. According to this, a half key corresponding to the contour of the inside diameter is inserted in the groove when balancing.

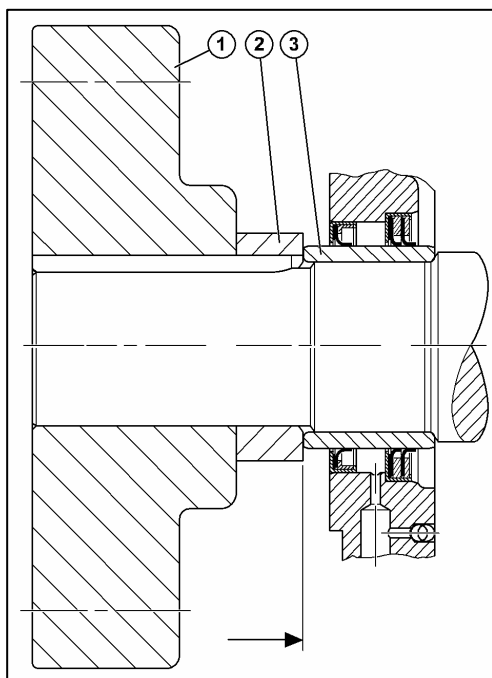
It has to be paid attention that only couplings with a balancing grade of G 2.5 or Q 2.5 or better are utilized.

#### WARNING

A insufficient balanced coupling might lead to damages of bearings and gears and so to destruction of the whole compressor unit.

To avoid additional unbalance force, the length of the coupling hub should correspond to the length of the driving journal (see section „Technical data“).

In case of a shorter coupling hub (1) a spacer ring (2) shall be fitted between coupling hub (1) and bearing ring (3), to axially fix the bearing ring and to avoid an unbalanced protruding key.



The coupling has to be designed for every particular and individual case according to the specification of the calculated rotary oscillation (see also section 4.4).

Sufficient axial clearance has to be considered. Adjustment of coupling has to be ensured by means of dial indicators.

Transmission of axial forces onto the drive pin is not allowed.

#### Example: fitting of coupling

1. parts to be fitted



2. Preparation cleaning

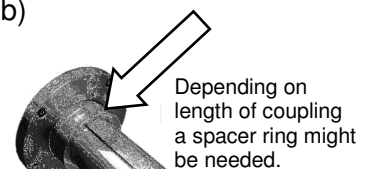


3. Steps of fitting

a)



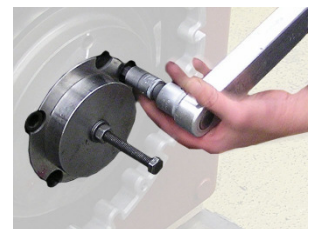
b)



c)



d)



e)



## 4.9.2 Belt drive

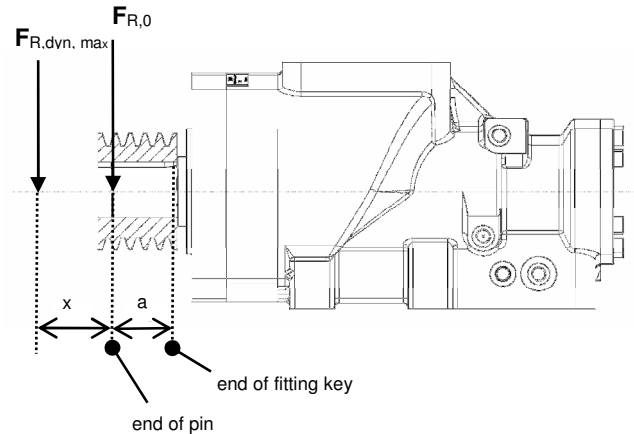
Pulleys should be used with a balancing grade of G 2.5 to DIN ISO 1940 respectively Q 2.5 to VDI 2060, balanced according to the “half-key convention” to DIN ISO 8821.

Pulley has to be locked to avoid axial displacement.

Following chart helps to calculate the maximum permissible dynamic radial load ( $F_{R, dyn, max}$ ) of the particular compressor.

### Note

Please contact our „Customer Support“ for technical assistance for the design of belt drive.



### Maximum permissible radial load

Type	Maximum permissible radial load at end of fitting key $F_{R,0}^*$ [N]	specific value of distance a [mm]
CF75D8	2 400	50
CF90D3	3 800	56
CF128R	7 400	125
CF180R	14 100	165

Calculation of permissible dynamic radial load:

$$F_{R, dyn, max} = F_{R,0} * \frac{a}{(a + x)} \quad [x \text{ in mm}]$$

## 5 Preparation prior to start operation

The equipment shall be set up on level ground and as far as possible from sources of heat and dust.

If an inclined position of portable compressors cannot be avoided, care must be taken that the oil supply is ensured.

### 5.1 Filling up oil

#### **WARNING**

Prior to initial start-up and after longer periods of standstill (about 2 months), the compressor shall be filled up with oil through the intake tube.

CF75/CF90	~ 0.5 l
CF128/CF180	~ 1.0 l
CF246	~ 2.0 l

When filling, it must absolutely be ensured that the whole oil system, inclusive of oil cooler, is filled.

The oil level in the oil reservoir must be checked.

#### **WARNING**

The oil must have the prescribed level.

### 5.2 Checking the direction of rotation

The direction of rotation of the driving motor must correspond with the rotation direction arrow on the compressor. Direction of rotation should be controlled in an uncoupled situation.

## 6 Maintenance

Checking the operation conditions at regular intervals and servicing all elements of the compressor system correctly and on time are the prerequisites for trouble-free operation and a long service life of the machine.

As a matter of principle, the maintenance of the compressor system is within the responsibility of the operating company who shall determine the time intervals for maintenance work taking into account the stipulations of the system manufacturer and the particular operating conditions prevailing on location (air properties, cooling water properties, ambient temperature).

The following information shall be used as reference:

- The oil level shall be checked at regular intervals. Replenish with the same specification of oil.
- The first oil change shall be made after approx. 500 hours of operation. (Observe the regulations of the oil manufacturer)
- Further oil changes shall be made dependent upon load of compressor (short time operation, high final temperatures etc.), or after one year at the latest. In either case instructions of oil manufacturer has to be observed.
- It is essential to observe that the whole oil system (inclusive of oil cooler) is drained during oil change. Afterwards it has to be observed that oil system (inclusive of oil cooler) is filled completely.
- The bearings of the compressor stage have to be replaced after an operating time of approx. 20.000 – 50.000 dependent upon load of operating conditions. It is recommended also to continually monitor the vibrations of bearings.
- It is recommended to have maintenance of compressor stages carried out by GHH RAND authorized personnel only.
- Opening of the compressor stage by agency staff (non-authorized personnel) voids all warranty claims.
- Maintenance of compressor unit installed components and additional equipment assemblies of other manufacturers have to be performed according to their instructions.

## 7 Spare parts

A long-lasting reliable operation of the compressor unit is ensured by regular renewal of wear- and tear parts. Please see the spare parts kits chart below (Standard-Kits are shaded).

### Konditionsblatt Ersatzteil-Kits Öleingespritzte Standardkompressoren Spare Part Kits for oilinjected standard airends

Typ Type	Zeichnungs-Nr. * Drawing number	Kompressor-Kit SB Compressor Kit	Kompressor-Kit Light SB Compressor Kit Light	Getriebe-Kit SB Gear Kit	Abdichtungs-Kit SB Sealing Kit
CF75D/D3	401-0-003929	83903537 2			83903538 5
CF75D5/D6/D8	22415269	83903706 5	C22696058 0		83901863 10
CF75D7	401-1-005707	83903389 0			83903390 0
CF75G1	400-0-028934	83903539 0			
CF75G2	401-0-002625	83903540 0			
CF75G	22950968	83901385 10	C22696066 0	83901384 0	83901383 10
CF90D/LD	400-0-044569	83903541 2			83903542 5
CF90D2/D3/LD1	22549836	83903543 10	C22696074 0		83903544 10
CF90G/G2/LG/LG2	400-0-015202	83901543 5	C22696090 0	83901542 2	83900808 5
CF90G5/G8/LG3/LG5	22552616	83901550 5	C22696330 0	83901549 0	83901548 3
CF90G6	401-0-005253	83901589 0			
CF128D/D2/LD	400-1-017757	83900827 3	C22696108 0		83900815 3
CF128G/G2/LG/LG2	400-1-016770	83900972 5	C22696116 0	83900826 5	83900825 5
CF128R/LR	22483382	C22875272 2	C22875736 0		C22875298 0
CF180D	400-0-039919	83903545 1			83903546 0
CF180R/RB	401-0-003329	83903548 3			83903549 3
CF180G	400-0-039920	83900812 2		83900979 1	83900978 2
CF180G1	400-0-039920			83900979 1	83900978 2
CF180G2	401-0-003580	83903547	C22696124 0	83900979 0	83900978 0
CF246G	400-0-045266	83903873 1	C22784540 0	83903874 1	83903875 0

\* please note current revision status

## Sales and Service Points

### Europe

GHH RAND Schraubenkompressoren GmbH, Steinbrinkstraße 1, D-46145 Oberhausen

Customer Support    Phone + 49 (0) 2 08 6 99 40 66    Fax + 49 (0) 2 08 6 99 40 50

### Asia

Customer Support    Phone + 86 21 54 52 98 93    Fax + 86 21 64 56 51 96

### North America and Latin America

Customer Support    Phone + 1 704 655 47 15    Fax + 1 704 655 47 25

E-mail:                    [service\\_ghh-rand@eu.irco.com](mailto:service_ghh-rand@eu.irco.com)

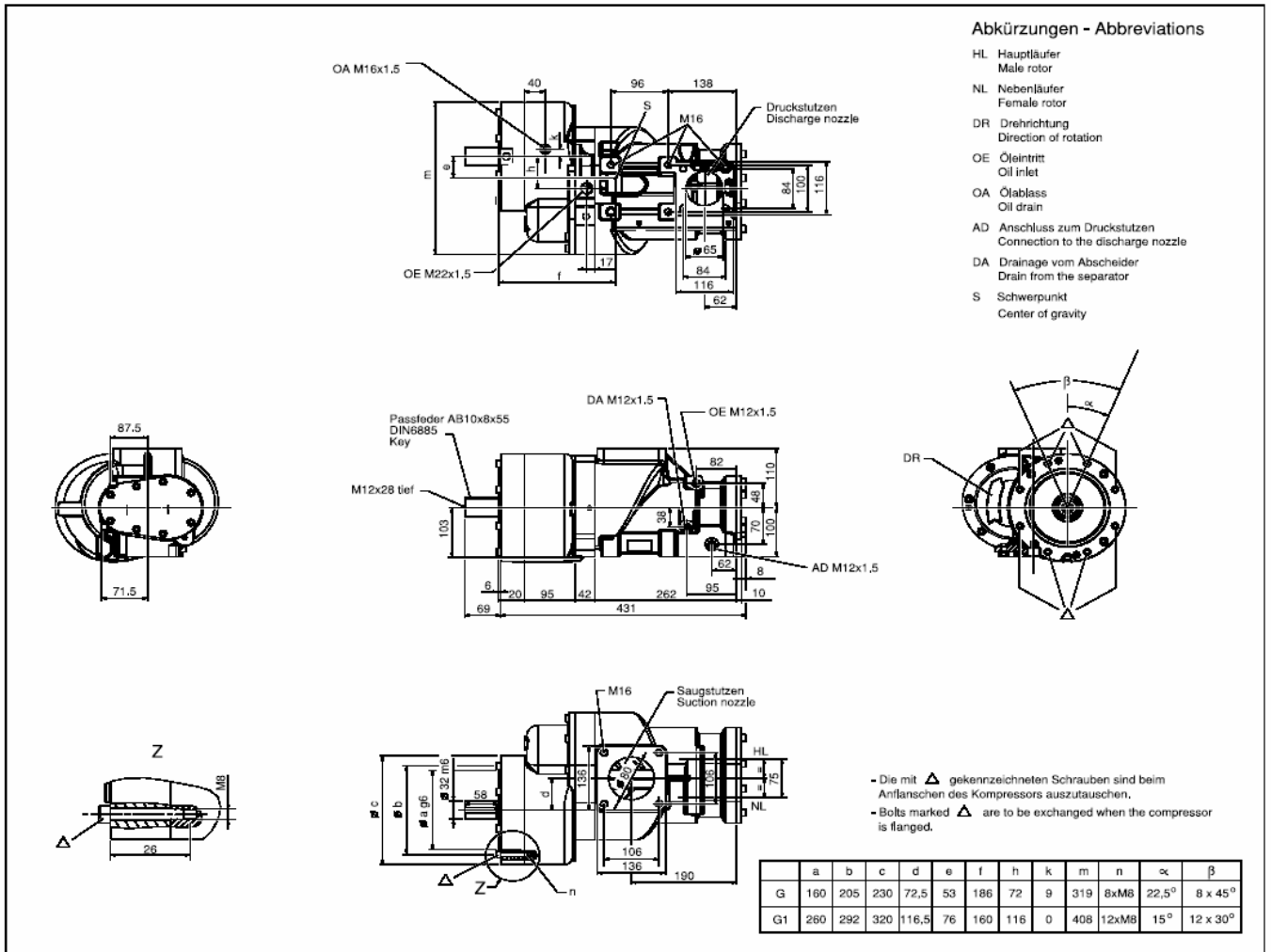
## 8 Annex I Technical data

**Note** Installation drawing and 3D-files separately available. Current versions available upon request.

### CF75G Technical data (Page 1 of 3)

**Dimensions:** 510 mm x 319 mm x 225 mm (LxWxH)

**Weight:** 70 kg



#### Permissible areas of operation:

	min	max
Speed of male rotor	1787 1/min	8935 1/min
Suction pressure	0.62 bar(abs)	atmospheric pressure
Discharge pressure	6 bar(abs) *	16 bar(abs)
Discharge temperature		110 °C
Gear ratio	1.0984	3.2667

\* without additional oil pump



## CF75G Technical data (Page 2 of 3)

### Chart Product Code:

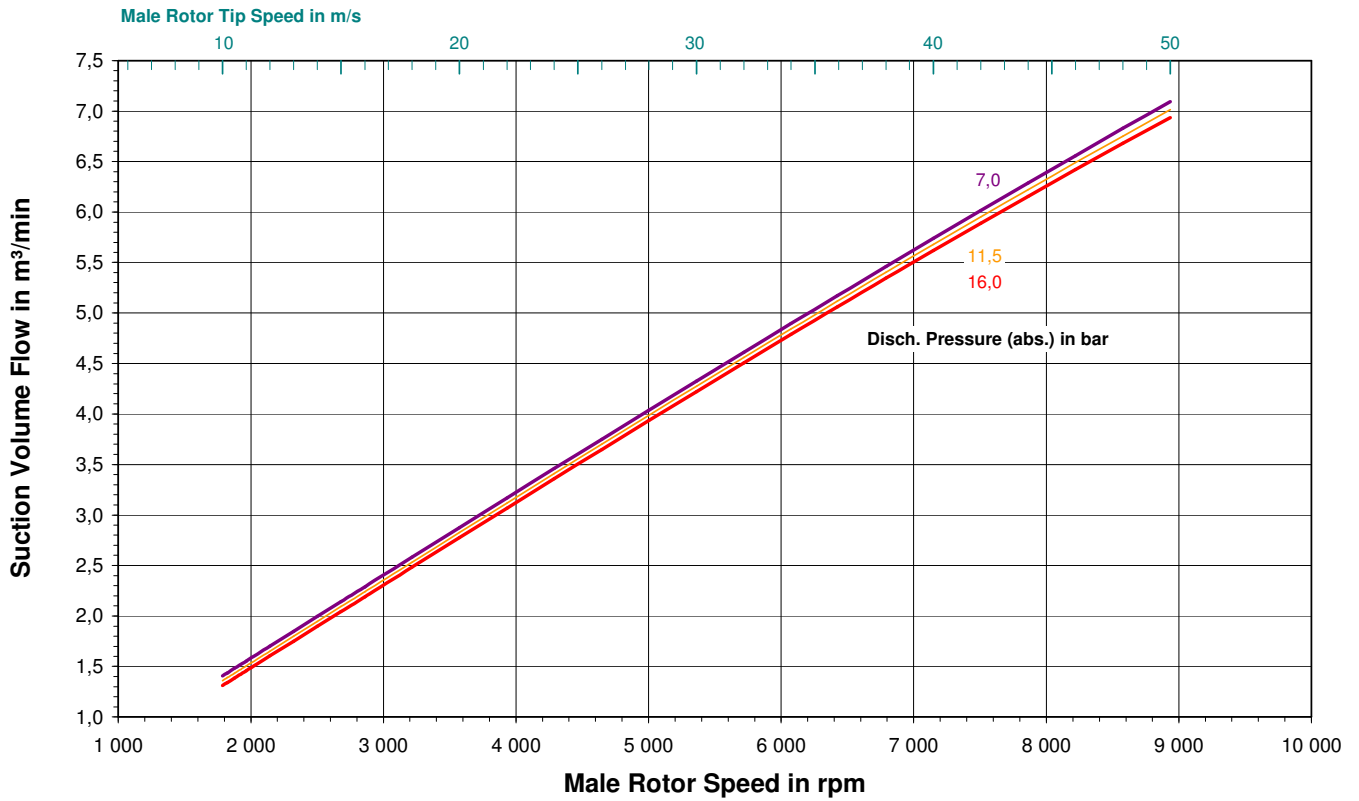
(Standard Gear Ratio shaded)

Product Code	Gear Ratio
<b>HAA</b>	<b>3,2667</b>
HAB	3,1290
<b>HAC</b>	<b>3,0000</b>
HAD	2,8788
<b>HAE</b>	<b>2,7647</b>
HAF	2,6571
<b>HAG</b>	<b>2,5556</b>
<b>HAH</b>	<b>2,4595</b>
HAI	2,3684
HAK	2,2821
<b>HAL</b>	<b>2,2000</b>
HAM	2,1220
HAN	2,0476
HAP	1,9767
HAQ	1,9091
HAR	1,8444
HAS	1,7826
HAT	1,7234
HAU	1,6667
HAV	1,6122
HAW	1,5600
HAX	1,5098
HAY	1,4615
HAZ	1,4151
HBA	1,3704
HBB	1,3273
HBC	1,2857
HBD	1,2456
HBE	1,2069
HBF	1,1695
HBG	1,1333
HBH	1,0984

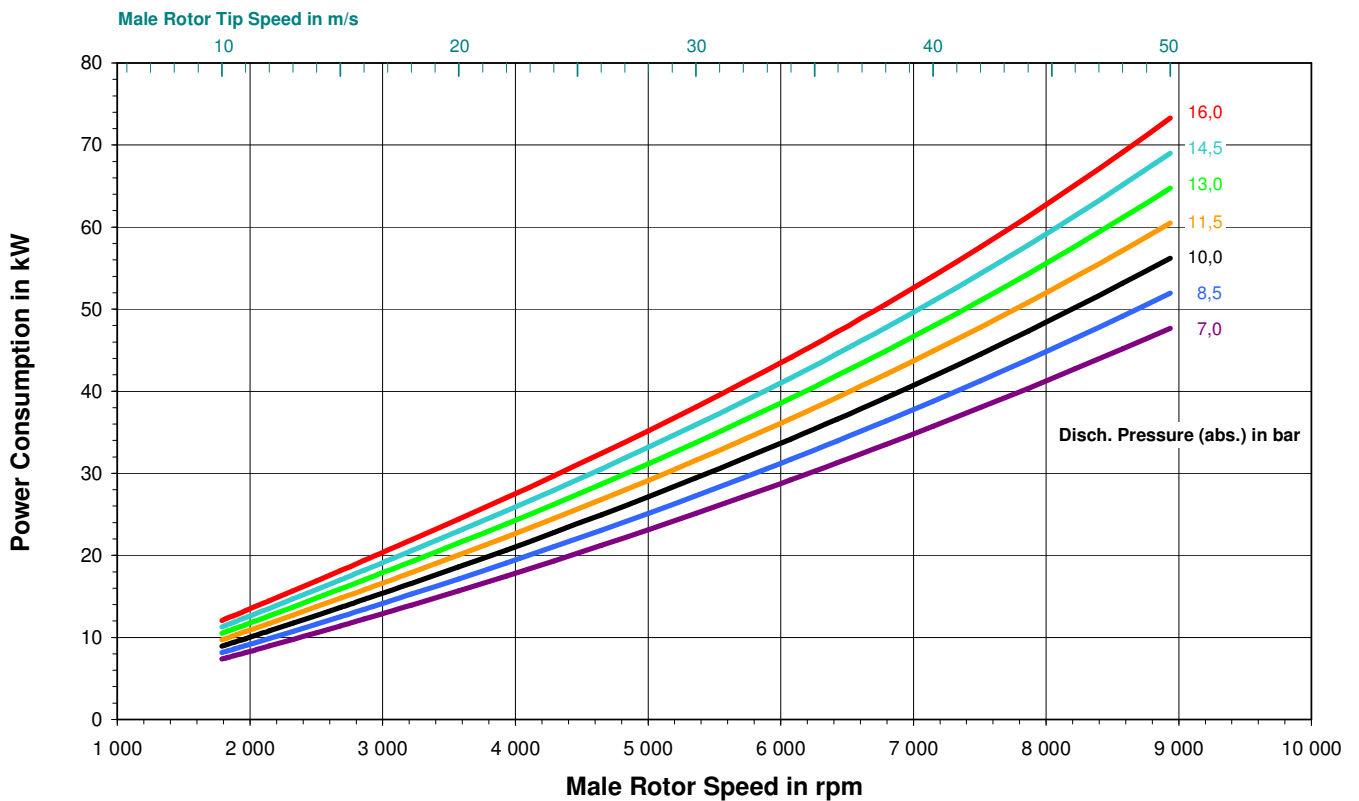
## CF75G Technical data (Page 3 of 3)

### Performance Predictions:

Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



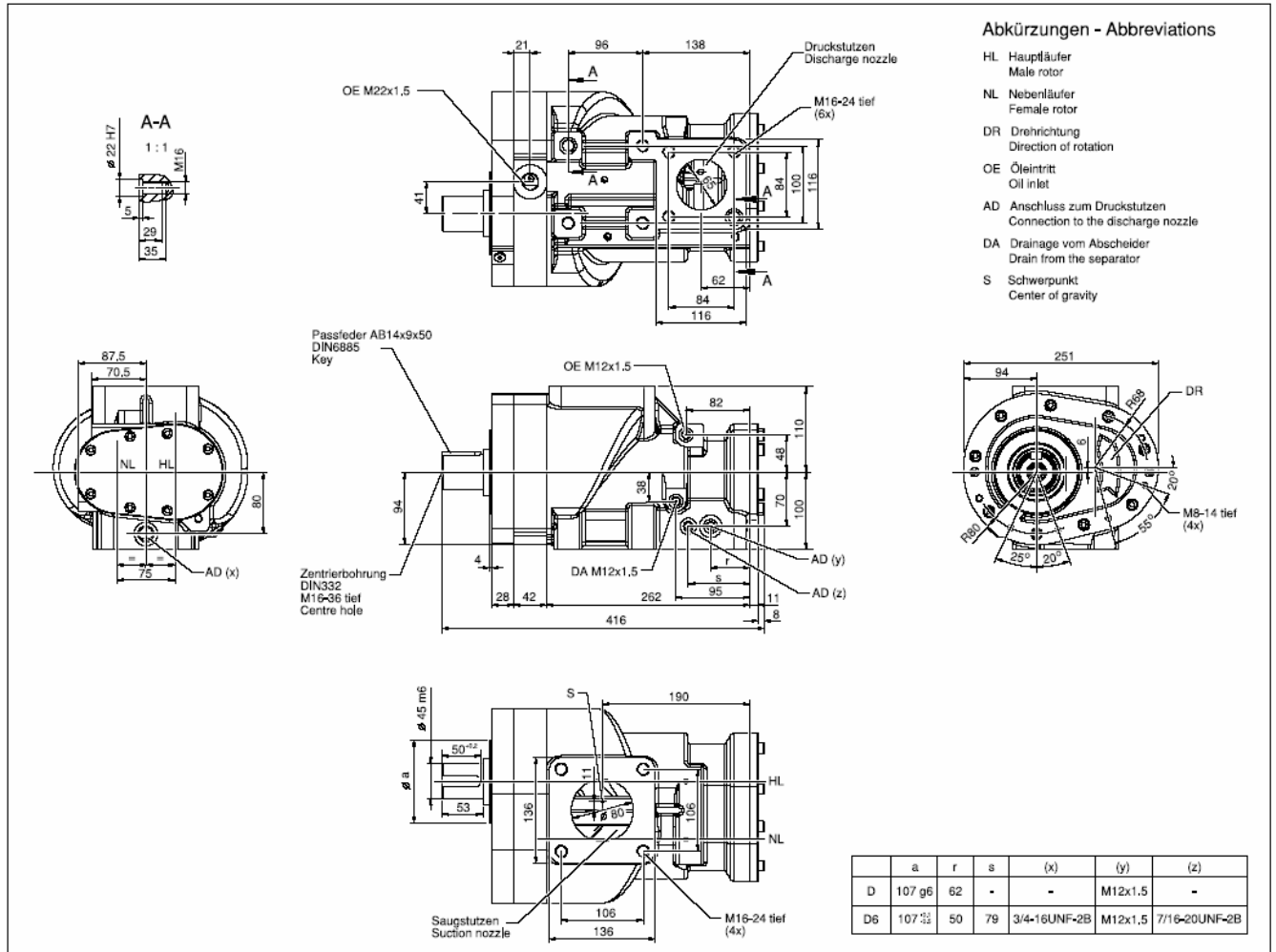
Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



## CF75D6/D8 Technical data (Page 1 of 2)

**Dimensions:** 416 mm x 251 mm x 210 mm (LxWxH)

**Weight:** 58 kg



### Permissible areas of operation:

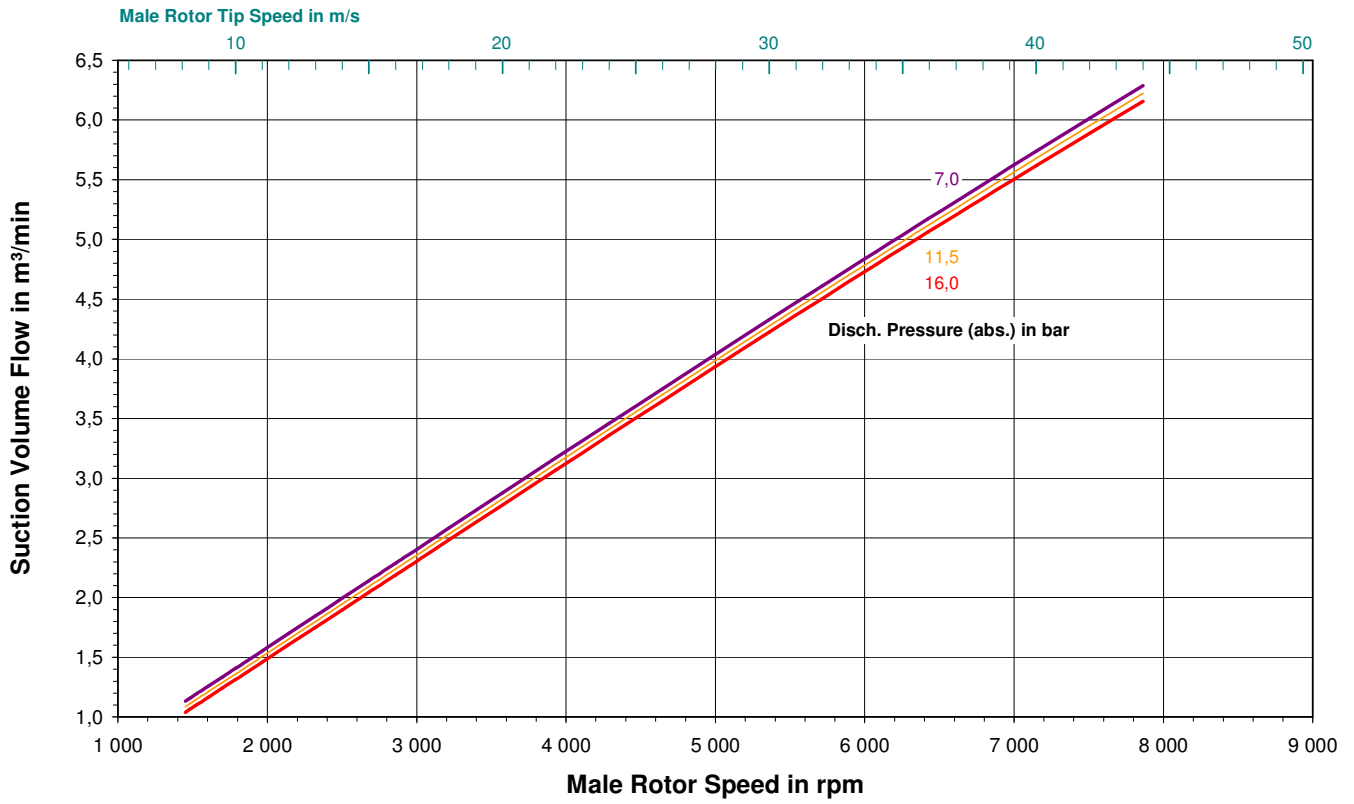
	min	max
Speed of male rotor	1450 1/min	8935 1/min
Suction pressure	0,62 bar(abs)	atmospheric pressure
Discharge pressure	6 bar(abs) *	16 bar(abs)
Discharge temperature		110 °C
Belt drive permitted	YES	

\* without additional oil pump

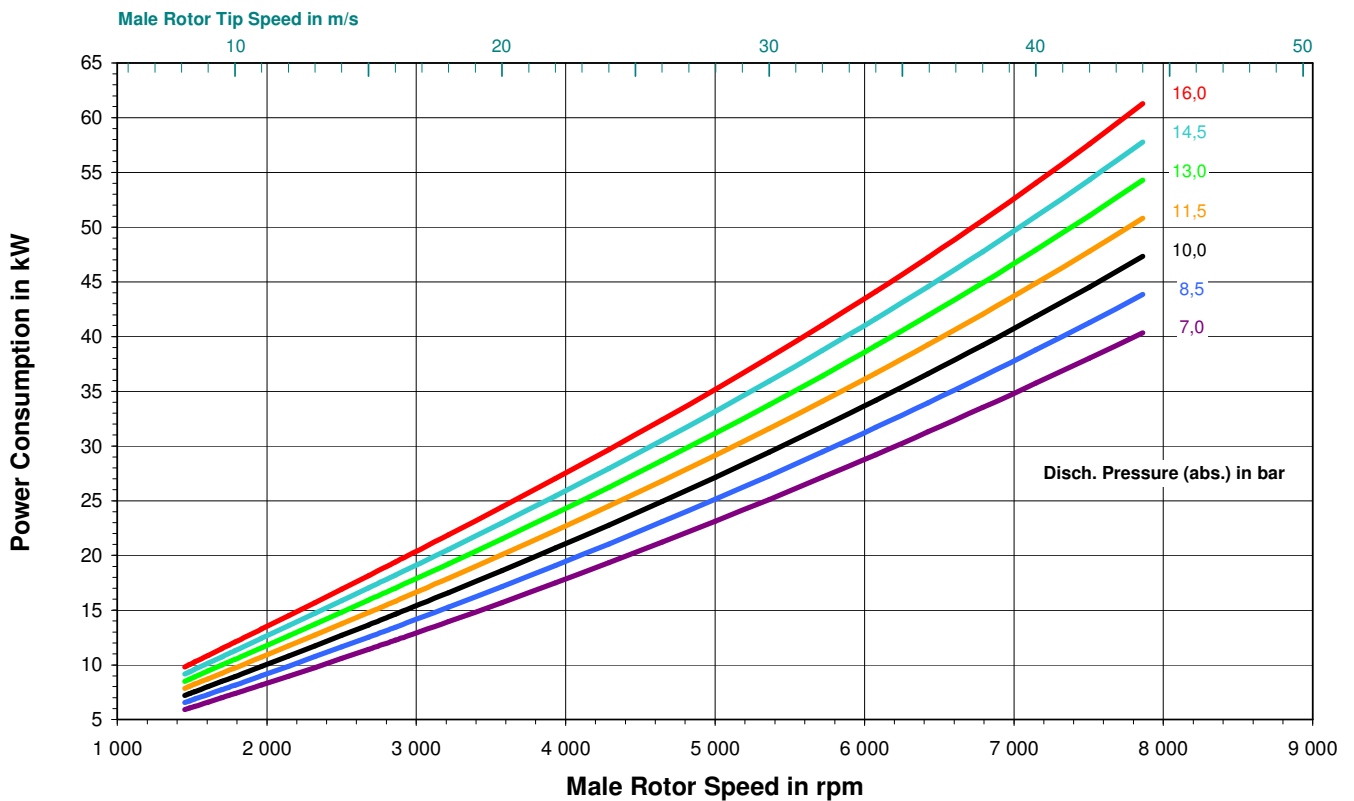
## CF75D6/D8 Technical data (Page 2 of 2)

### Performance predictions:

Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46





## CF90G5 Technical data (Page 2 of 3)

### Chart Product Code:

(Standard Gear Ratio shaded)

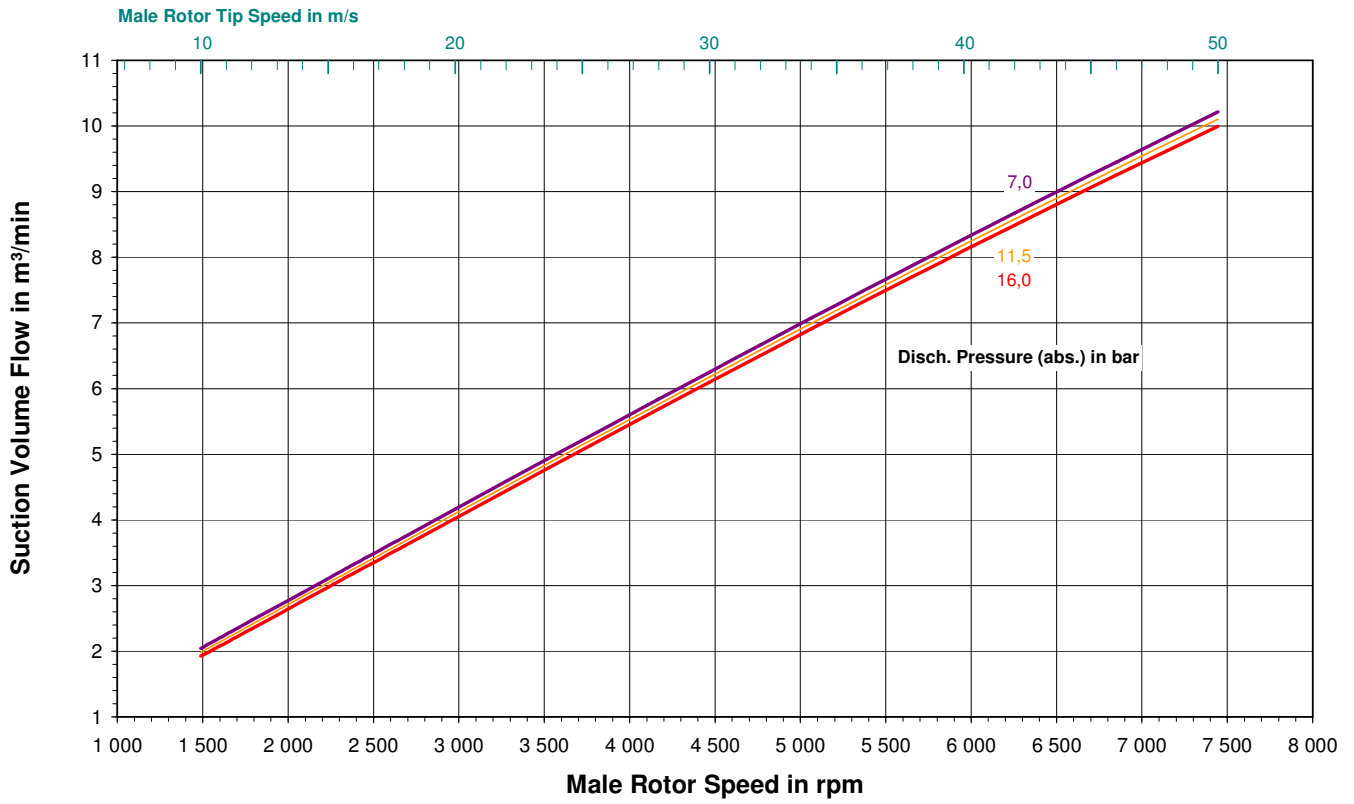
Product Code	Gear Ratio
<b>HPV</b>	<b>3,0000</b>
<b>HPW</b>	<b>2,8519</b>
<b>HPX</b>	<b>2,7143</b>
<b>HPY</b>	<b>2,5862</b>
HPZ	2,4667
<b>HQA</b>	<b>2,3548</b>
<b>HQB</b>	<b>2,2500</b>
HQC	2,1515
<b>HQD</b>	<b>2,0588</b>
HQE	1,9714
HQF	1,8889
<b>HQG</b>	<b>1,8108</b>
<b>HQH</b>	<b>1,7368</b>
HQJ	1,6667
<b>HQK</b>	<b>1,6000</b>
HQL	1,5366
HQM	1,4762
HQN	1,4186
HQP	1,3636
HQQ	1,3111
HQR	1,2609
HQS	1,2128
HQT	1,1667



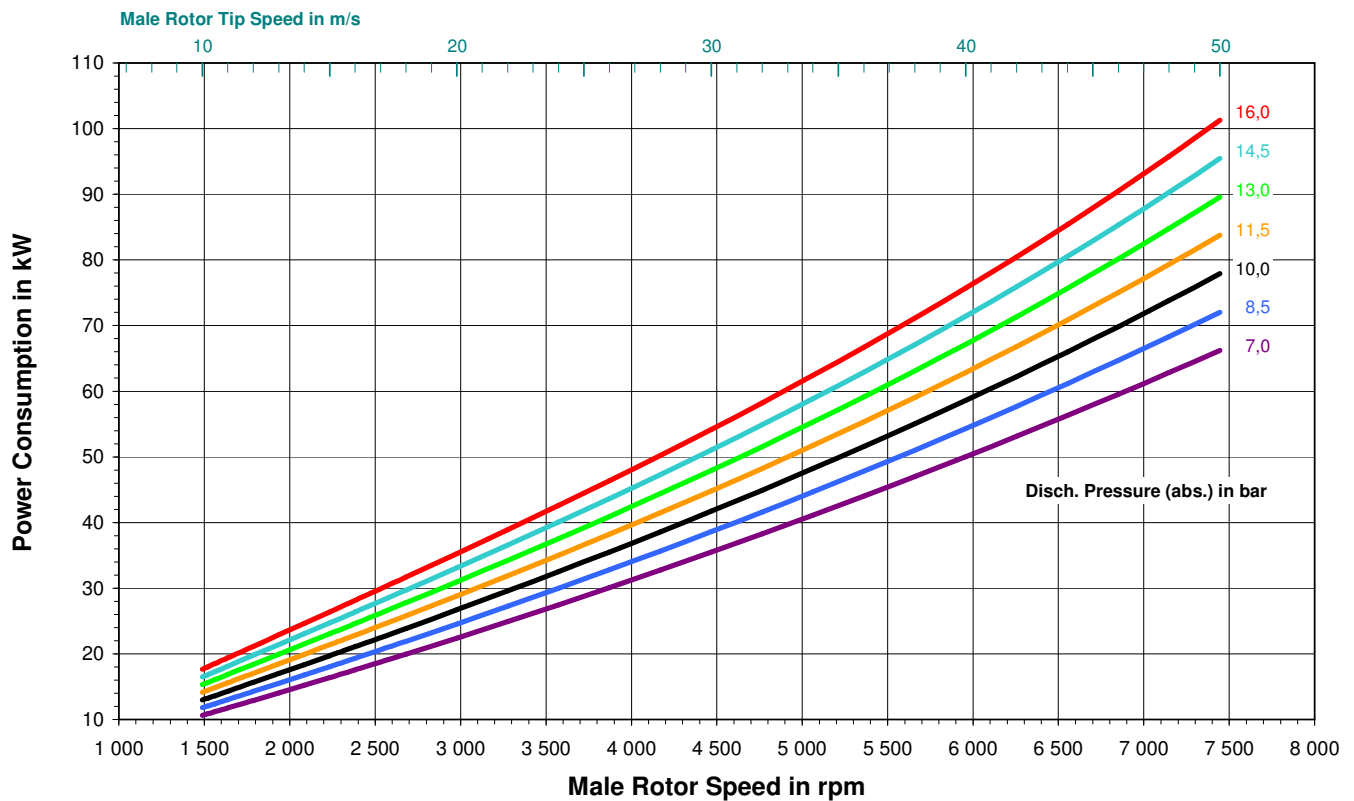
## CF90G5 Technical data (Page 3 of 3)

### Performance predictions:

Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46





## CF90G8 Technical data (Page 2 of 3)

### Chart Product Code:

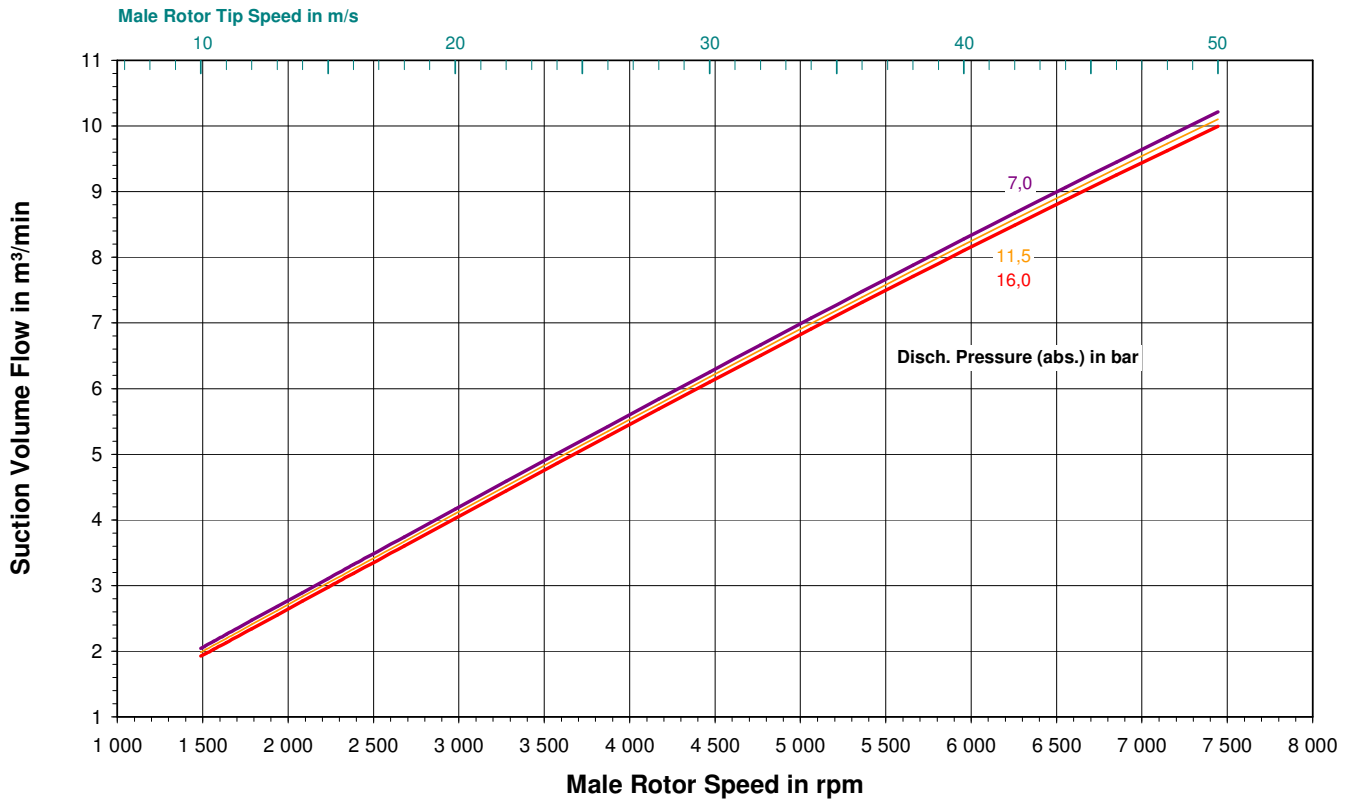
(Standard Gear Ratio shaded)

Product Code	Gear Ratio
HWU	3,0000
HWV	2,5862
HXA	2,3548

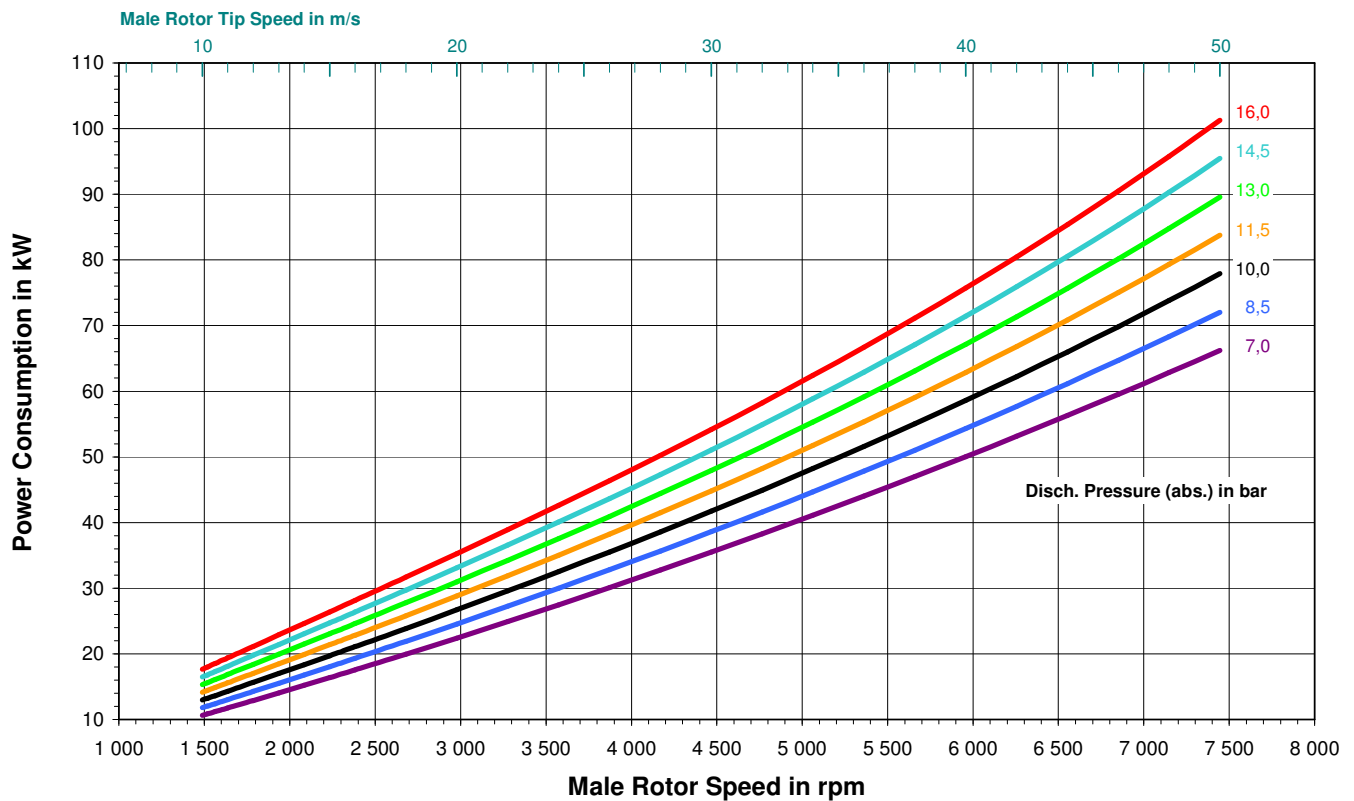
## CF90G8 Technical data (Page 3 of 3)

### Performance predictions:

Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



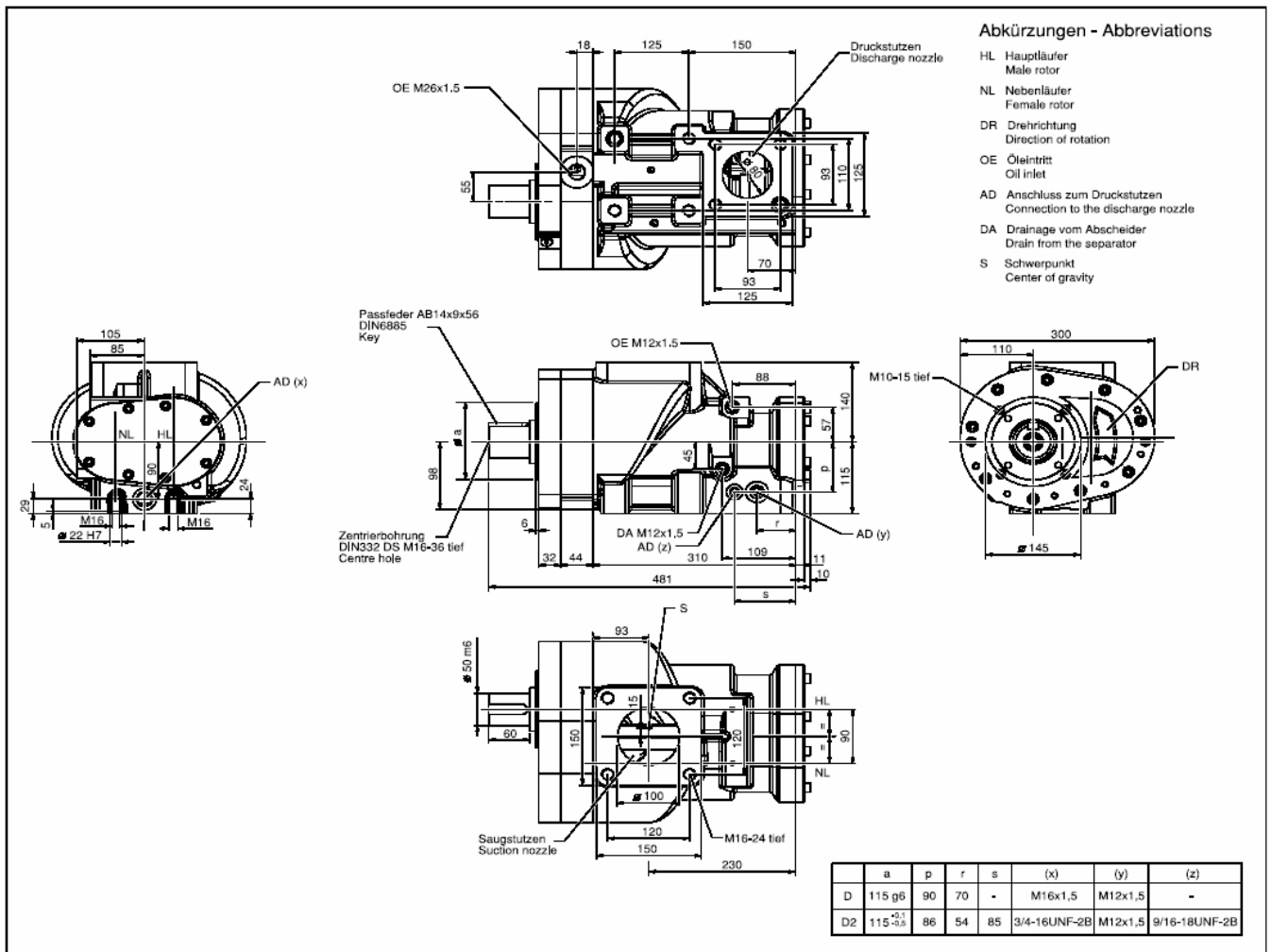
Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



## CF90D3/D4 Technical data (Page 1 of 2)

**Dimensions:** 480 mm x 315 mm x 255 mm (LxWxH)

**Weight:** 88 kg



### Permissible areas of operation:

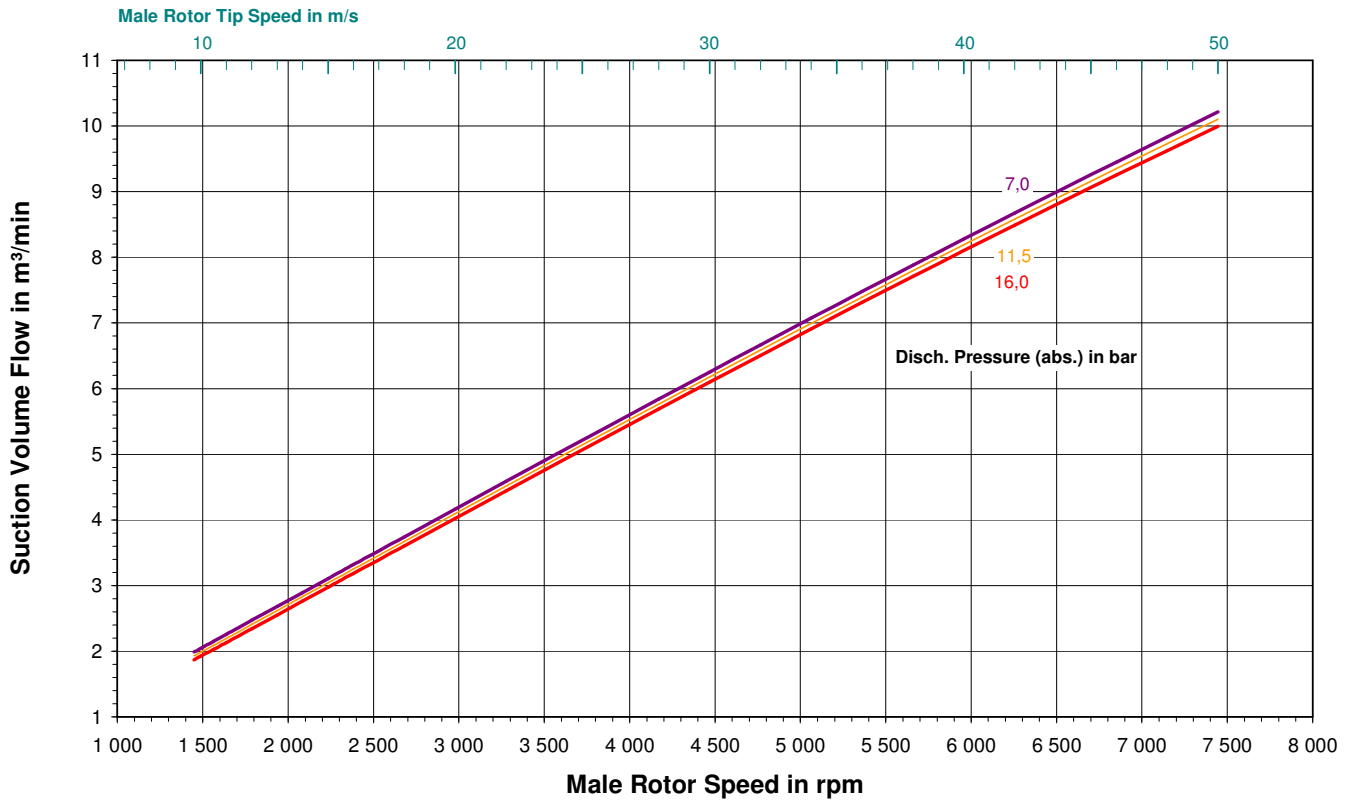
	min	max
Speed of male rotor	1450 1/min	7446 1/min
Suction pressure	0,62 bar(abs)	atmospheric pressure
Discharge pressure	6 bar(abs) *	16 bar(abs)
Discharge temperature		110°C
Belt drive permitted	YES	

\* without additional oil pump

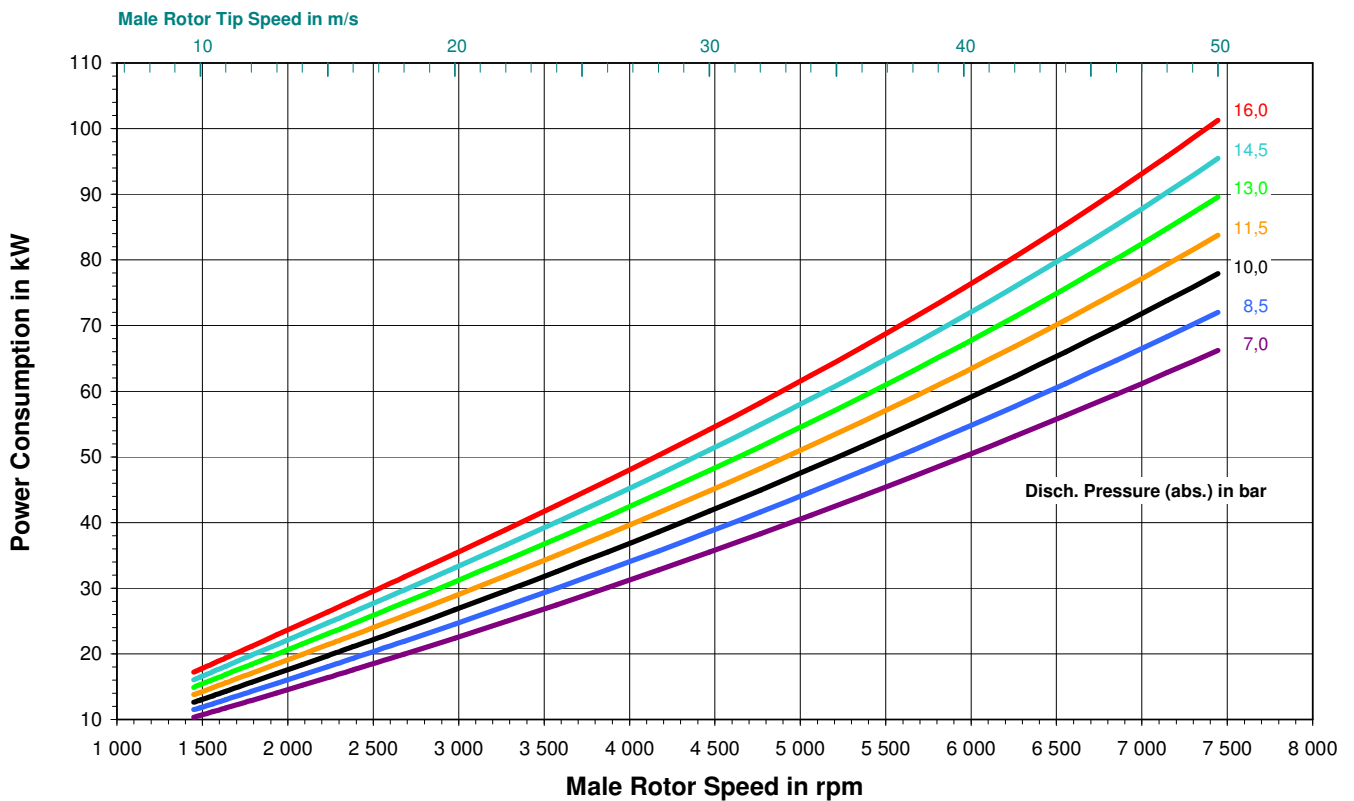
## CF90D3/D4 Technical data (Page 2 of 2)

### Performance predictions:

Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46

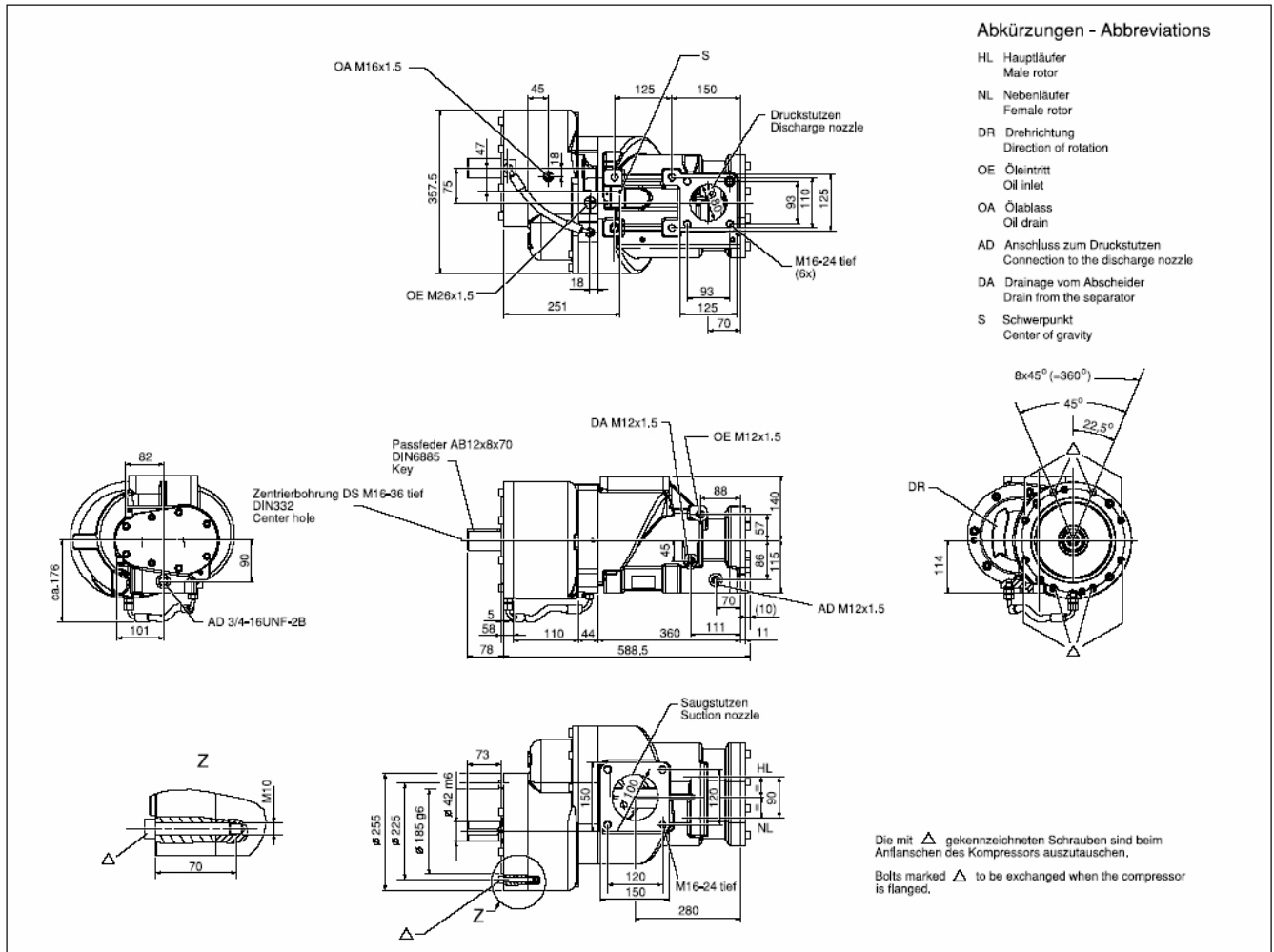


Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



## CF90LG3 Technical data (Page 1 of 3)

**Dimensions:** 667 mm x 373 mm x approx. 320 mm (LxWxH)  
**Weight:** 129 kg



### Permissible areas of operation:

	min	max
Speed of male rotor	1489 1/min	7446 1/min
Suction pressure	0,62 bar(abs)	atmospheric pressure
Discharge pressure	6 bar(abs) *	11,5 bar(abs)
Discharge temperature		110°C
Gear ratio	1,1667	3,0000

\* without additional oil pump

## CF90LG3 Technical data (Page 2 of 3)

### Chart Product Code:

(Standard Gear Ratio shaded)

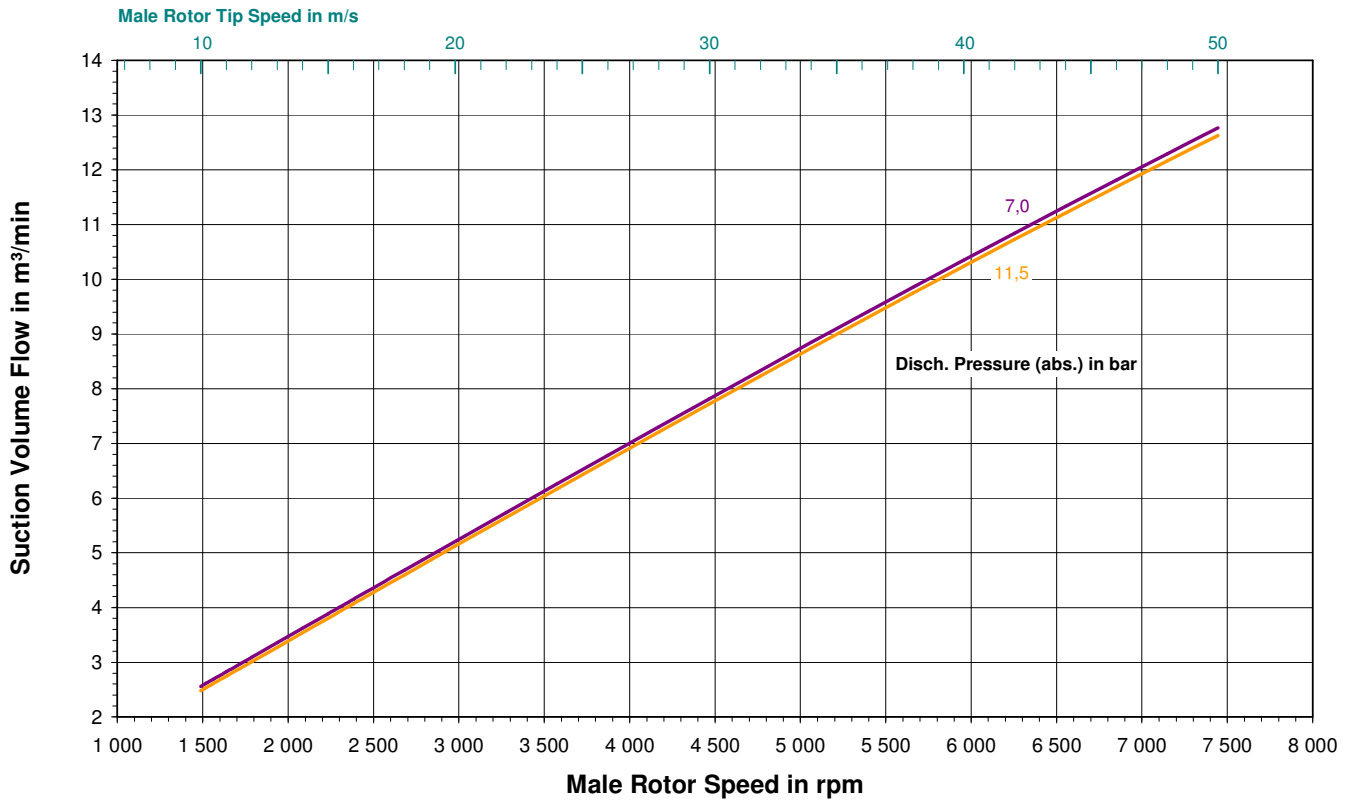
Produkt Code	Gear Ratio
<b>HVT</b>	<b>3,0000</b>
<b>HVU</b>	<b>2,8519</b>
<b>HVV</b>	<b>2,7143</b>
<b>HVW</b>	<b>2,5862</b>
HVX	2,4667
<b>HVY</b>	<b>2,3548</b>
<b>HVZ</b>	<b>2,2500</b>
HWA	2,1515
<b>HWB</b>	<b>2,0588</b>
HWC	1,9714
HWD	1,8889
<b>HWE</b>	<b>1,8108</b>
<b>HWF</b>	<b>1,7368</b>
HWG	1,6667
<b>HWH</b>	<b>1,6000</b>
HWJ	1,5366
HWK	1,4762
HWL	1,4186
HWM	1,3636
HWN	1,3111
HWP	1,2609
HWQ	1,2128
HWR	1,1667



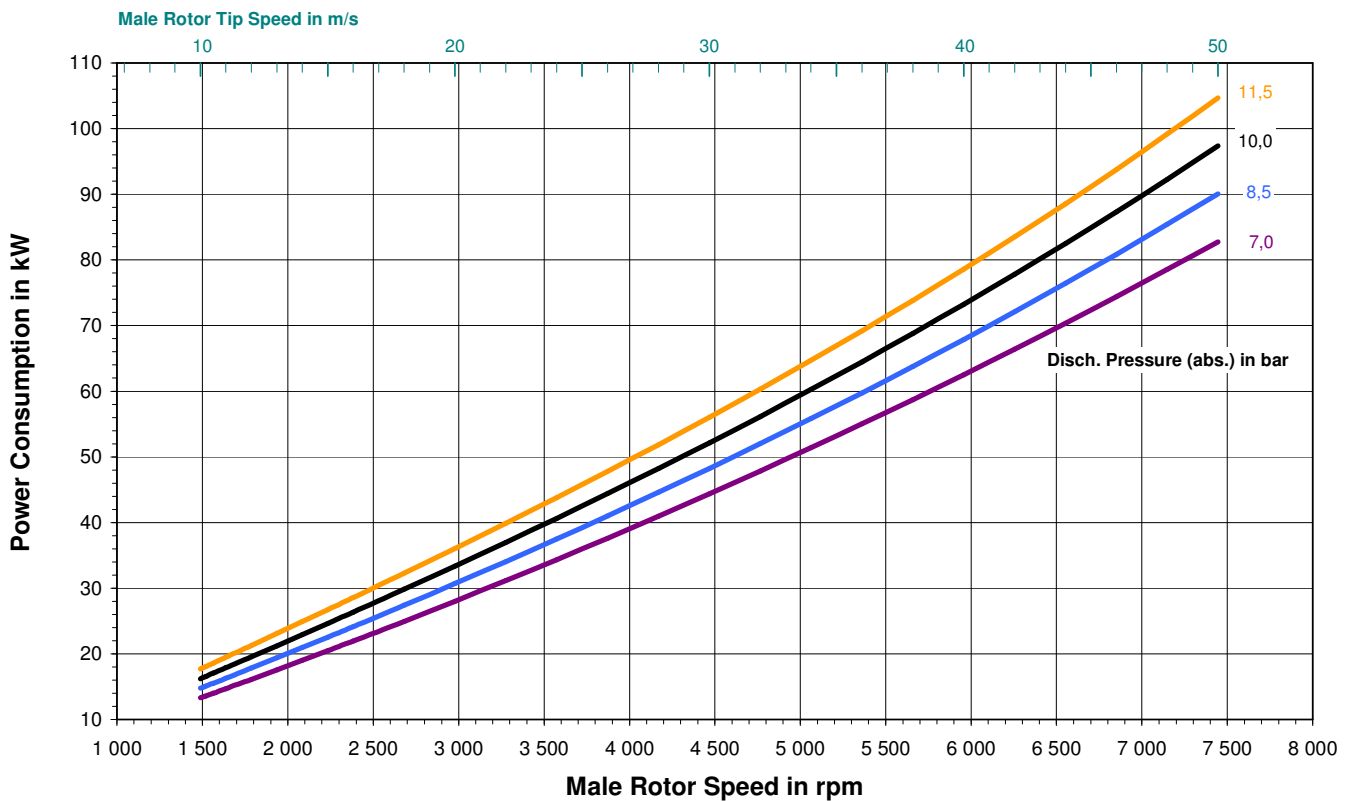
## CF90LG3 Technical data (Page 3 of 3)

### Performance predictions:

Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46





## CF90LG5 Technical data (Page 2 of 3)

### Chart Product Code:

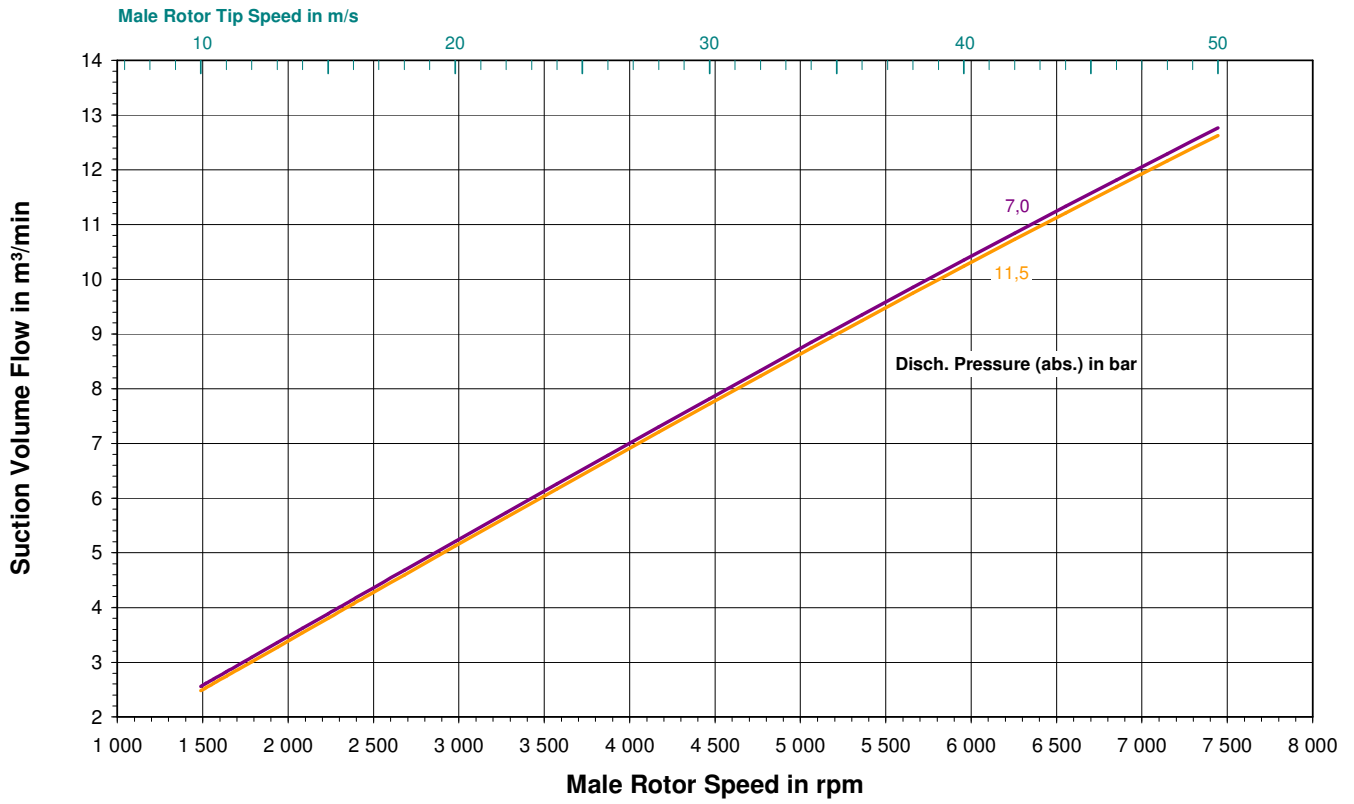
(Standard Gear Ratio shaded)

Product Code	Gear Ratio
HWW	3,0000
HWX	2,5862
HWY	2,3548

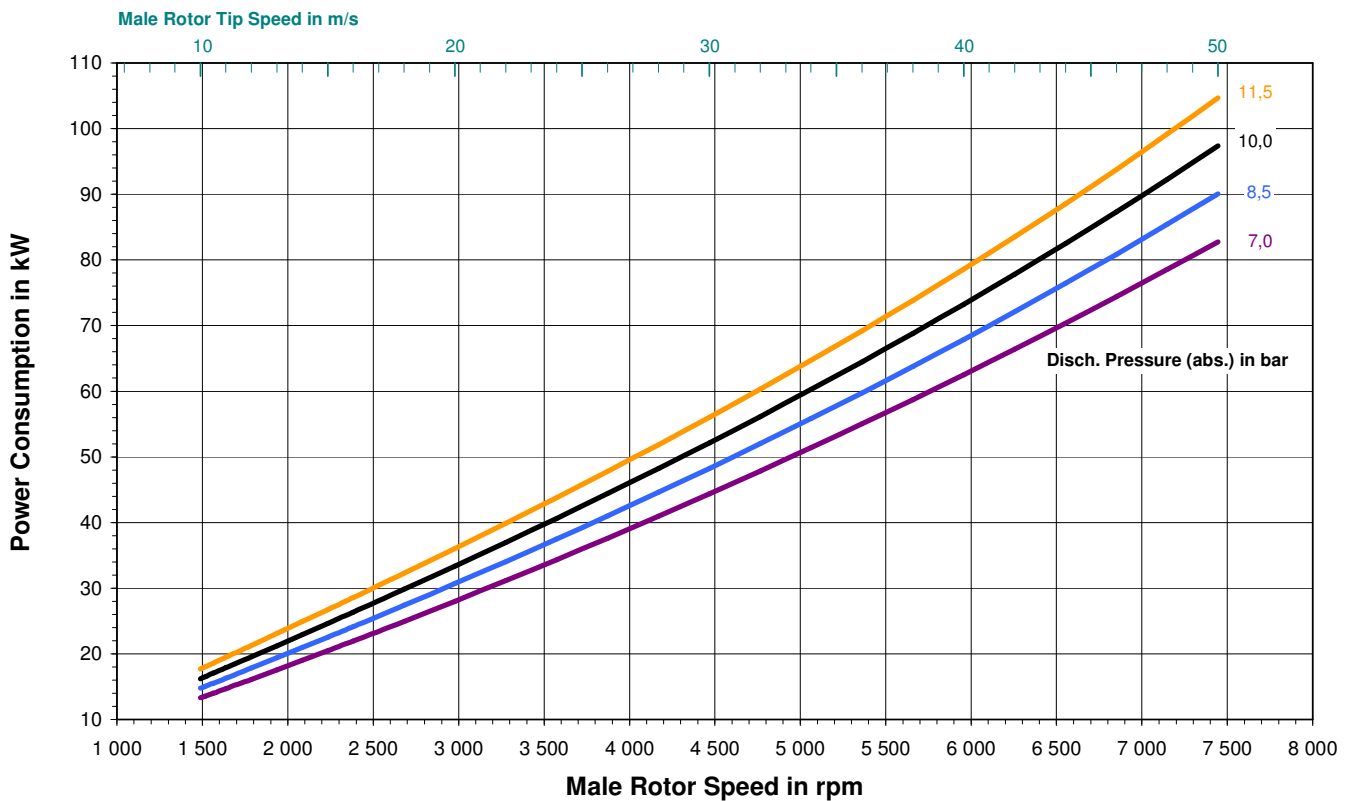
## CF90LG5 Technical data (Page 3 of 3)

### Performance predictions:

Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



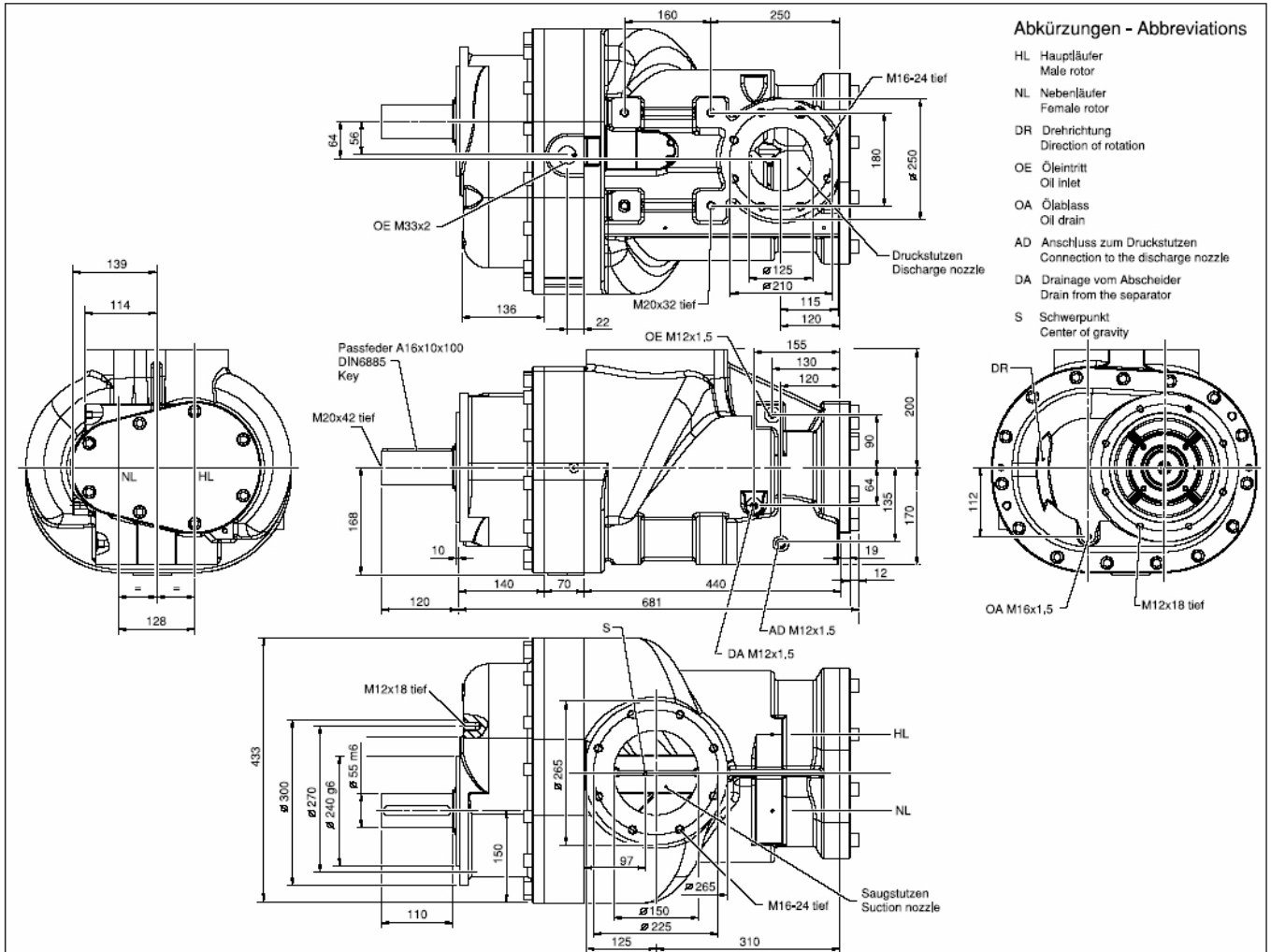
Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



## CF128G Technical data (Page 1 of 3)

**Dimensions:** 801 mm x 433 mm x 370 mm (LxWxH)

**Weight:** 280 kg



### Permissible areas of operation:

	min	max
Speed of male rotor	1047 1/min	5235 1/min
Suction pressure	0,62 bar(abs)	atmospheric pressure
Discharge pressure	6 bar(abs) *	16 bar(abs)
Discharge temperature		110°C
Gear Ratio	0,8254	2,3824

\* without additional oil pump

## CF128G Technical data (Page 2 of 3)

### Chart Product Code:

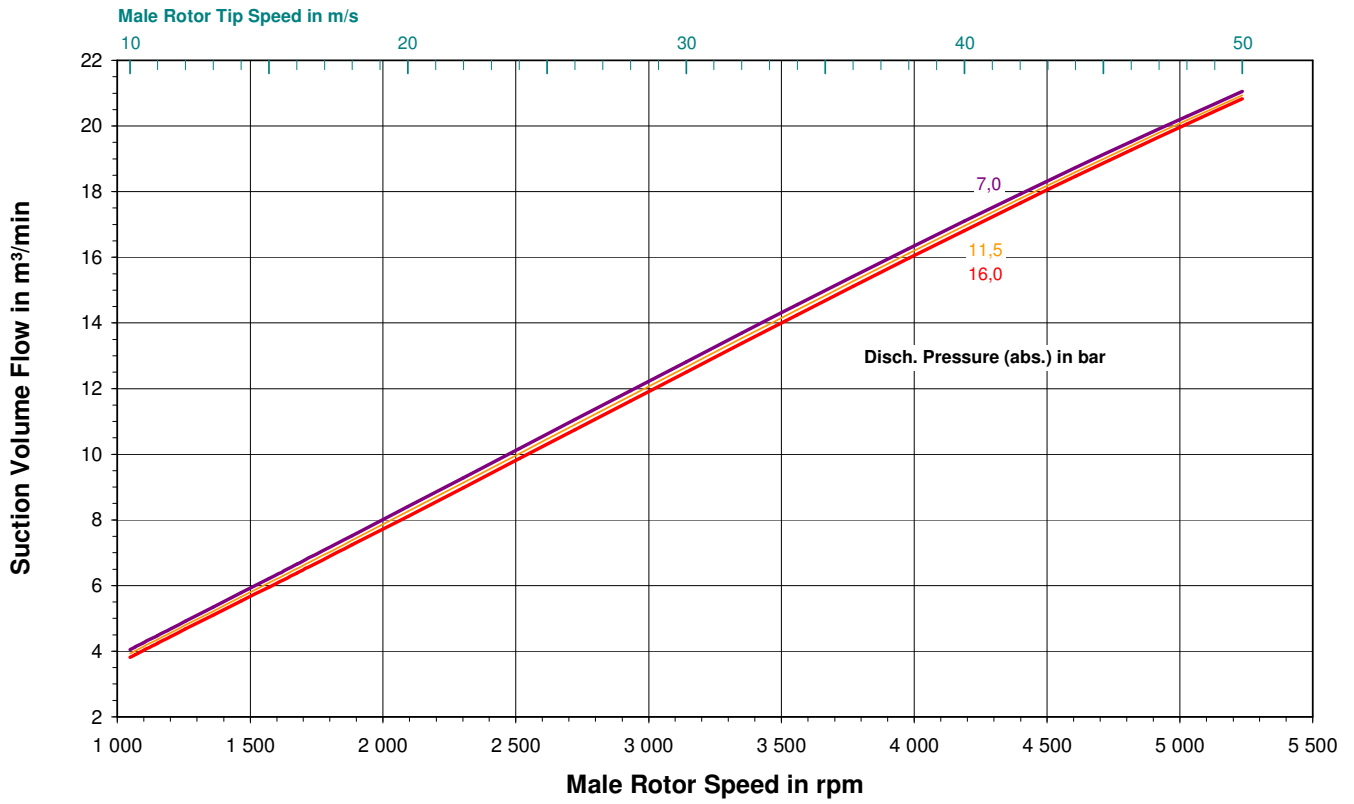
(Standard Gear Ratio shaded)

Product Code	Gear Ratio
<b>JAC</b>	<b>2,3824</b>
<b>JAD</b>	<b>2,2857</b>
JAE	2,1944
JAF	2,1081
<b>JAG</b>	<b>2,0263</b>
JAH	1,9487
<b>JAJ</b>	<b>1,8750</b>
<b>JAK</b>	<b>1,8049</b>
JAL	1,7381
<b>JAM</b>	<b>1,6744</b>
JAN	1,6136
<b>JAP</b>	<b>1,5556</b>
<b>JAQ</b>	<b>1,5000</b>
<b>JAR</b>	<b>1,4468</b>
JAS	1,3958
<b>JAT</b>	<b>1,3469</b>
<b>JAU</b>	<b>1,3000</b>
JAV	1,2549
<b>JAW</b>	<b>1,2115</b>
<b>JAX</b>	<b>1,1698</b>
JAY	1,1296
JAZ	1,0909
JBA	1,0536
JBB	1,0175
JBC	0,9828
JBD	0,9492
JBE	0,9167
JBF	0,8852
JBG	0,8548
JBH	0,8254

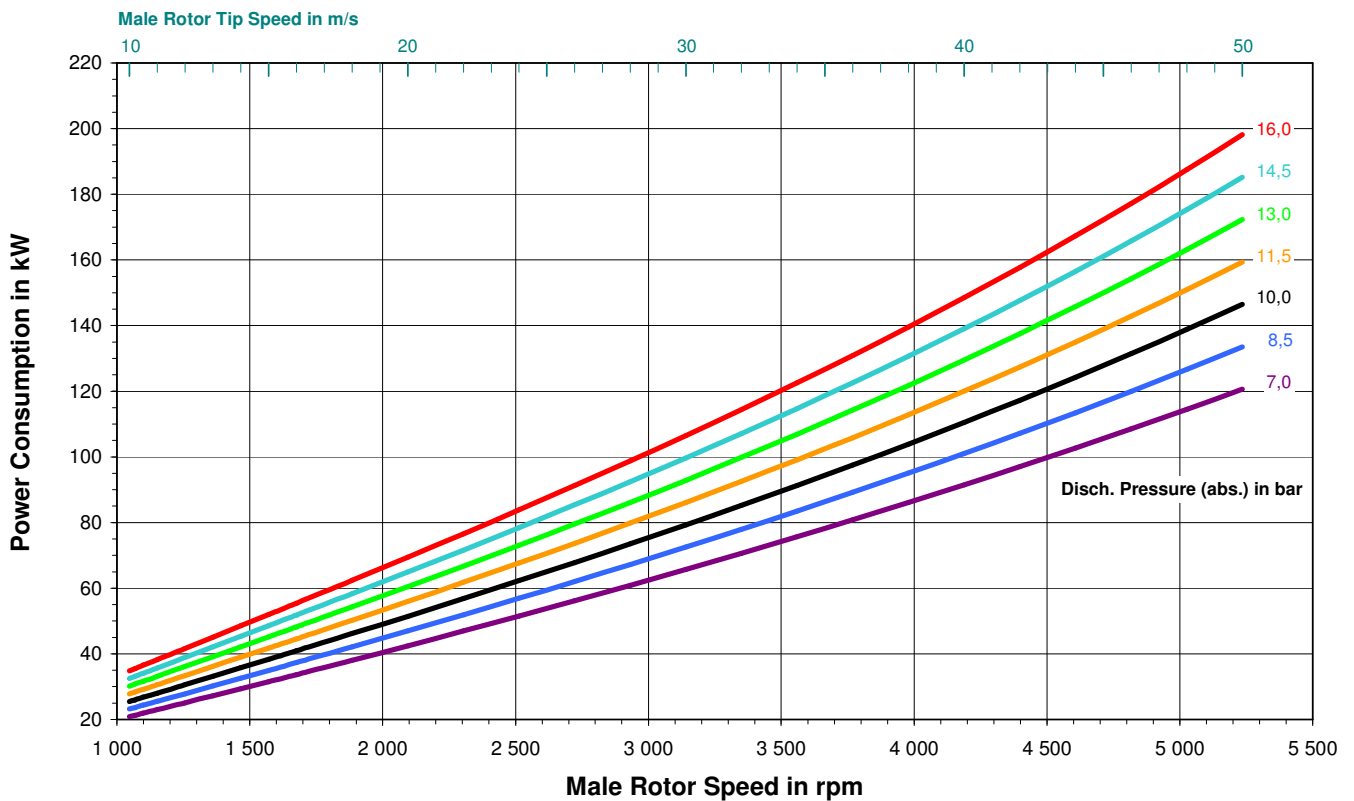
## CF128G Technical data (Page 1 of 3)

### Performance predictions:

Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



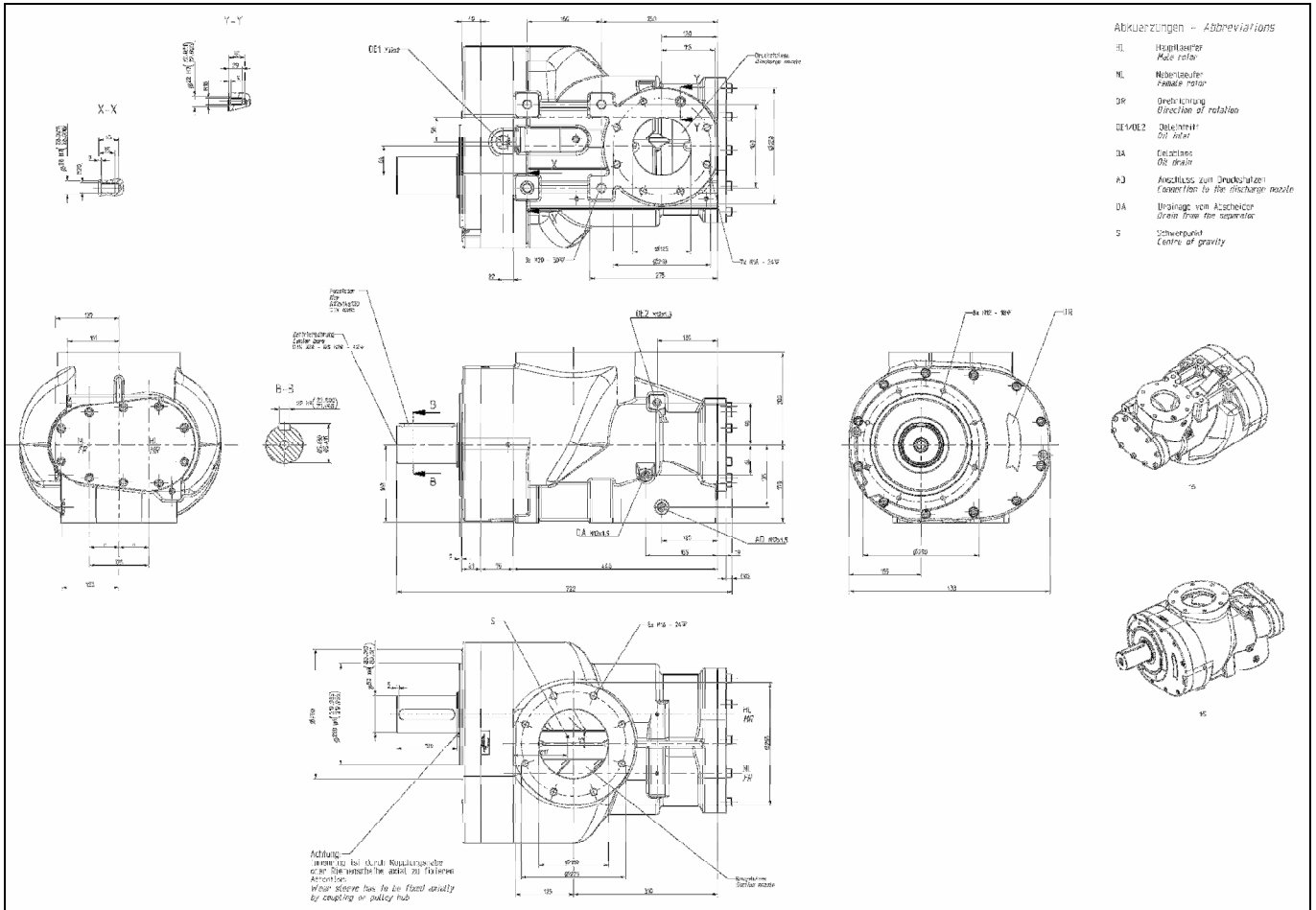
Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



## CF128R Technical data (Page 1 of 2)

**Dimensions:** 722 mm x 433 mm x 370 mm (LxWxH)

**Weight:** 265 kg



### Permissible areas of operation:

	min	max
Speed of male rotor	1047 1/min	5235 1/min
Suction pressure	0,62 bar(abs)	atmospheric pressure
Discharge pressure	6 bar(abs) *	16 bar(abs)
Discharge temperature		110°C
Belt drive permitted	YES	

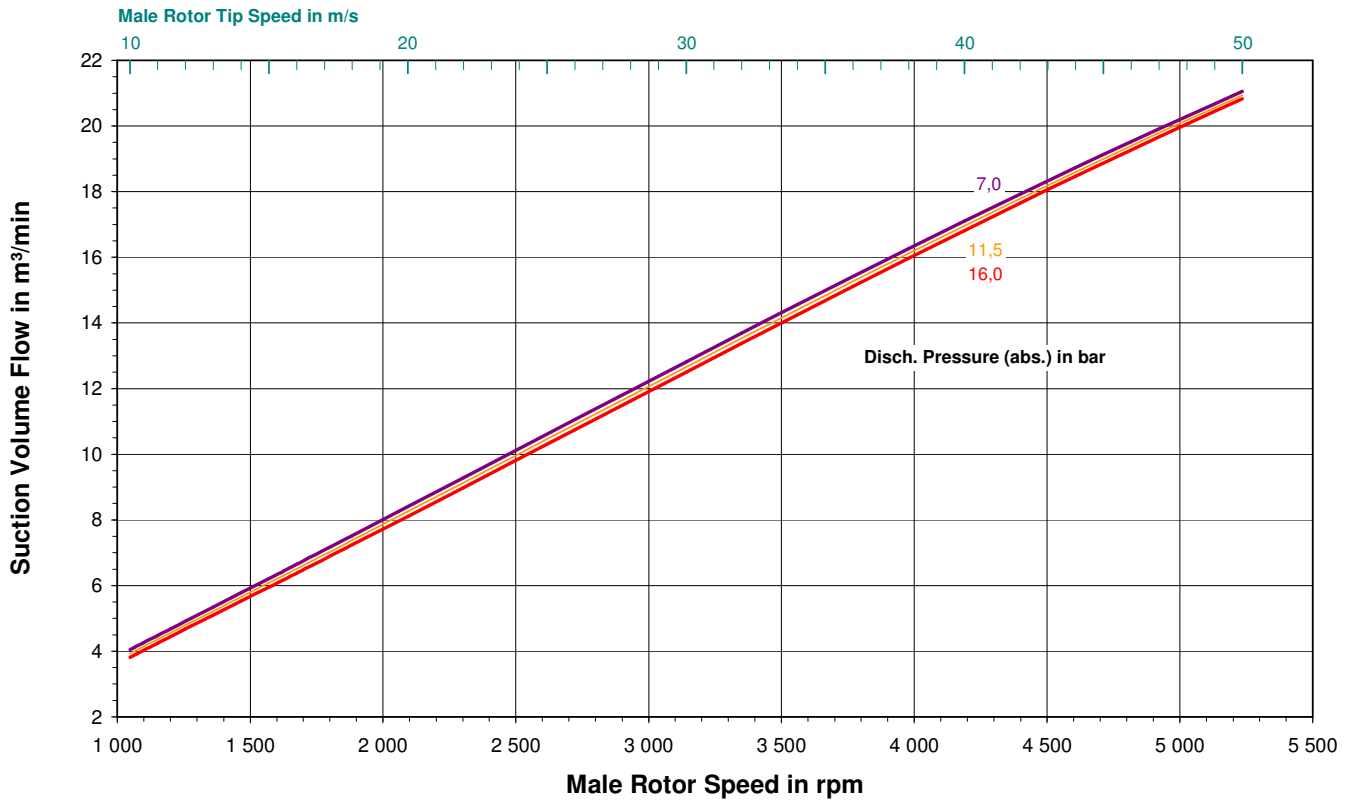
\* without additional oil pump



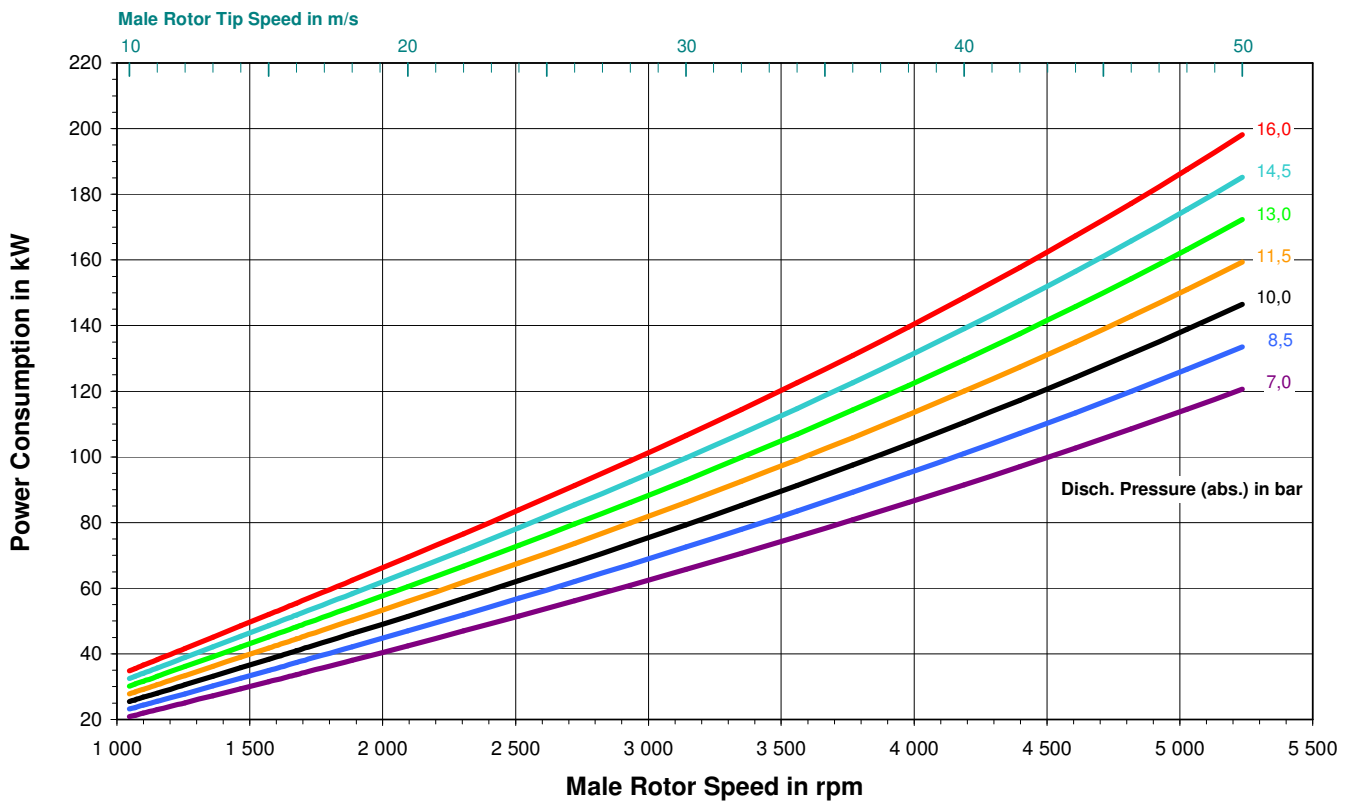
## CF128R Technische Daten (Page 2 of 2)

### Performance predictions:

Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



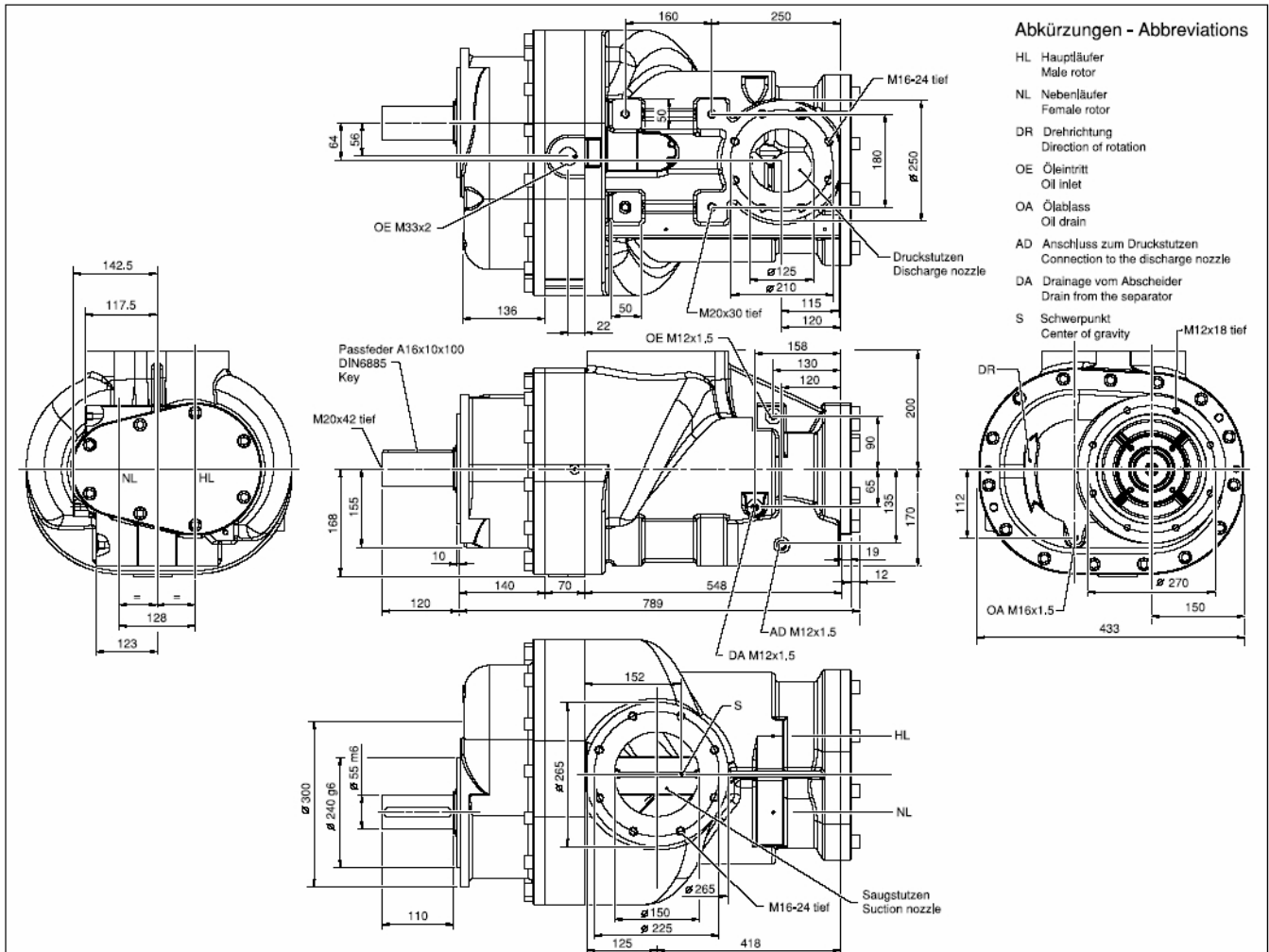
Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



## CF128LG Technical data (Page 1 of 3)

**Dimensions:** 909 mm x 433 mm x 370 mm (LxWxH)

**Weight:** 330 kg



### Permissible areas of operation:

	min	max
Speed of male rotor	1047 1/min	5235 1/min
Suction pressure	0,62 bar(abs)	atmospheric pressure
Discharge pressure	6 bar(abs) *	11,5 bar(abs)
Discharge temperature		110°C
Gear ratio	0,8254	2,3824

\* without additional oil pump

## CF128LG Technical data (Page 2 of 3)

### Chart Product Code:

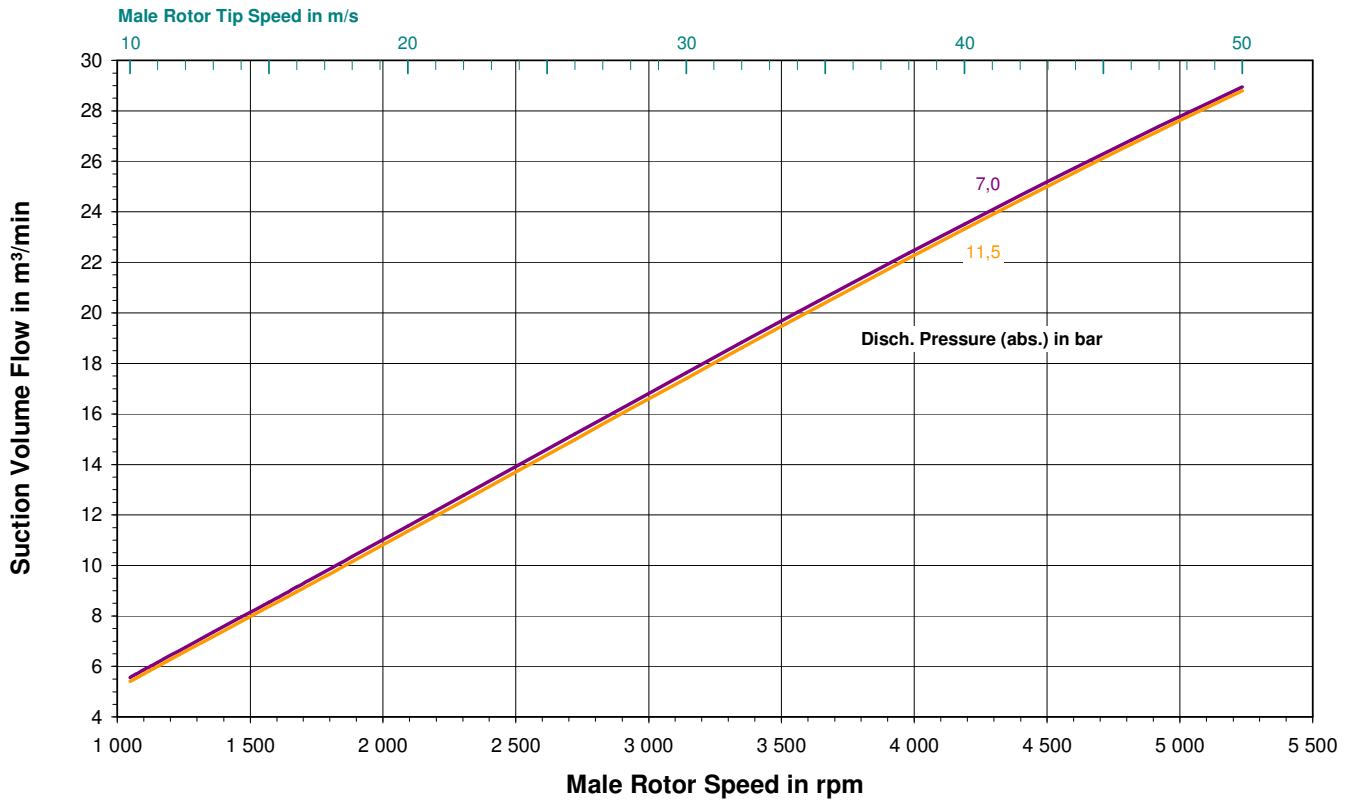
(Standard Gear Ratio shaded)

Product Code	Gear Ratio
<b>JGK</b>	<b>2,3824</b>
<b>JGL</b>	<b>2,2857</b>
JGM	2,1944
JGN	2,1081
<b>JGP</b>	<b>2,0263</b>
JGQ	1,9487
<b>JGR</b>	<b>1,8750</b>
<b>JGS</b>	<b>1,8049</b>
JGT	1,7381
<b>JGU</b>	<b>1,6744</b>
JGV	1,6136
<b>JGW</b>	<b>1,5556</b>
<b>JGX</b>	<b>1,5000</b>
<b>JGY</b>	<b>1,4468</b>
JGZ	1,3958
<b>JHA</b>	<b>1,3469</b>
<b>JHB</b>	<b>1,3000</b>
JHC	1,2549
<b>JHD</b>	<b>1,2115</b>
<b>JHE</b>	<b>1,1698</b>
JHF	1,1296
JHG	1,0909
JHH	1,0536
JHJ	1,0175
JHK	0,9828
JHL	0,9492
JHM	0,9167
JHN	0,8852
JHP	0,8548
JHQ	0,8254

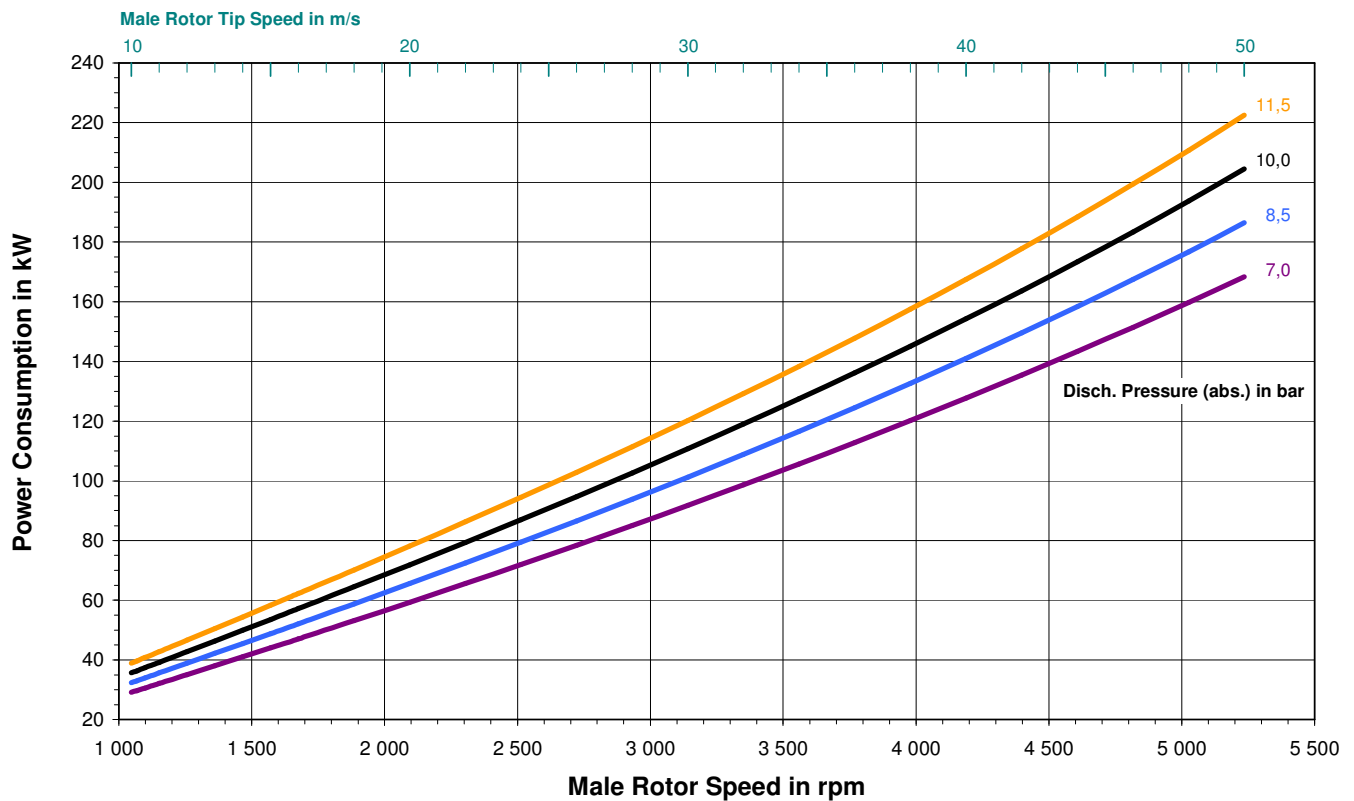
## CF128LG Technical data (Page 3 of 3)

### Performance predictions:

Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



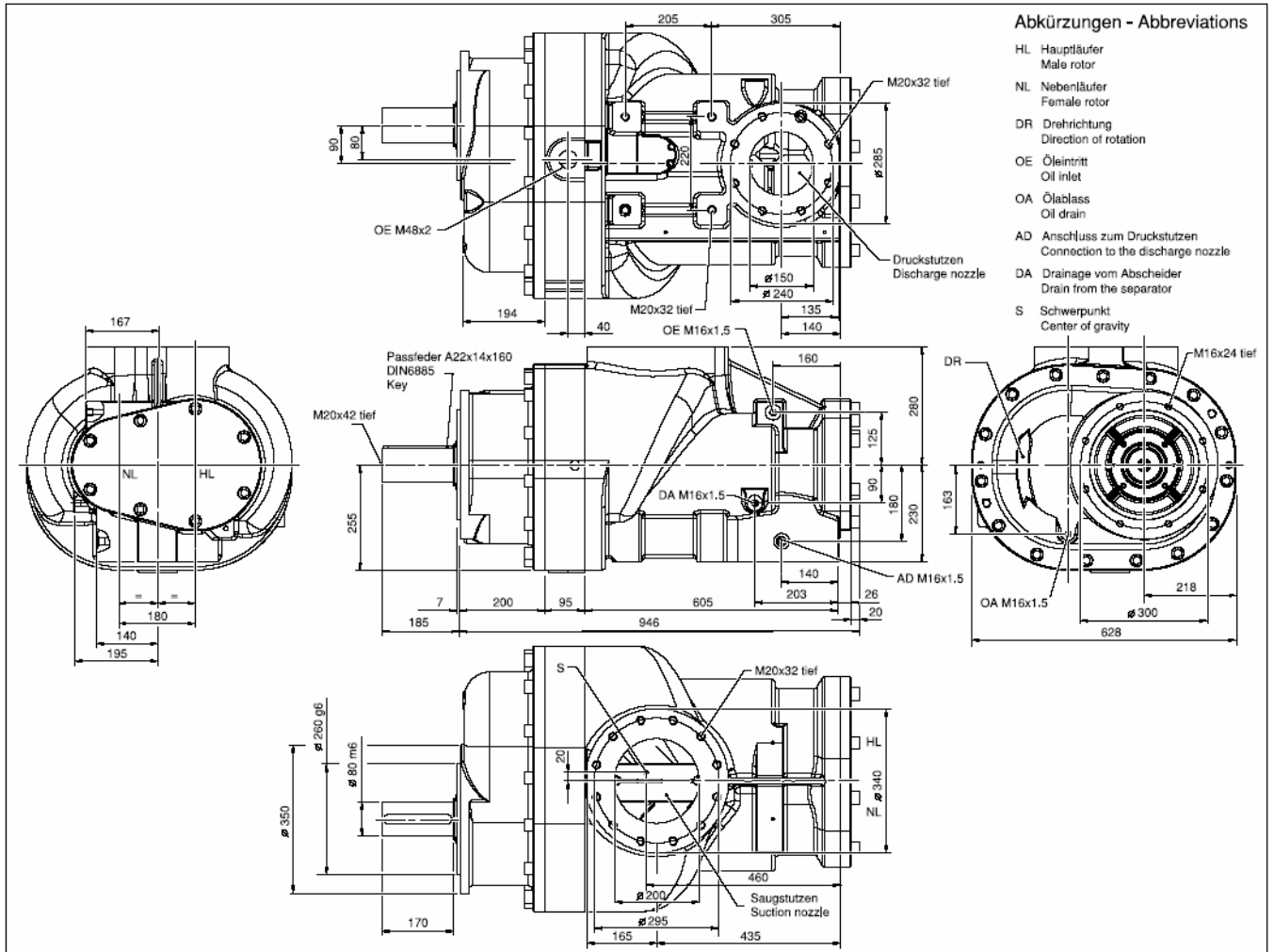
Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



## CF180G2 Technical data (Page 1 of 3)

**Dimensions:** 1130 mm x 626 mm x 535 mm (LxWxH)

**Weight:** 780 kg



### Permissible areas of operation:

	min	max
Speed of male rotor	745 1/min	3723 1/min
Suction pressure	0,62 bar(abs)	atmospheric pressure
Discharge pressure	6 bar(abs) *	16 bar(abs)
Discharge temperature		110°C
Gear Ratio	0,6119	2,4839

\* without additional oil pump

## CF180G2 Technical data (Page 2 of 3)

### Chart Product Code:

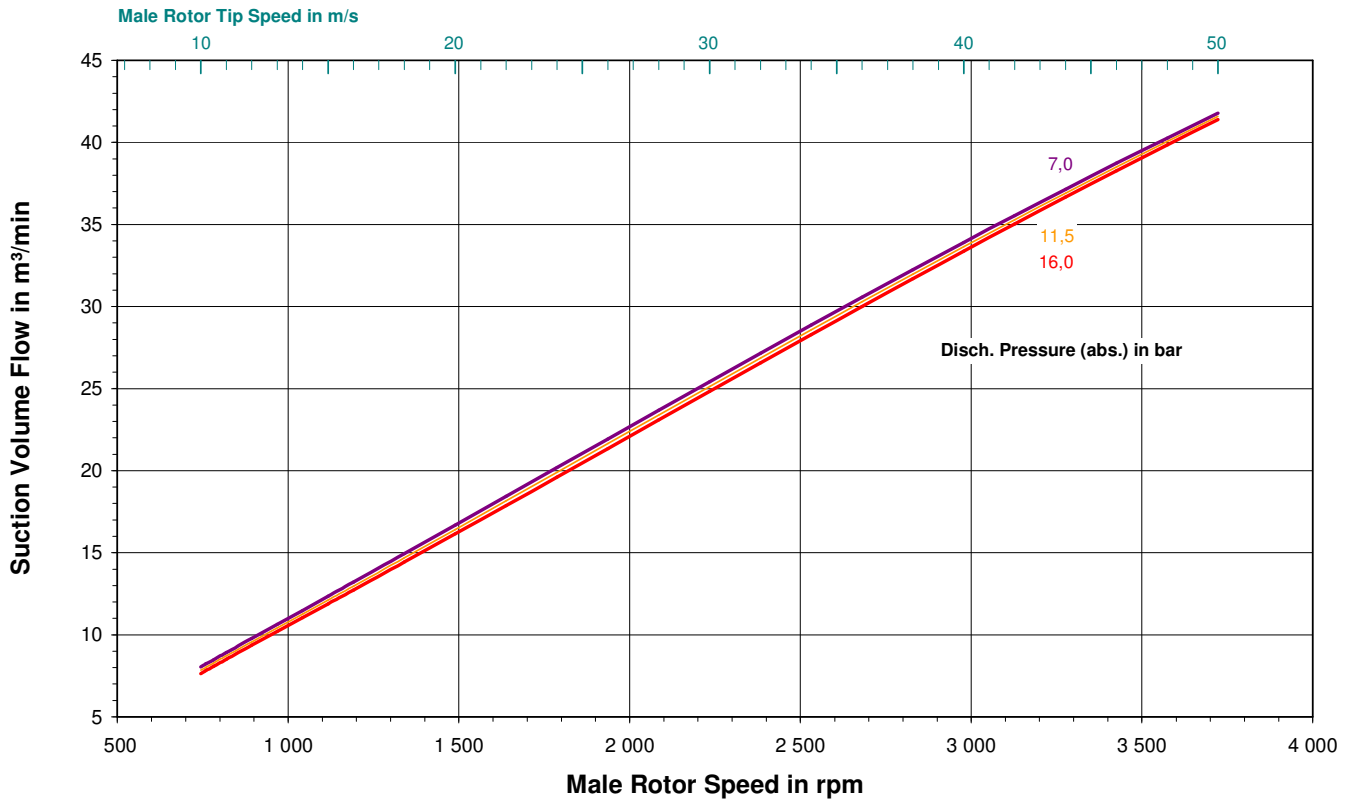
(Standard Gear Ratio shaded)

Product Code	Gear Ratio
JPA	2,2727
JPB	2,1765
JPC	2,0857
JPD	2,0000
JPE	1,9189
JPF	1,8421
JPG	1,7692
JPH	1,7000
JPJ	1,6341
<b>JPK</b>	<b>1,5714</b>
JPL	1,5116
JPM	1,4545
JPN	1,4000
JPP	1,3478
JPQ	1,2979
<b>JPR</b>	<b>1,2500</b>
JPS	1,2041
<b>JPT</b>	<b>1,1600</b>
JPU	1,1176
<b>JPV</b>	<b>1,0769</b>
JPW	1,0377
JPX	1,0000
JPY	0,9636
JPZ	0,9286
JQA	0,8947
JQB	0,8621
JQC	0,8305
JQD	0,8000
JQE	0,7705
JQF	0,7419
JQG	0,7143
JQH	0,6875
JQJ	0,6615
JQL	0,6119
<b>JTN</b>	<b>2,4839</b>

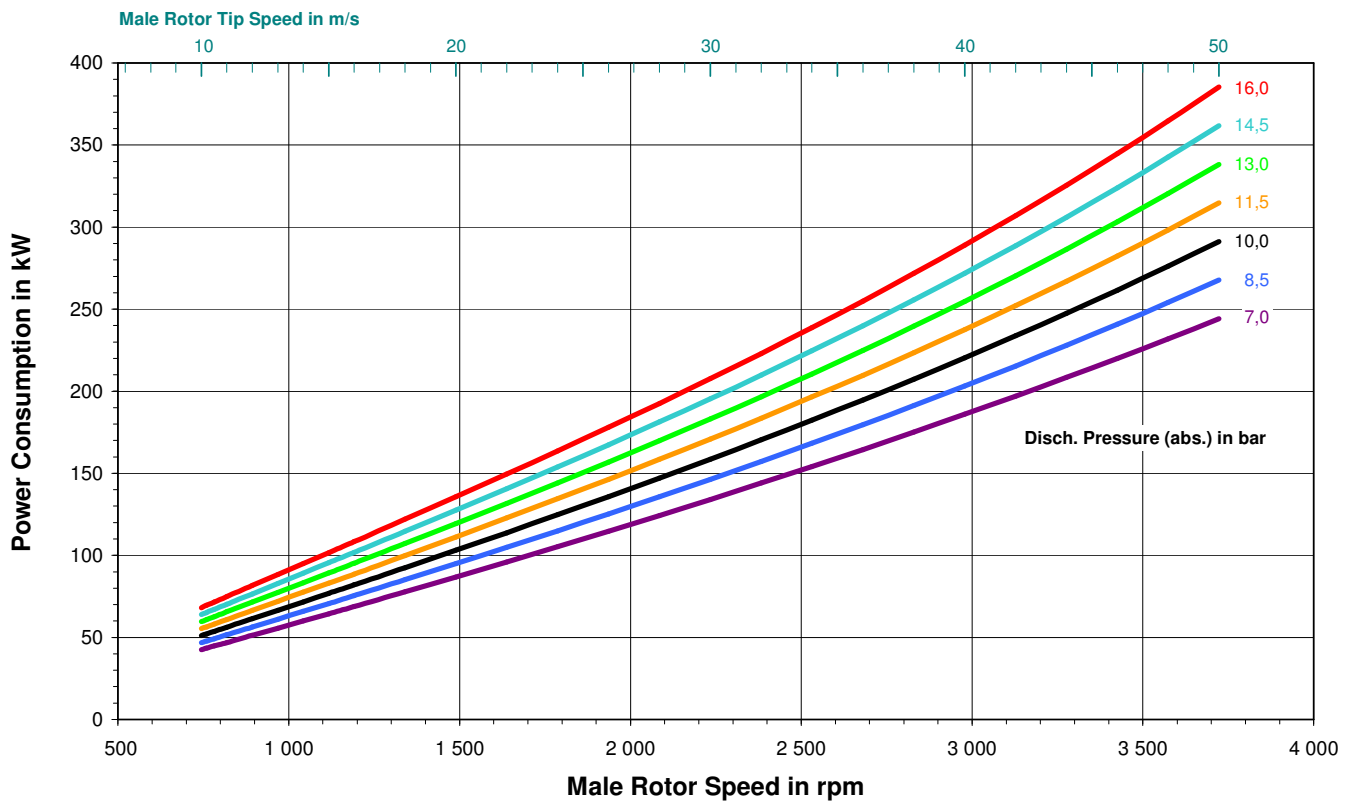
## CF180G2 Technical data (Page 3 of 3)

### Performance predictions:

Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



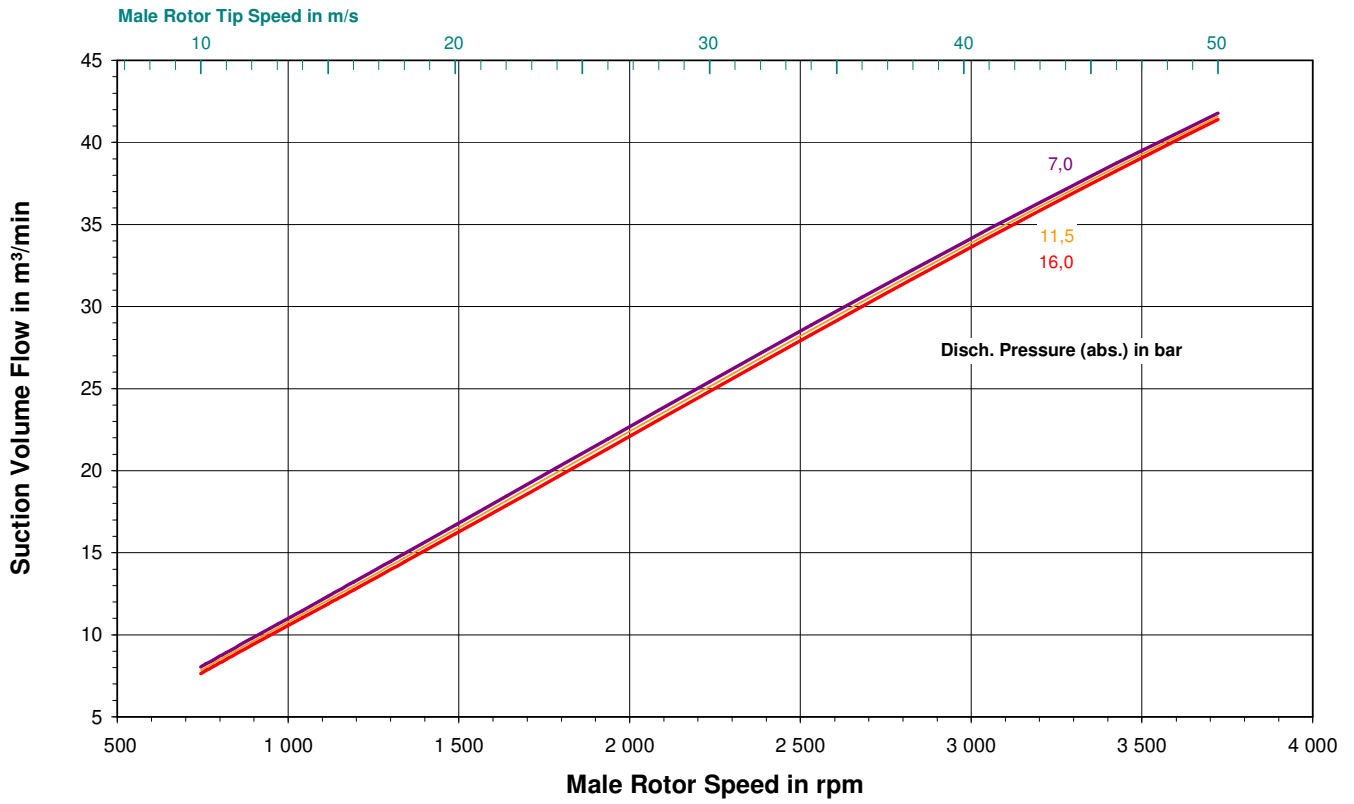




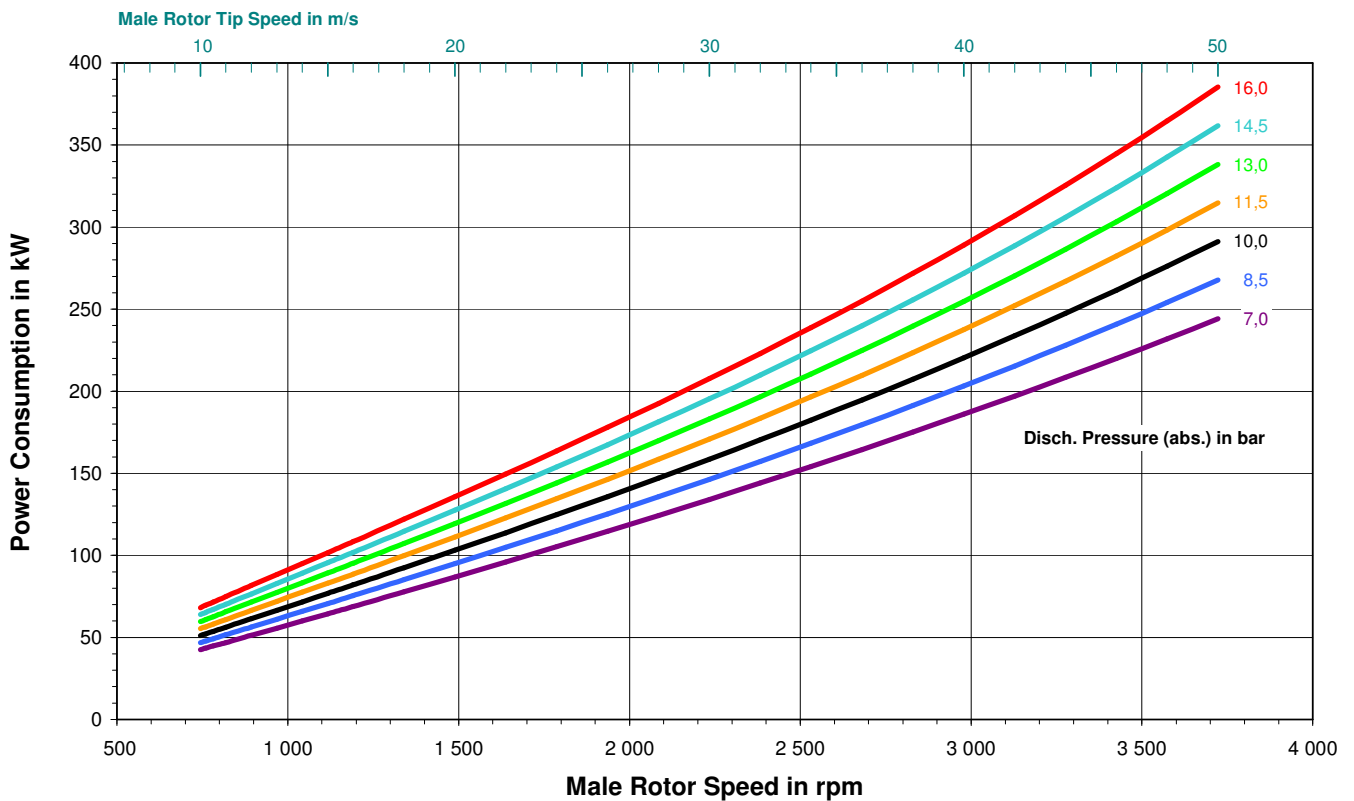
## CF180R Technical data (Page 2 of 2)

### Performance predictions:

Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



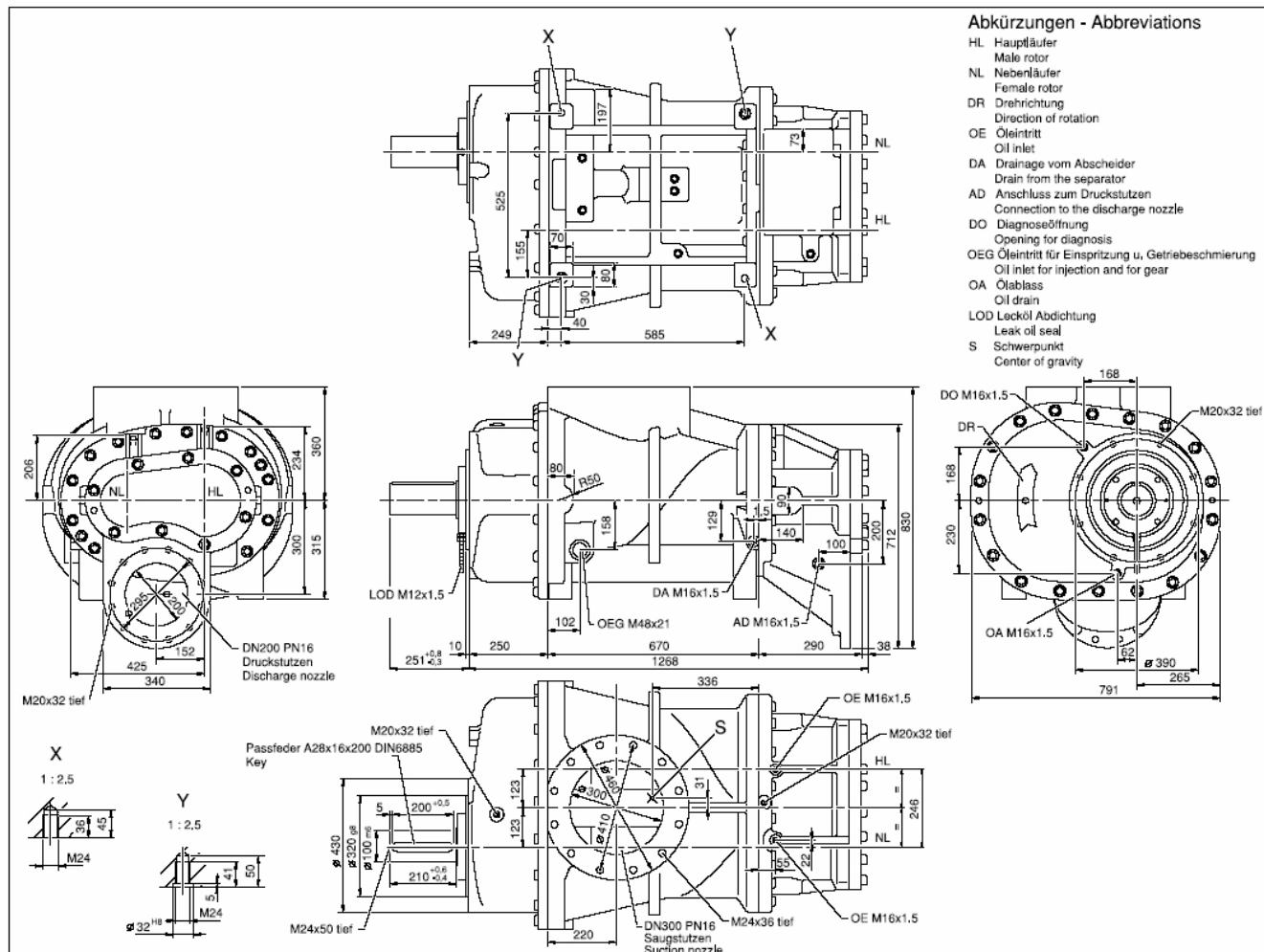
Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



## CF246G Technische Daten (Blatt 1 von 3)

**Dimensions:** 1519 mm x 791 mm x 830 mm (LxWxH)

**Weight:** 1600 kg



### Permissible areas of operation:

	min	max
Speed of male rotor	575 1/min	2875 1/min
Suction pressure	0,62 bar(abs)	atmospheric pressure
Discharge pressure	6 bar(abs) *	14,5 bar(abs)
Discharge temperature		110°C
Gear ratio	0,4605	1,9211

\* without additional oil pump

## CF246G Technical data (Page 2 of 3)

### Chart Product Code:

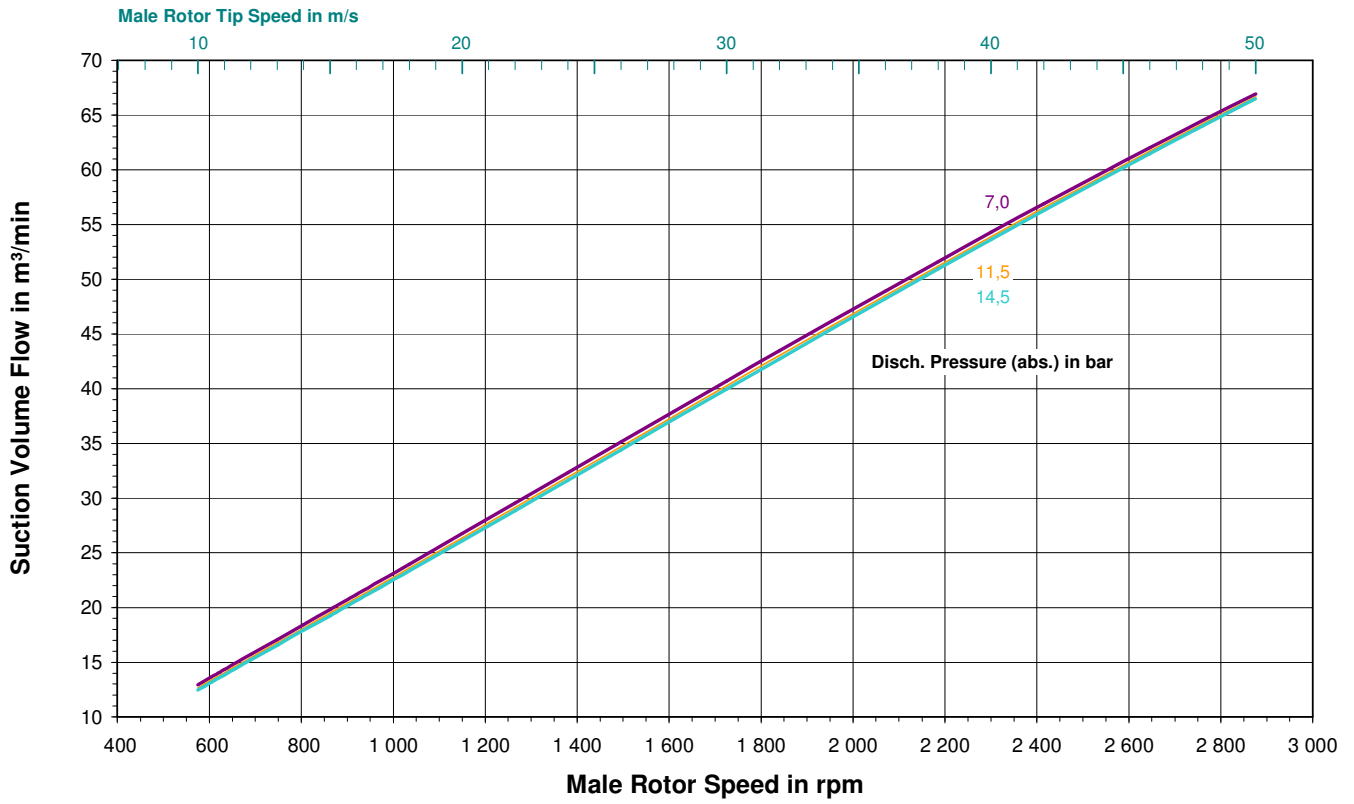
(Standard Gear Ratio shaded)

Product-Code	Gear Ratio
<b>JUA</b>	<b>1,9211</b>
JUB	1,8462
JUC	1,7750
<b>JUD</b>	<b>1,7073</b>
JUE	1,6429
<b>JUF</b>	<b>1,5814</b>
JUG	1,5227
<b>JUH</b>	<b>1,4667</b>
JUJ	1,4130
JUK	1,3617
JUL	1,3125
JUM	1,2653
JUN	1,2200
JUP	1,1765
JUQ	1,1346
JUR	1,0943
JUS	1,0556
<b>JUT</b>	<b>1,0182</b>
JUU	0,9821
JUV	0,9474
JUW	0,9138
JUX	0,8814
JUY	0,8500
JUZ	0,8197
JVA	0,7903
JVB	0,7619
JVC	0,7344
JVD	0,7077
JVE	0,6818
JVF	0,6567
JVG	0,6324
<b>JVH</b>	<b>0,6087</b>
JVJ	0,5857
JVK	0,5634
JVL	0,5417
JVM	0,5205
JVN	0,5000
JVP	0,4800
JVQ	0,4605

## CF246G Technical data (Page 3 of 3)

### Performance predictions:

Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46



Medium: Air, rel. humidity 60 %; suction press. (abs.): 1 bar; suction temp.: 20 °C; disch. temp.: 80 °C; oil quality: ISO VG46

