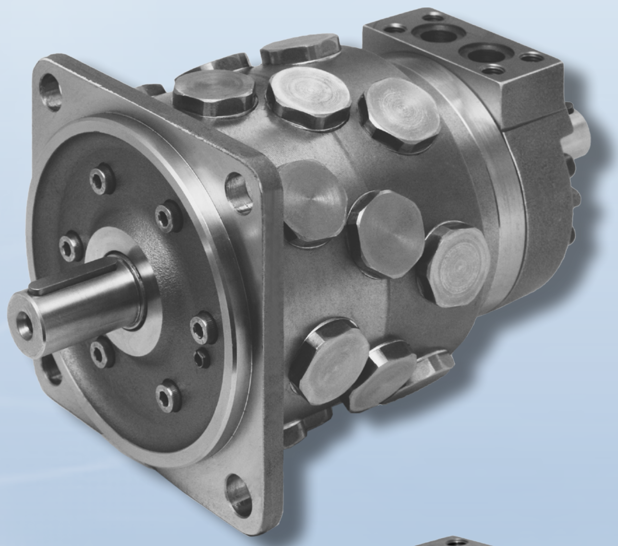
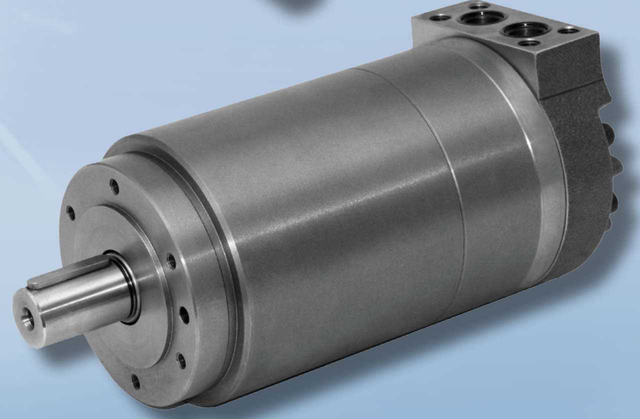
DÜSTERLOH Fluidtechnik

High-Precision Hydraulic Motors



Radial Piston Motors

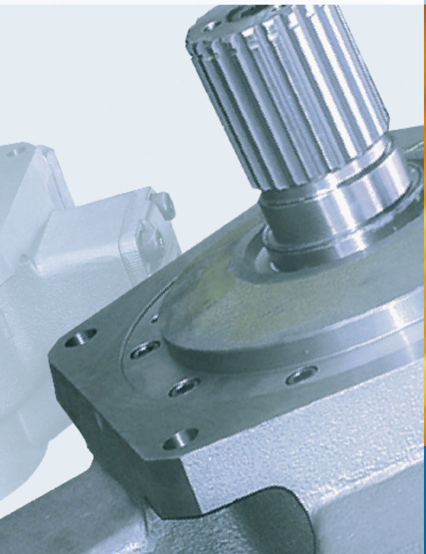
with fixed displacement
RMHP 90 - RMHP 110
V_g = 88,4 cm³/U - 109,5 cm³/U



Axial Piston Motors

with fixed desplacement
AEHP 40
V_g = 43,7 cm³/U

Catalogue



HM1-018 EN Edition 2022.06 / 02

Special characteristics of the high precision hydraulic motors

Duesterloh high precision hydraulic motors generate an extreme low cyclic irregularity. The RMHP-motors have a cyclic irregularity of just 0,28 % and the AEHP of 0,73 %. In combination with a highly precise control of the oil flow to the pistons, the motors generate a high speed constancy, specially by driving low numbers of rotations.

Characteristics of the high precision Duesterloh hydaulic motors

- long service due to mature design
- shaft end able to support large radial and axial forces
- small number of components in drive
- extreme low moment of inertia
- by default with measuring shaft
- translationally operating control unit with play adjustment control
- suitable for use with liquids with low combustion properties
- maintenance free
- quiet running
- wide speed range
- 100 % torque throughout the entire speed range
- immediately reversible
- high starting torque
- no counterpressure required for motor operation
- can be used as pump if feed is available
- suitable for several applications as a control unit
- feed and discharge control possible
- total efficiency of up to 93 %
- direct valve mounting available as a standard option

Characteristic:

Motor	Displace-ment	Torque		Speed	Cont.-pressure	Maximum pressure	Peak-pressure		Output	
	V_g [cm³/U]	T_{spec} [Nm/bar]	T_{max} [Nm]	n_{min*} [min⁻¹]	n_{max} [min⁻¹]	$p_{cont.}$ [bar]	p_{max} [bar]	p_{peak} [bar]	$P_{cont.}$ [kW]	$P_{intermit.}$ [kW]
RMHP 90	88,4	1,24	252	1	900	140	210	250	8,5	10
RMHP 110	109,5	1,55	310	1	750	140	210	250	8,5	10
AEHP 40	43,7	0,63	155	1	2000	210	250	315	18,0	21

Calculation - Performance limits:

With known pressure difference Δp:

RMHP 90: $$n \le \frac{8{,}5\text{kW} \times 9549{,}3}{\Delta p \times 1{,}24\text{Nm/bar}} = \frac{65459}{\Delta p}\ [1/\text{min}]$$

RMHP 110: $$n \le \frac{8{,}5\text{kW} \times 9549{,}3}{\Delta p \times 1{,}55\text{Nm/bar}} = \frac{52367}{\Delta p}\ [1/\text{min}]$$

AEHP 40: $$n \le \frac{18\text{kW} \times 9549{,}3}{\Delta p \times 0{,}63\text{Nm/bar}} = \frac{272837}{\Delta p}\ [1/\text{min}]$$

With known number of rotations n:

RMHP 90: $$\Delta p \le \frac{8{,}5\text{kW} \times 9549{,}3}{n \times 1{,}24\text{Nm/bar}} = \frac{65459}{n}\ [\text{bar}]$$

RMHP 110: $$\Delta p \le \frac{8{,}5\text{kW} \times 9549{,}3}{n \times 1{,}55\text{Nm/bar}} = \frac{52367}{n}\ [\text{bar}]$$

AEHP 40: $$\Delta p \le \frac{18\text{kW} \times 9549{,}3}{n \times 0{,}63\text{Nm/bar}} = \frac{272837}{n}\ [\text{bar}]$$

Δp	inlet pressure p_1 minus outlet pressure p_2
$p_{cont.}$	if limited to $P_{cont.}$
p_{max}	if limited to $P_{intermit.}$ operating for a maximum duration of 10 % in every hour
p_{peak}	highest pressure at which the components will remain functional
$P_{cont.}$	continuous output (at a return pressure of 10 bar); if this output is constantly exceeded, the drive mus be flushed
$P_{intermit}$	output with which the motor can be run intermittently (for an operating time of 10 % in every hour).

High-Precision Hydraulic Motor

Motortyp
with play self-adjustment

Motortyp / Displacement		Denotation
Radial-piston motor	88 cm^3/U	= **RMHP 90**
Radial-piston motor	109 cm^3/U	= **RMHP 110**
Axial-piston motor	44 cm^3/U	= **AEHP 40**

Drive shaft	Denotation
Cylindrical Keyway DIN 6885 T1	= **Z**

Connections	Denotation
Flange connection, radial Duesterloh standard (for mounting the valve)	= **A1**
Threaded connection, radial G ½ DIN ISO 228-1	= **A**
Threaded connection, axial G ¾ DIN ISO 228-1	= **B5**

Sealing material	Denotation
NBR seals, suitable for HLP mineral oils according to DIN 51524 part 2	= *
FPM seals, suitable for ester of phosphoric acid (HFD).	= **V**

Second shaft end	Denotation
cylindrical measuring shaft ø10_{h6} for sensor (incremental speed sensor etc.)	= **M** **(Not available for B5 connections)**
without second shaft end	= *

Flange dimensions

Attachment	Denotation
S = ø80; K = ø100	= *
S = ø120; K = ø140	= **F3** **(only RMHP)**

Flange connection

S = ø160; K = ø200 ISO 3019/2	= **F**

(S = diameter of the centring ring)
(K = circle diameter for screw holes)

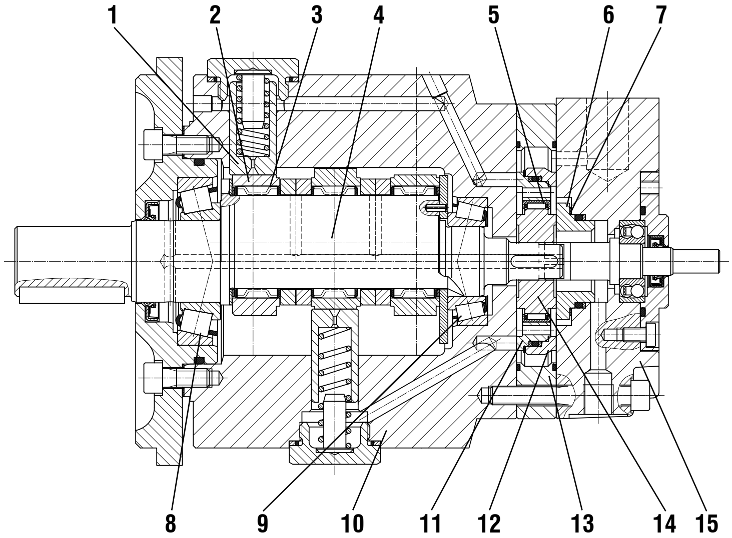
Additional information	Denotation
Flush connection	= **S99** **(AEHP = standard)**

* No information given in the type key number.

1. General properties and features

Hydrostatic radial piston motor

Purpose:
Transformation of hydraulic power to drive power. High efficiency, also suitable for very low speeds, low moment of inertia, rapidly reversible, four-quadrant operation possible, very suitable for applications as a control, quiet operation.



2. Structure and function

2.1 Drive unit

Design:
Internal piston support
Method of functioning:
Twenty-one radial pistons **(1)** load the crankshaft **(4)** via a heptagon ring **(2)** with a needle bearing cage **(3)**.

Drive details
Crankshaft bearing: Prestressed, amply dimensioned taper roller bearing **(8/9)** in X-arrangement.
High guiding accuracy, therefore smooth running, high axial and radial load capacity (e.g. a flying arrangement of a pinion on the drive shaft). Load transmission piston **(1)** - crank shaft **(4)**: Through heptagon ring **(2)** with needle bearing **(3)**.
Advantage: Low frictional losses, very long service life, relatively insensitive to dirt, high starting torque, high continuous torque, no stick-slip effect at low speeds, only minor leakage (necessary for the lubrication and cooling of the drive), high efficiency.

2.2 Control

Design:
Planar translational distribution valve with play adjustment.

Purpose:
Distribution of the volume feed to the twenty-one cylinders, collection of the return volume flow.

Methode of functioning:
Control rings **(11/12)** with the external ring **(13)** and with the eccentric **(14)** form an external and an internal ring space. By moving the control rings **(11/12)** between the motor housing **(10)** and the end cover **(15)** by means of the eccentric **(4)** which is fixed to the crankshaft **(14)**, the internal and the external ring spaces are connected to the cylinders in turn. The ring spaces themselves are connected to the outside through pressure connections to the motor.

Control details
Roller bearing **(5)** between the control rings **(11/12)** and the eccentric **(14)**. The control rings **(11/12)** mainly move translationally, nevertheless rotationally movement is possible (two-degree-of-freedom-system) - this means small frictional losses at the control rings **(11/12)** and a cleaning effect in the sealing gap, approximately equal relative speeds of the sealing faces. Sinusoidal opening function for the control openings - this means smooth running even at low speeds and quiet running at high speeds, large volume flow in the control ring **(11)**.
Adjustment of the play on the control rings **(11/12)** and the flats on the eccentric **(14)**:
Through hydrostatic pressure, the control rings **(11/12)** are forced against the flats. In case of zero and low pressure situations, the contect between rings and flats is guranteed throughout a spring washer, hydrostatic re-adjustment of the eccentric flats to each other, supported by a pressure thrust piece **(6)** and by a helical spring **(7)**.
Very low leakage and small frictional losses, automatic compensation of pressure and temperature influences (temperature shocks among others), relatively insensitive to dirt.

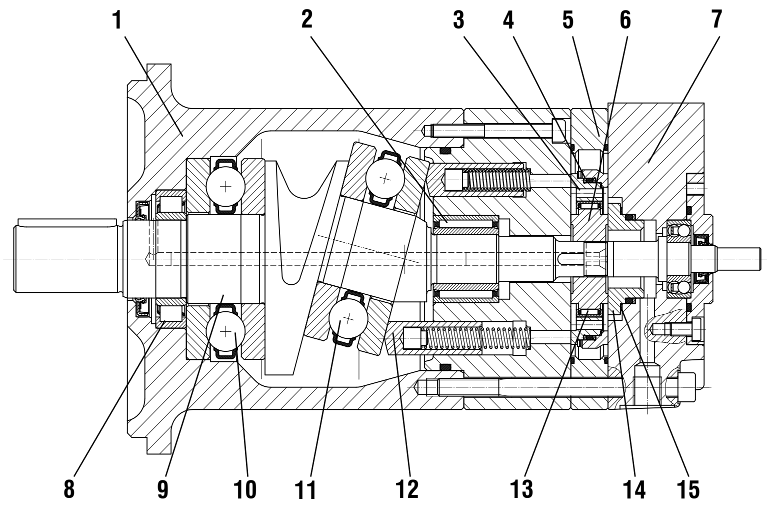
1. General properties and features

Hydrostatic axial piston motor

Purpose:
Transformation of hydraulic power to drive power. High efficiency, also suitable for very low speeds, low moment of inertia, rapidly reversible, high totals printout load capacity, four-quadrant operation possible, very suitable for applications as a control, quiet operation.

2. Structure and function

2.1 Drive unit



Design:
Wobble plate
Method of functioning:
Thirteen axial pistons **(12)** load the wobble spindle **(9)** via deep groove ball thrust bearing **(11)**.

Drive details
Balanced wobble spindle **(9)**, bedded in a deep groove ball thrust bearing **(10)** and a cylinder roller bearing **(8)** facing drive side. The wobble spindle **(9)** facing the control unit is bedded in a needle bearing **(2)**. High radial load capacity (e.g. a flying arrangement of a pinion on the drive shaft).The generation of the torque results from the power transmission through the operating medium to the pistons **(12)**. By means of deep groove ball thrust bearings **(10/11)** in combination with the wobble plate the pistons affect the wobble spindle **(9)**.
Advantage: Low frictional losses, very long service life, relatively insensitive to dirt, high starting torque, high continuous torque, no stick-slip effect at low speeds, only minor leakage (necessary for the lubrication and cooling of the drive), high efficiency.

2.2 Control

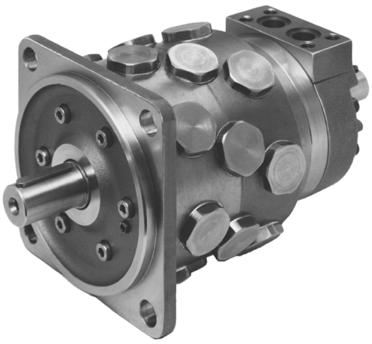
Design:
Planar translational distribution valve with play adjustment.

Purpose:
Distribution of the volume flow to the thirteen cylinders, collection of the return volume flow.

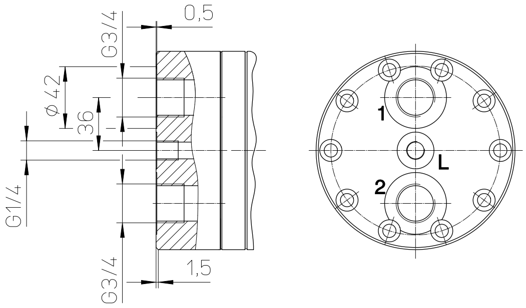
Methode of functioning:
Control rings **(3/4)** with the external ring **(5)** and with the eccentric **(6)** form an external and an internal ring space. By moving the control rings **(3/4)** between the motor housing **(1)** and the end cover **(7)** by means of the eccentric **(6)** which is fixed to the wobble spindle **(9)**, the internal and the external ring spaces are connected to the cylinders in turn. The ring spaces themselves are connected to the outside through pressure connections to the motor.

Control details
Roller bearing **(13)** between the control rings **(3/4)** and the eccentric **(6)**. The control rings **(3/4)** mainly move translationally, nevertheless rotational movement is possible (two-degree-of-freedom-system) - this means small frictional losses at the control rings **(3/4)** and a cleaning effect in the sealing gap, approximately identical relative speeds of the sealing faces. Sinusoidal opening function for the control openings - this means smooth running even at low speeds and quiet running at high speeds, large volume flow in the control ring **(13)**.
Adjustment of the play on the control rings **(3/4)** and the flats on the eccentric **(6)**:
Through hydrostatic pressure, the control rings **(3/4)** are forced against the flats. In case of zero and low pressure situations, the contact between rings and flats is guaranteed throughout a spring washer, hydrostatic re-adjustment of the eccentric flats to each other, supported by a pressure thrust piece **(14)** and by a helical spring **(15)**. Very low leakage and small frictional losses, automatic compensation of pressure and temperature influences (temperature shocks among others), relatively insensitive to dirt.

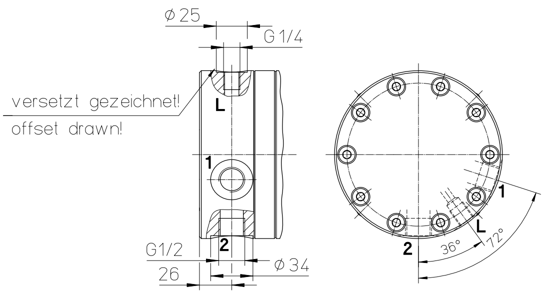
RMHP 90 ZA1MF



Alternative end cover: B5



Alternative end cover: A



Hydraulic characteristic values RMHP 90

Geometr. displacement:	88,4	[cm³/U]
Theor. spec. torque:	1,4	[Nm/bar]
Average spec. torque:	1,24	[Nm/bar]
Peak pressure:*	250	[bar]
Max. operating pressure:**	210	[bar]
Continuous pressure:	140	[bar]
Max. operating torque:	252	[Nm]
Continuous torque:	173	[Nm]
Drain line pressure:	max. 1	[bar]
	(discharge pressureless to tank)	
Hydraulic fluid temperature range:	243 - 363	[K]
	minus 30 - +90	[°C]
Viscosity range:	20 - 150	[mm²/s]
	(max. 1000 mm²/s at start)	

Pressure fluids:
Mineralöl H-LP conformity with DIN 51424 part 2
Bio-degradable fluids available on request.

* Definition acc. to DIN 24 312: Peak pressure = exeeding the maximum operating pressure fo a short time at which the motor remains able to function.

** If the sum of inlet pressure and outlet pressure is higher than the peak pressure, please consult the manufacturer.

HFC	Reduce HFC pressure to 70% Check the bearing servise life	Definition CETOP RP 77 H ISO/DIS 6071
HFD	FPM-/FKM-seals are required	

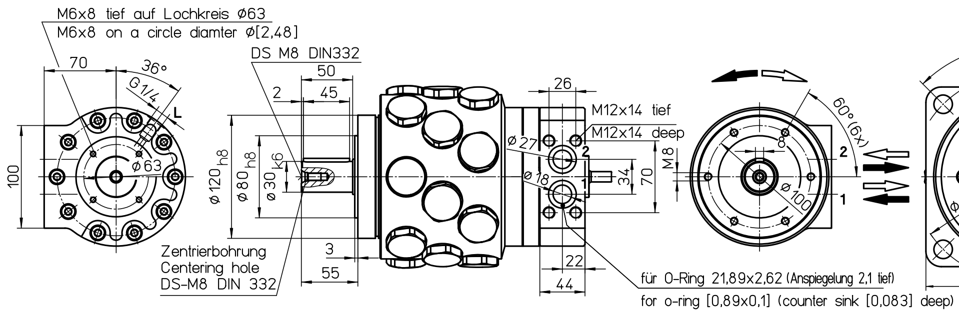
Filtering:
Max. permissible degree of contamination of the fluid according NAS 1638 Klasse 9.
We recommend filters with a minimum retention rate $\beta_{10} \geq 100$
For a long service life we recommend filtering acc. to NAS 1638 class 8, and filters with a minimum retention rate $\beta_5 \geq 100$.

Characteristic values according to VDI 3278

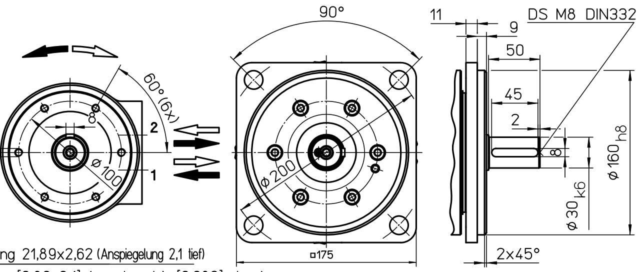
Weight:	25,2	[kg]
Monting position:		as required
Operating speed range:	1 - 900	[min⁻¹]
Moment of inertia:	0,00032	[kgm²]
Continuous power:	8,5	[kW]
Intermittent power:	10,0	[kW]

Direction of rotation, if viewed at the shaft end
clockwise: flow from connection 2 to connection 1
anti-clockwise: flow from connection 1 to connection 2

Standard design: RMHP 90 ZA1M



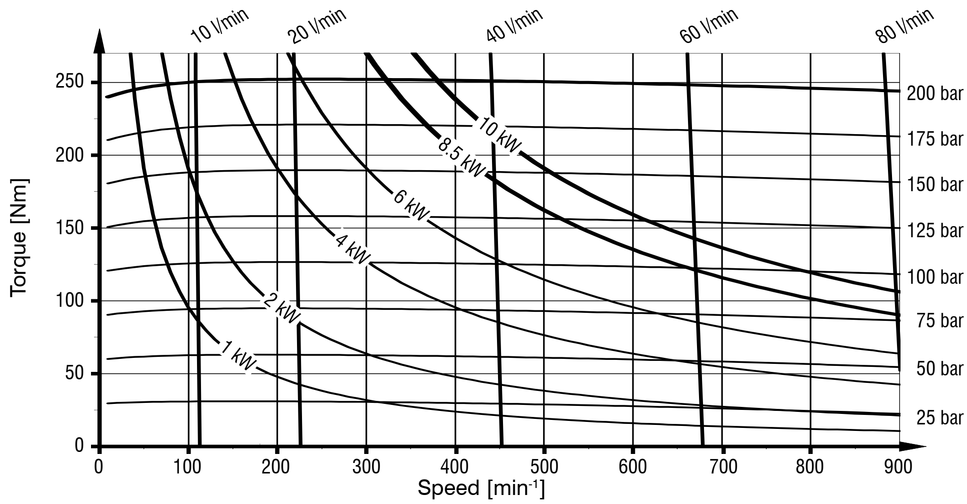
Flange design: F



pressure medium: HLP 46 operating temperature: T = 50°C pressure difference: $\Delta p = p_1 - p_2$; p_2 = 0 bar

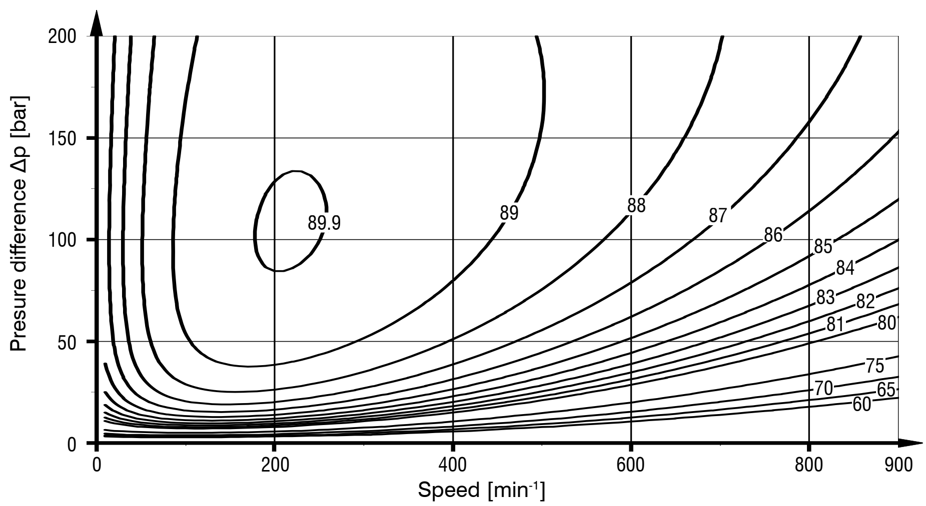
Torque characteristic

Diagram A:



Hydraulic-mechanical efficiendy in percentage

Diagram B:



Strength of the shaft

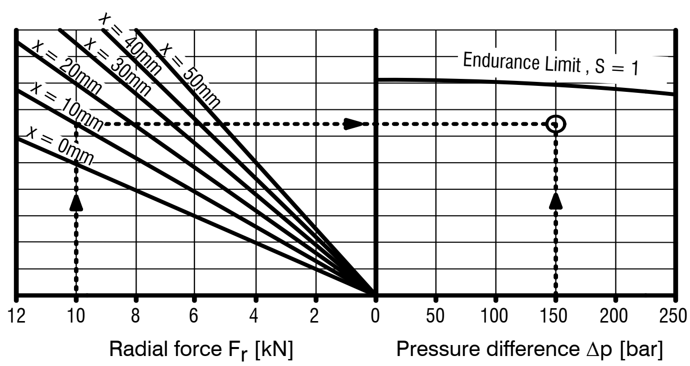
Diagram C:

Example:

Given: Fr = 10 kN; x = 10 mm; Δp = 150 bar

Required: Shaft strength

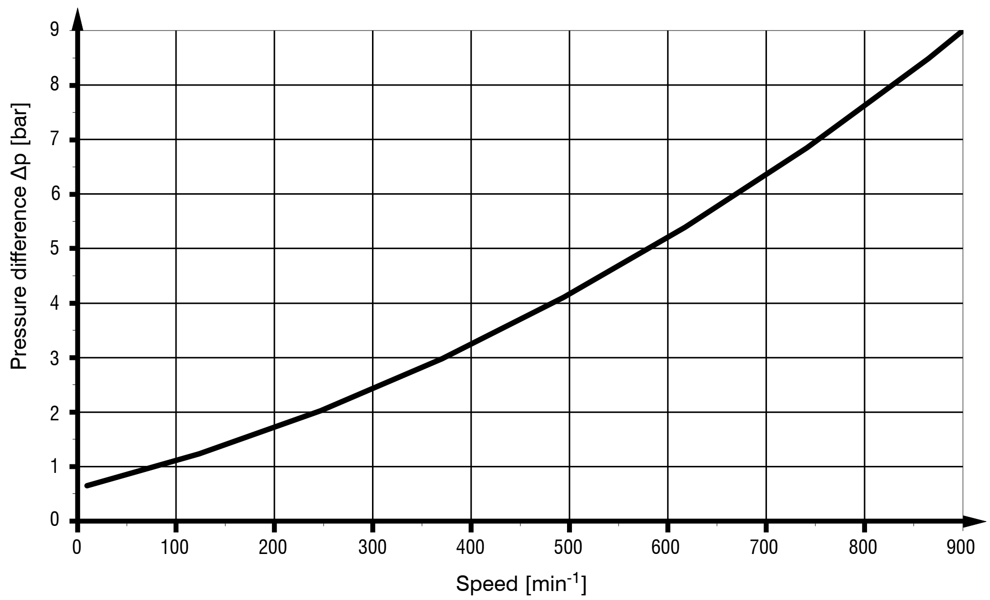
Draw a vertical line from Fr = 10 kN to distance x = 10 mm and a straight horizontal line to the right. If the intersection of the horizontal with the vertical line of Δp = 150 bar is below the curve S = 1, the shaft has sufficient fatigue strength. Allowable axial forces will be provided on request.



pressure medium: HLP 46 operating temperature: T = 50°C pressure difference: $\Delta p = p_1 - p_2$; p_2 = 0 bar

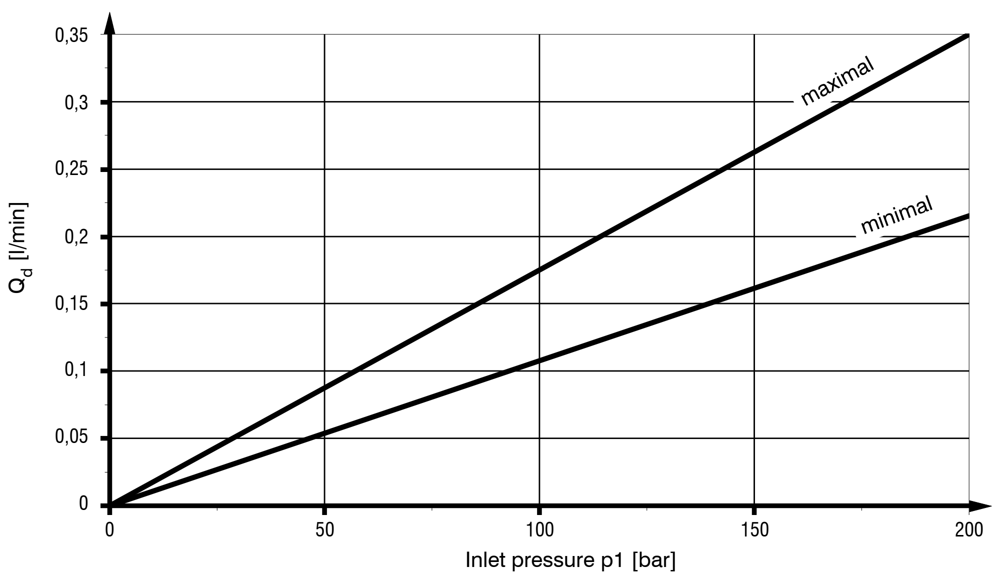
Idle speed

Diagram D:



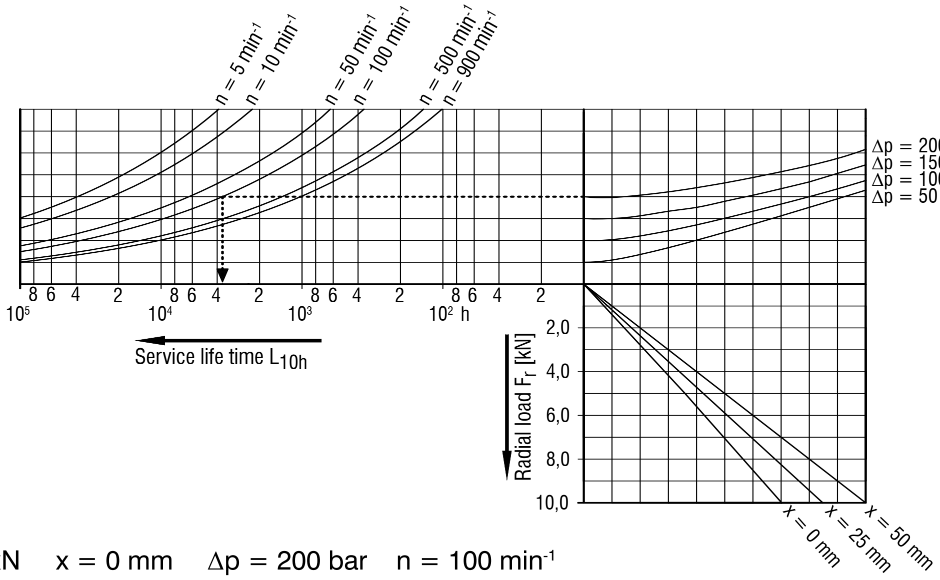
External leakage through flow

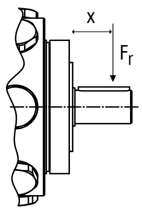
Diagram E:



Service life of the radial bearing loaded with a radial force facing the drive shaft.

Diagram F:

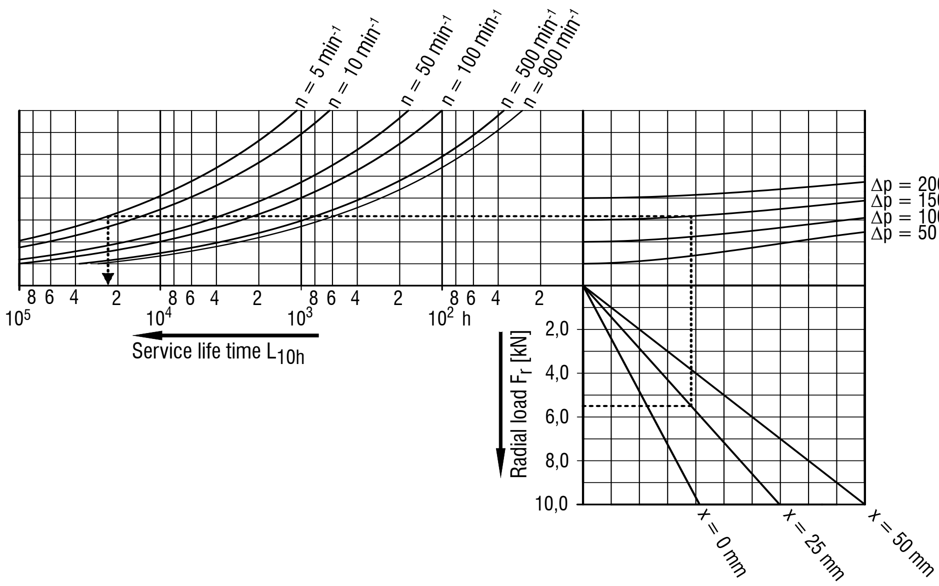


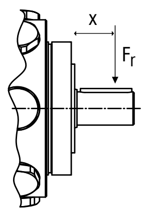


Given : Fr = 0 kN x = 0 mm Δp = 200 bar n = 100 min^{-1}
Required: Service life time of the drive shaft facing radial bearing.
Diagram F:
Form a rorizontal line from the Δp = 200 bar curve to the n = 100 min^{-1} curve. From this follows a service life time value of L_{10h} = 3665,5 h.

Service life of the radial bearing loaded with a radial force facing the control unit.

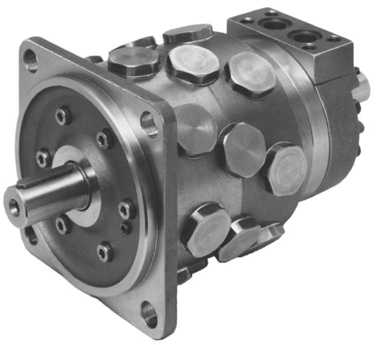
Diagram G:



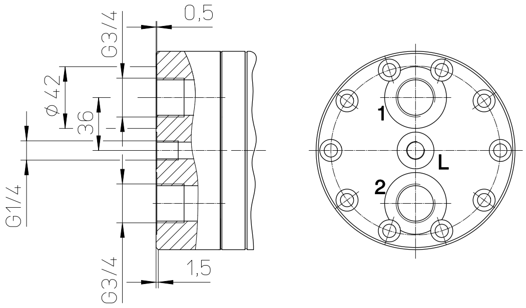


Given : Fr = 5,5 kN x = 25 mm Δp = 150 bar n = 5 min^{-1}
Required: Service life time of the drive shaft facing radial bearing.
Diagram G:
Form a horizontal line from Fr = 5,5 kN to x = 25 mm. From the intersection form a vertical line to the pressure curve Δp = 150 bar. Afterwards, draw a line from the pressure curve to the speed curve n = 5 min^{-1}.
The intersection shows the service life time L_{10h} = 23351 h.

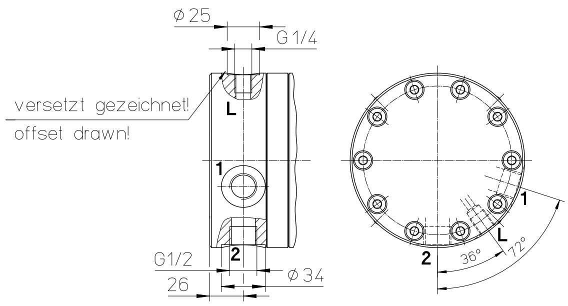
RMHP 110 ZA1MF



Alternative end cover: B5



Alternative end cover: A



Hydraulic characteristic values RMHP 110

Geometr. displacement:	109,5	[cm³/U]
Theor. spec. torque:	1,74	[Nm/bar]
Average spec. torque:	1,55	[Nm/bar]
Peak pressure:*	250	[bar]
Max. operating pressure:**	210	[bar]
Continuous pressure:	140	[bar]
Max. operating torque:	310	[Nm]
Continuous torque:	217	[Nm]
Drain line pressure:	max. 1	[bar]
	(discharge pressureless to tank)	
Hydraulic fluid temperautre range:	243 - 363	[K]
	minus 30 - +90	[°C]
Viscosity range:	20 - 150	[mm²/s]
	(max. 1000 mm²/s at start)	

Pressure fluids:
Mineralöl H-LP conformity with DIN 51424 part 2
Bio-degradable fluids available on request.

* Definition acc. to DIN 24 312: Peak pressure = exeeding the maximum operating pressure fo a short time at which the motor remains able to function.

** If the sum of inlet pressure and outlet pressure is higher than the peak pressure, please consult the manufacturer.

HFC	Reduce HFC pressure to 70% Check the bearing servise life	Definition CETOP RP 77 H ISO/DIS 6071
HFD	FPM-/FKM-seals are required	

Filtering:
Max. permissible degree of contamination of the fluid according NAS 1638 Klasse 9.
We recommend filters with a minimum retention rate $\beta_{10} \geq 100$
For a long service life we recommend filtering acc. to NAS 1638 class 8, and filters with a minimum retention rate $\beta_5 \geq 100$.

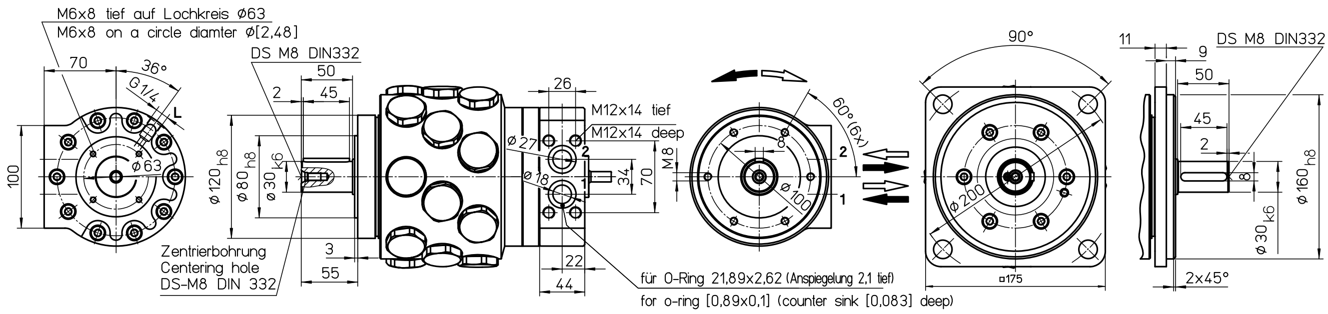
Characteristic values according to VDI 3278

Weight:	25,2	[kg]
Monting position:		as required
Operating speed range:	1 - 750	[min⁻¹]
Moment of inertia:	0,00034	[kgm²]
Continuous power:	8,5	[kW]
Intermittent power:	10,0	[kW]

Direction of rotation, if viewed at the shaft end
clockwise: flow from connection 2 to connection 1
anti-clockwise: flow from connection 1 to connection 2

Standard design: RMHP 110 ZA1M

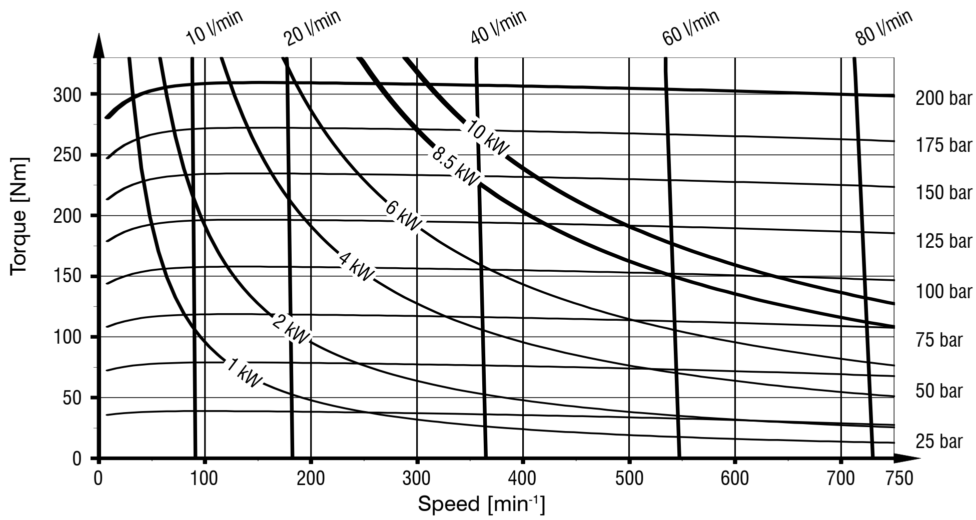
Flange design: F



pressure medium: HLP 46 | operating temperature: T = 50°C | pressure difference: $\Delta p = p_1 - p_2$; p_2 = 0 bar

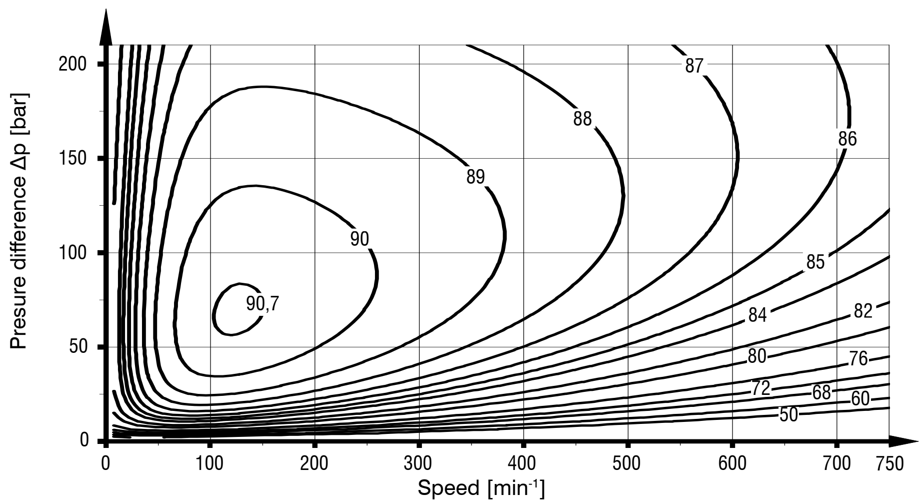
Torque characteristic

Diagram A:



Hydraulic-mechanical efficiendy in percentage

Diagram B:



Strength of the shaft

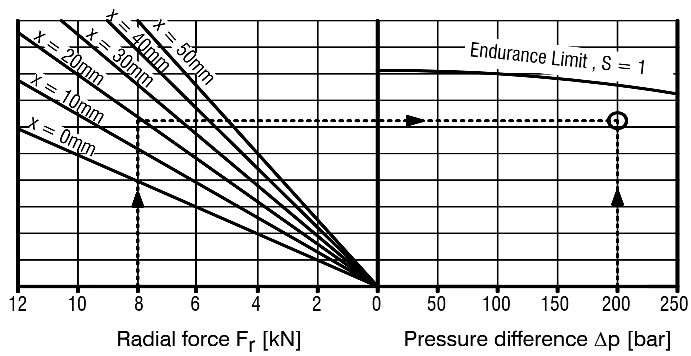
Diagram C:

Example:

Given: Fr = 8 kN; x = 20 mm; Δp = 200 bar

Required: Shaft strength

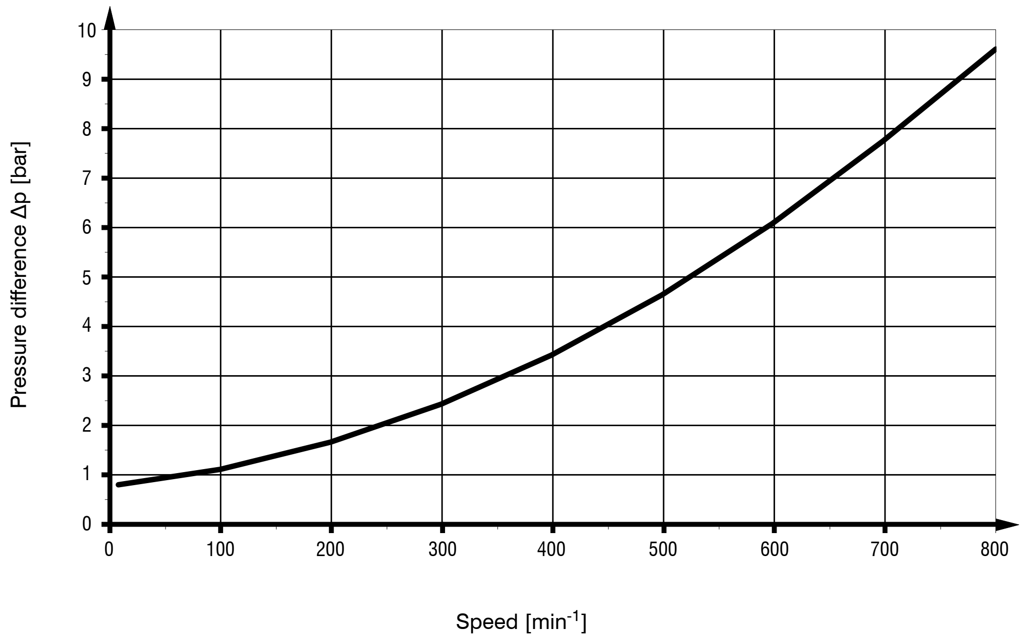
Draw a vertical line from Fr = 8 kN to distance x = 10 mm and a straight horizontal line to the right. If the intersection of the horizontal with the vertical line of Δp = 200 bar is below the curve S = 1, the shaft has sufficient fatigue strength. Allowable axial forces will be provided on request.



pressure medium: HLP 46 operating temperature: T = 50°C pressure difference: $\Delta p = p_1 - p_2$; p_2 = 0 bar

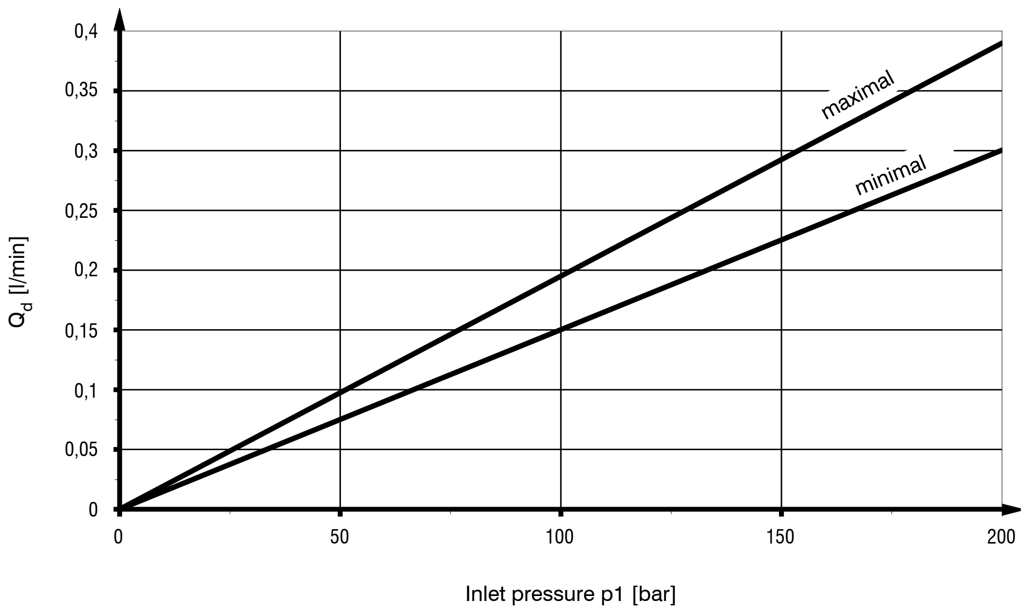
Idle speed

Diagram D:



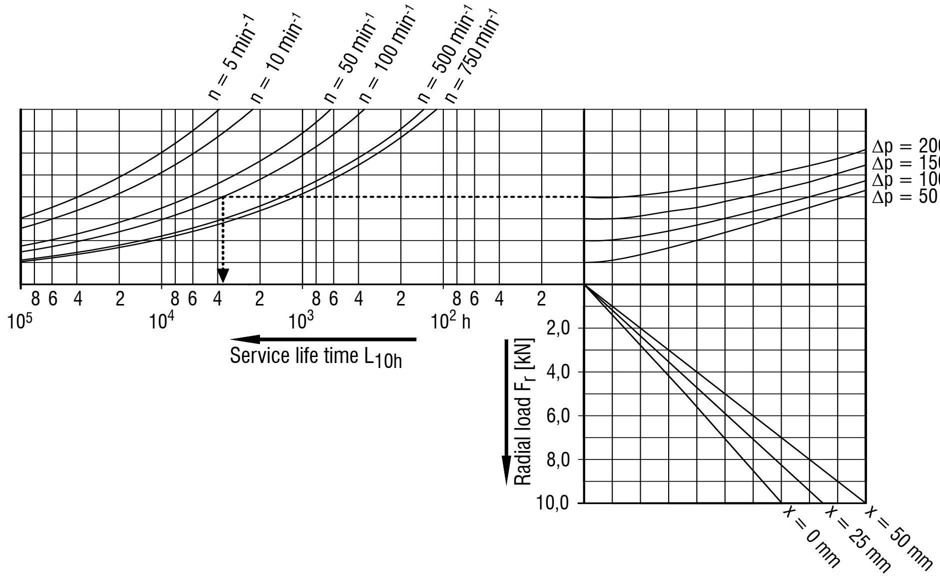
External leakage through flow

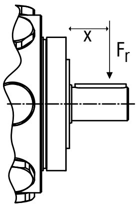
Diagram E:



Service life of the radial bearing loaded with a radial force facing the drive shaft.

Diagram F:



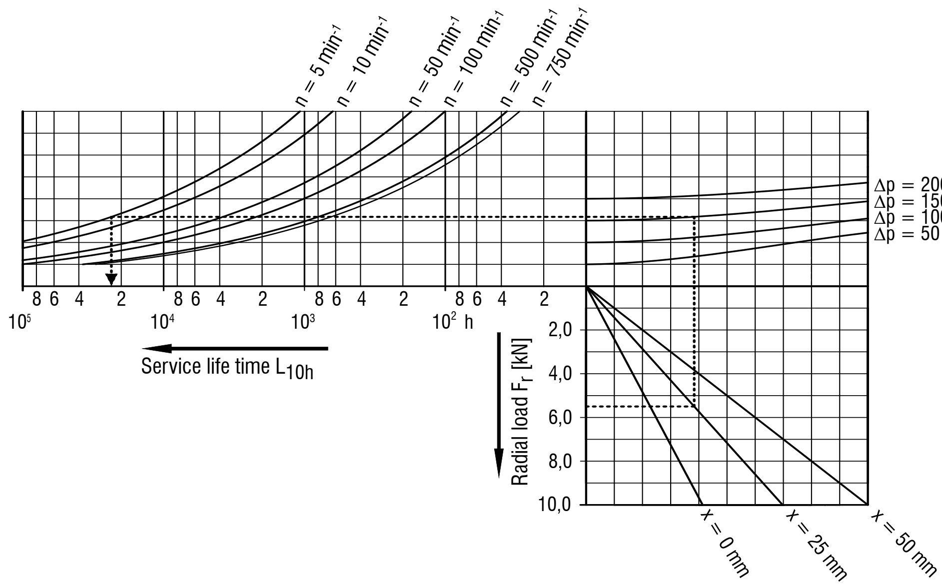


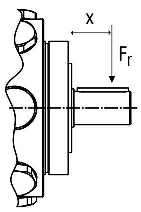
Given : Fr = 0 kN x = 0 mm Δp = 200 bar n = 100 min-1
Required: Service life time of the drive shaft facing radial bearing.

Diagram F:
Form a rorizontal line from the Δp = 200 bar curve to the n = 100 min-1 curve. From this follows a service life time value of L_{10h} = 3665,5 h.

Service life of the radial bearing loaded with a radial force facing the control unit.

Diagram G:



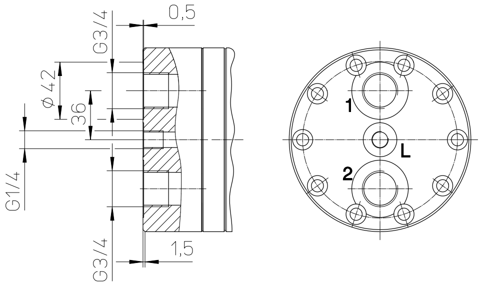


Given : Fr = 5,5 kN x = 25 mm Δp = 150 bar n = 5 min-1
Required: Service life time of the drive shaft facing radial bearing.

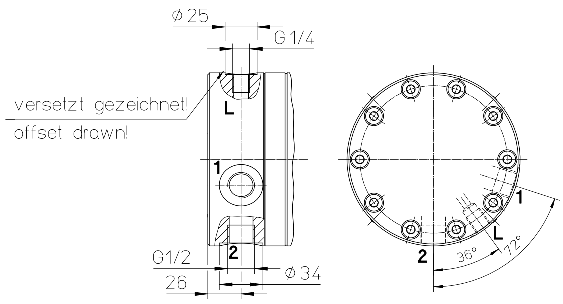
Diagram G:
Form a horizontal line from Fr = 5,5 kN to x = 25 mm. From the intersection form a vertical line to the pressure curve Δp = 150 bar. Afterwards, draw a line from the pressure curve to the speed curve n = 5 min-1.
The intersection shows the service life time L_{10h} = 23351 h.

AEHP 40 ZA1

Alternative end cover: B5



Alternative end cover: A



Hydraulic characteristic values AEHP 40

Geometr. displacement:	43,7	[cm³/U]
Theor. spec. torque:	0,7	[Nm/bar]
Average spec. torque:	0,63	[Nm/bar]
Peak pressure:*	315	[bar]
Max. operating pressure:**	250	[bar]
Continuous pressure:	210	[bar]
Max. operating torque:	159	[Nm]
Continuous torque:	131,5	[Nm]
Drain line pressure:	max. 1	[bar]
	(discharge pressureless to tank)	
Hydraulic fluid temperautre range:	243 - 363	[K]
	minus 30 - +90	[°C]
Viscosity range:	20 - 150	[mm²/s]
	(max. 1000 mm²/s at start)	

Pressure fluids:
Mineralöl H-LP conformity with DIN 51424 part 2
Bio-degradable fluids available on request.

* Definition acc. to DIN 24 312: Peak pressure = exeeding the maximum operating pressure fo a short time at which the motor remains able to function.

** If the sum of inlet pressure and outlet pressure is higher than the peak pressure, please consult the manufacturer.

HFC	Reduce HFC pressure to 70% Check the bearing servise life	Definition CETOP RP 77 H ISO/DIS 6071
HFD	FPM-/FKM-seals are required	

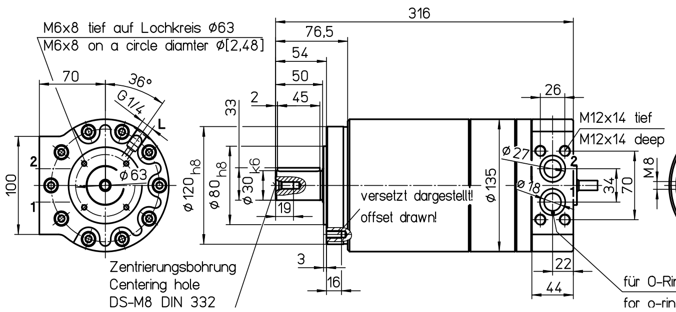
Filtering:
Max. permissible degree of contamination of the fluid according NAS 1638 Klasse 9.
We recommend filters with a minimum retention rate $\beta_{10} \geq 100$
For a long service life we recommend filtering acc. to NAS 1638 class 8, and filters with a minimum retention rate $\beta_5 \geq 100$.

Characteristic values according to VDI 3278

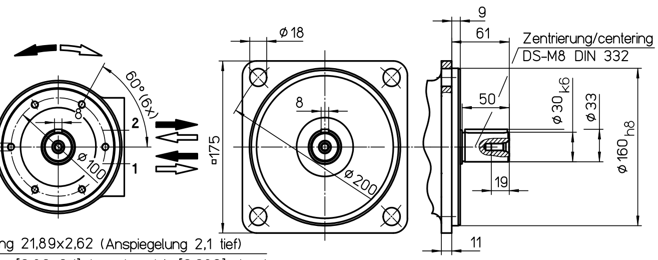
Weight:	25,0	[kg]
Monting position:		as required
Operating speed range:	1 - 2000	[min⁻¹]
Moment of inertia:	0,0011	[kgm²]
Continuous power:	18,0	[kW]
Intermittent power:	21,0	[kW]

Direction of rotation, if viewed at the shaft end
clockwise: flow from connection 2 to connection 1
anti-clockwise: flow from connection 1 to connection 2

Standard design: AEHP 40 ZA1M



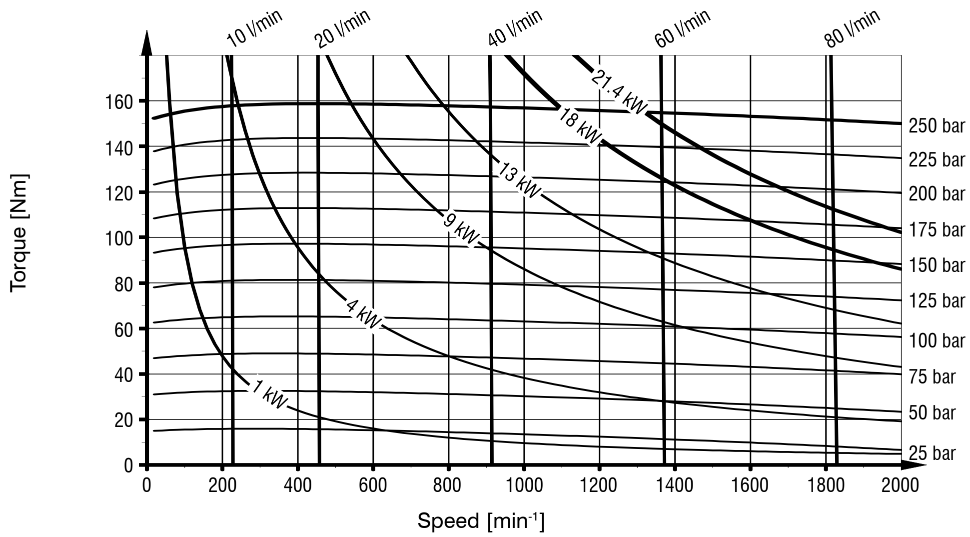
Flange design: F



pressure medium: HLP 46 operating temperature: T = 50°C pressure difference: Δp = p_1-p_2; p_2 = 0 bar

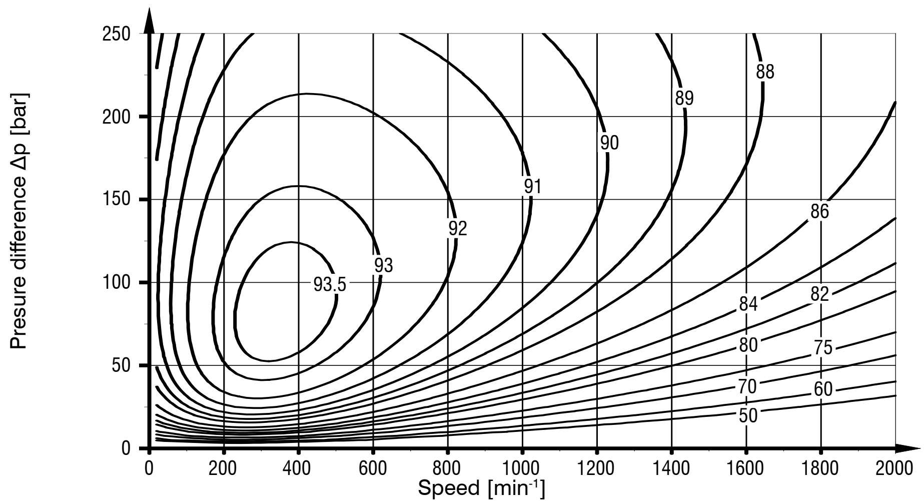
Torque characteristic

Diagram A:



Hydraulic-mechanical efficiendy in percentage

Diagram B:



Strength of the shaft

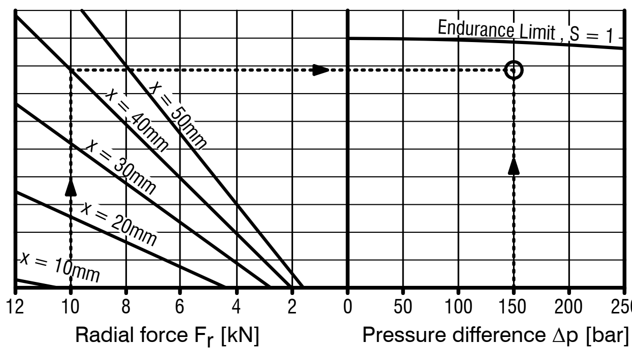
Diagram C:

Example:

Given: Fr = 10 kN; x = 40 mm; Δp = 150 bar

Required: Shaft strength

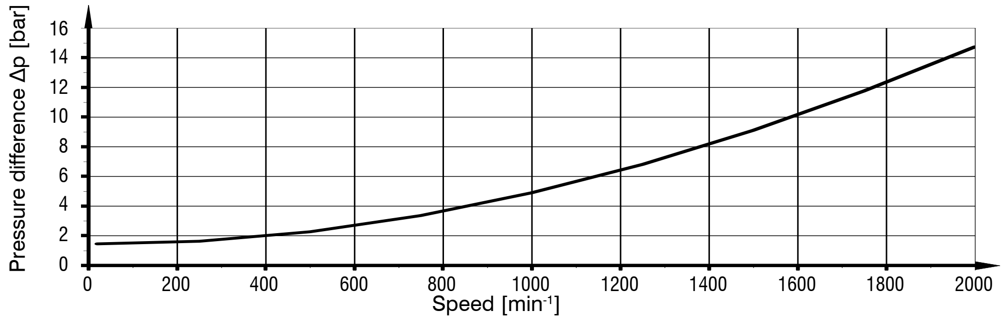
Draw a vertical line from Fr = 10 kN to distance x = 40 mm and a straight horizontal line to the right. If the intersection of the horizontal with the vertical line of Δp = 150 bar is below the curve S = 1, the shaft has sufficient fatigue strength. Allowable axial forces will be provided on request.



pressure medium: HLP 46 operating temperature: T = 50°C pressure difference: $\Delta p = p_1 - p_2$; p_2 = 0 bar

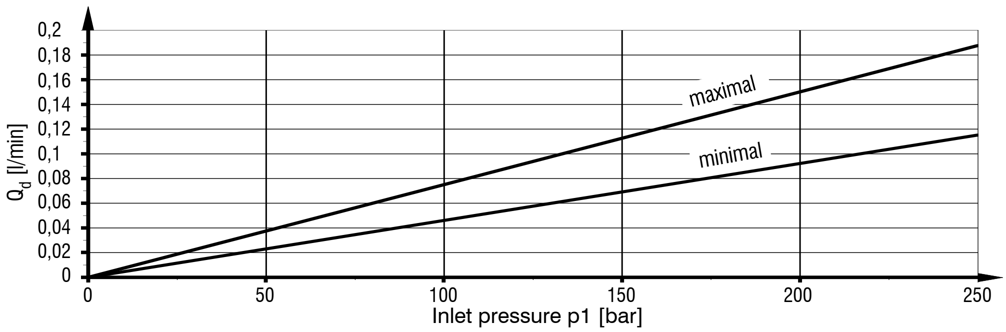
Idle speed

Diagram D:



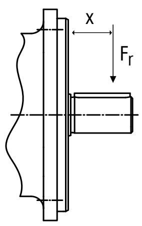
External leakage through flow

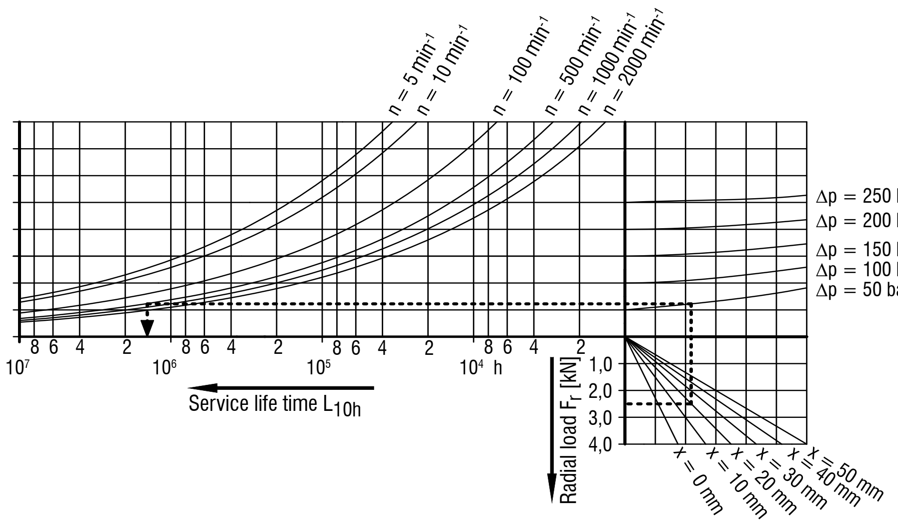
Diagram E:



Service life of the radial bearing loaded with a radial force facing the control unit.

Diagram F:



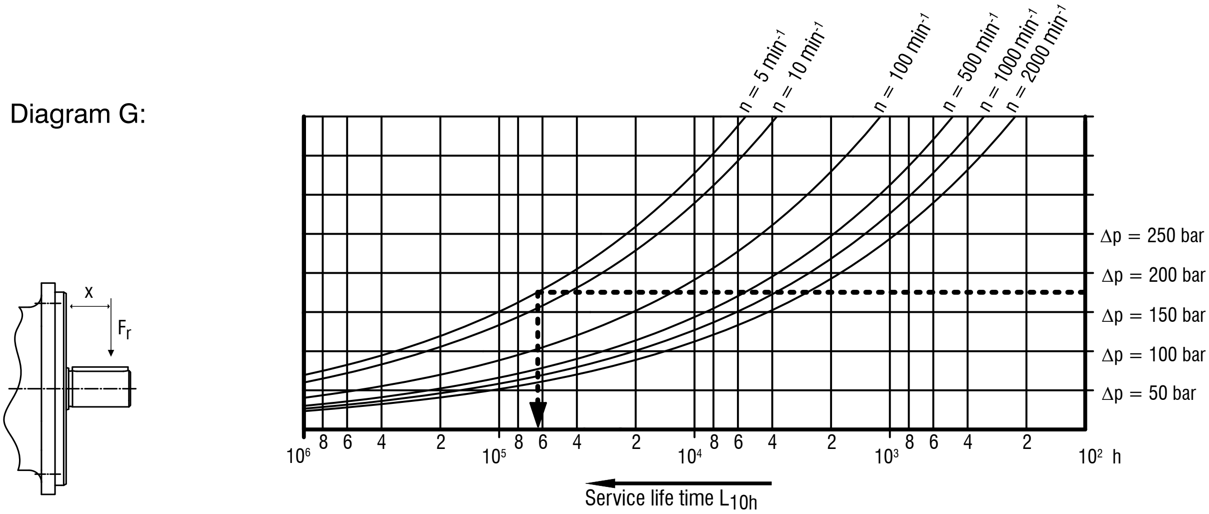


Given : Fr = 2,5 kN x = 20 mm Δp = 50 bar n = 500 min^{-1}
Required: Service life time of the drive shaft facing radial bearing.

Diagram G:
Form a horizontal line from Fr = 2,5 kN to x = 20 mm. From the intersection form a vertical line to the pressure curve Δp = 50 bar. Afterwards, draw a line from the pressure curve to the speed curve n = 500 min^{-1}.
The intersection shows the service life time L_{10h} = 1.686.674 h

Service life of the radial bearing loaded with a radial force facing the drive shaft.

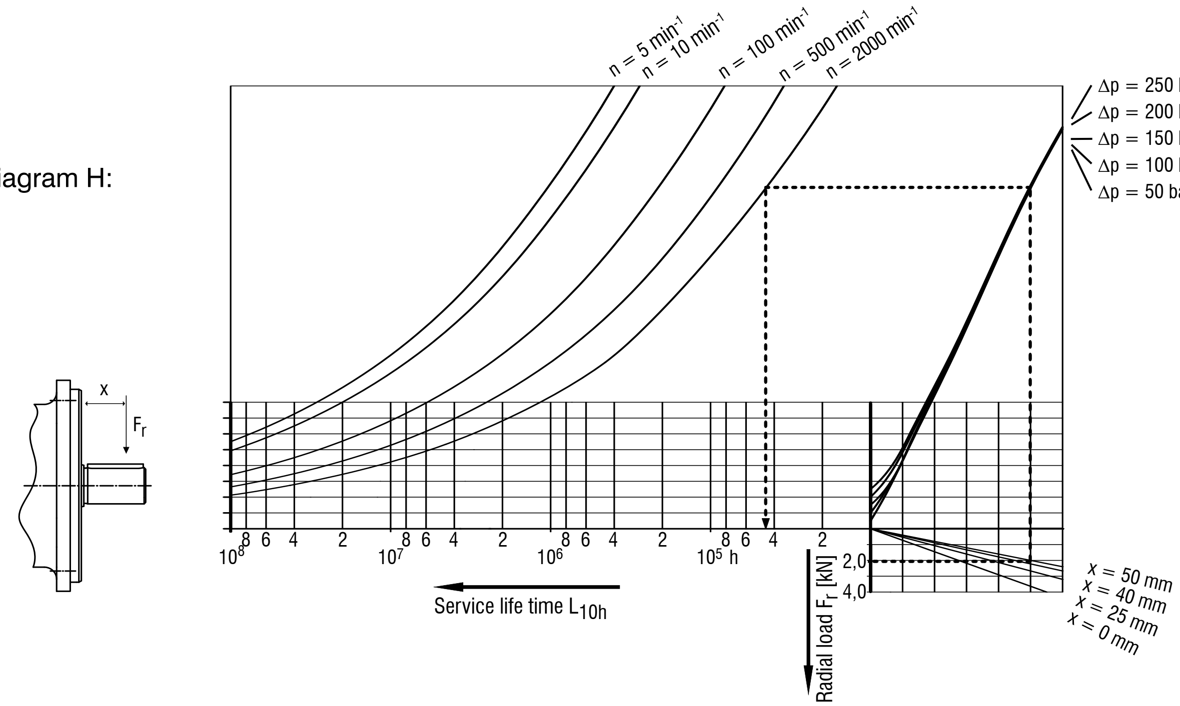
Diagram G:



Given : Fr = 0 kN   x = 0 mm   Δp = 175 bar   n = 5 min^{-1}
Required : Service life time of the drive shaft facing radial bearing.
Diagram G:
Form a rorizontal line from the Δp = 175 bar curve to the n = 5 min^{-1} curve. From this follows a service life time value of L_{10h} = 71.068 h.

Service life of the radial bearing loaded with a radial force facing the control unit.

Diagram H:



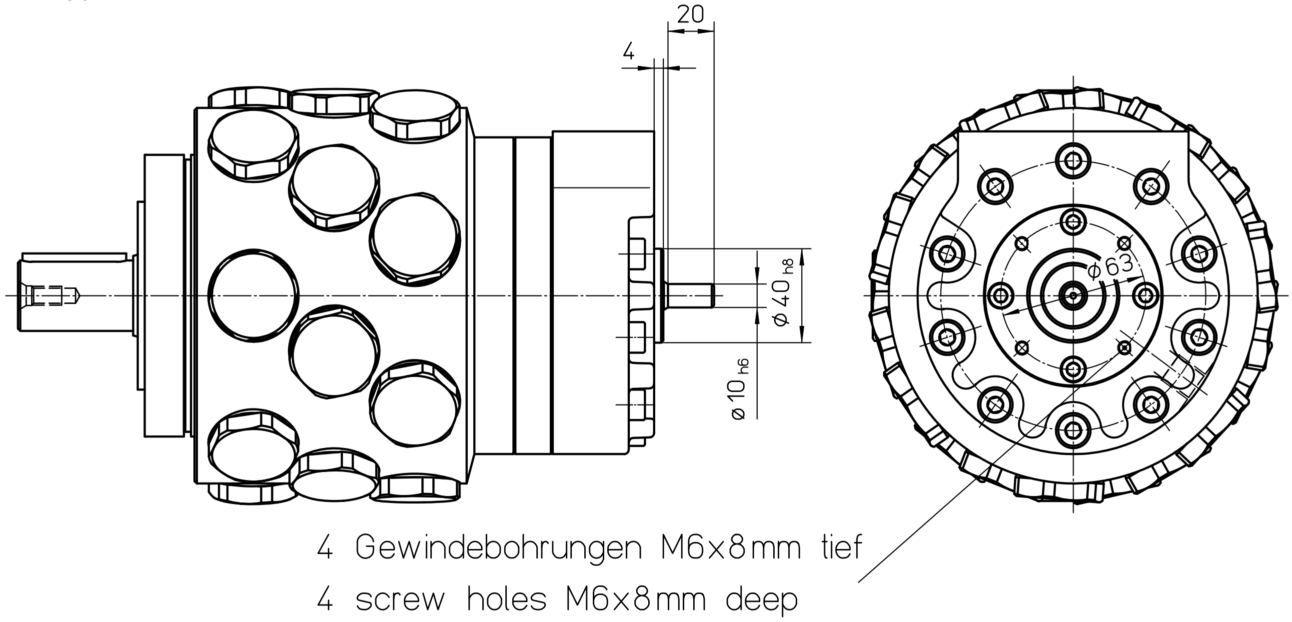
Given : Fr = 2 kN   x = 50 mm   Δp = 100 bar   n = 2000 min^{-1}
Required : Service life time of the drive shaft facing radial bearing.

Diagram H:
Form a horizontal line from Fr = 2 kN to x = 50 mm. From the intersection form a vertical line to the pressure curve Δp = 100 bar. Afterwards, draw a line from the pressure curve to the speed curve n = 2000 min^{-1}. The intersection shows the service life time L_{10h} = 45.477 h.

Cylindrical measuring shaft: M

Radial- and axial piston motors of the series RMHP 90, RMHP 110 and AEHP 40 with the addititonal denotation "M" are coupled to a cylindrical measuring shaft to determine the speed of the engine. The cylindrical measuring shaft is fixed to the crankshaft and is able to assign a torque of about 5 Nm. If a higher torque is required, please request separately. Informations about accessories like speed indicators, dynamos, impuls generators and power frequency generators please request also separately.

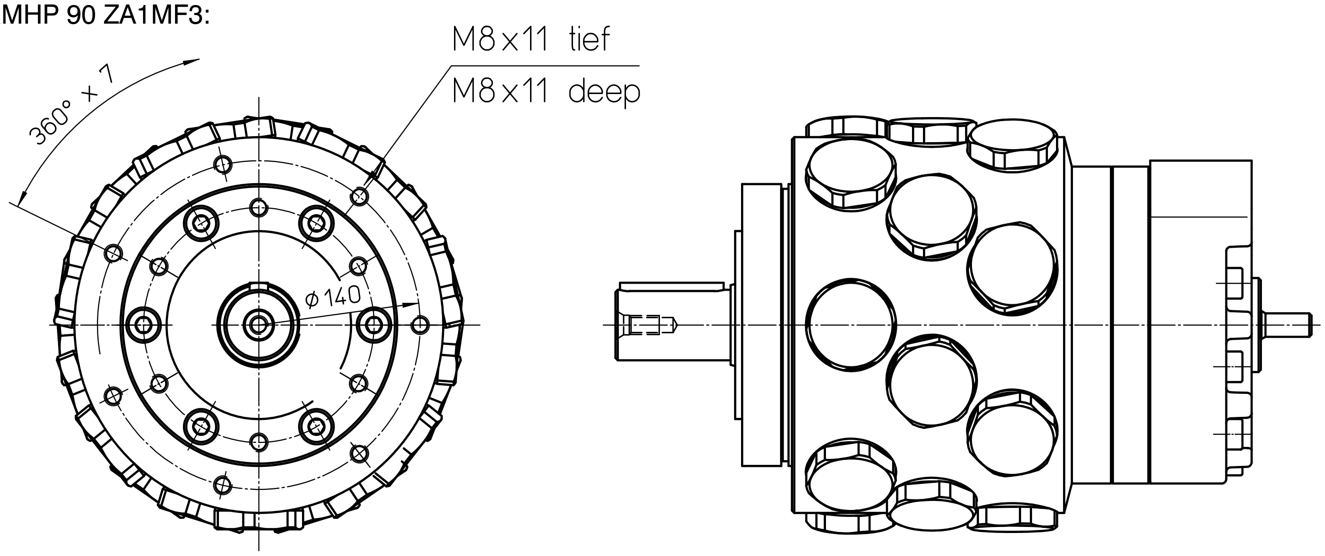
RMHP 90 ZA1M:



Flange connection: F3 (just RMHP)

Seven additional mounting boreholes M8 x 11 deep on a pitch circle Ø 140.

RMHP 90 ZA1MF3:



You know your product, we know our high-precision motors! Give us your conditions, we will calculate all important data for a suitable drive.

1. **Company*** ______________ **For attention of*** ______________
Street / P.O.Box ______________ Department ______________
Postal code / City ______________ **Phone No*** ______________
Country ______________ **E-Mail*** ______________

2. Operating data: secondary drive

2.1 Machine type: ______________ project: ______________
2.2 Machine operating factor / gearboxes k = ______________
2.3 Installation position: ☐ horizontal ☐ vertical
☐ drive shaft upwards ☐ drive shaft downwards
2.4 Forces on drive shaft: ☐ pressure ☐ tension
radial: ______________ N axial: ______________ N

2.5	Nominal torque	T_N	= ________ Nm	speed	n	= ________ min^{-1}	time = ________ min
2.6	**Continuous torque***	**T_{cont}***	**= ________ Nm**	**speed**	**n***	**= ________ min^{-1}**	time = ________ min
2.7	Maximum torque	T_{max}	= ________ Nm	speed	n	= ________ min^{-1}	time = ________ min
2.8	Minimum torque	T_{min}	= ________ Nm	speed	n	= ________ min^{-1}	time = ________ min
2.9	Maximum speed	n_{max}	= ________ min^{-1}	time	t	= ________ min	
2.10	Minimum speed	n_{min}	= ________ min^{-1}	time	t	= ________ min	

2.11 Information about working cycle: ______________
____
2.12 ☐ Secondary drive with valve assembly on the motor
2.13 ☐ Control drive with proportinal- / servo valve
2.14 Maximum power: P_{max} = ________ kW **continuous power*: P_{dauer}* = ________ kW**
2.15 ☐ one-shift-operation ☐ two-shift-operation ☐ three-shift-operation
2.16 Desired bearing life: L_{h10} = ________ hours
2.17 Remarks: ______________
____
____

3. Operating data: primary drive

Hydraulic fluid: ______________
operating temperature: Θ = ________ °C
Delivery volume of pump Q_P = ________ l/min
☐ opened circuit ☐ closed circuit
Feeding pressure p_F = ________ bar
System pressure p_{Sys} = ________ bar
Desired operating pressure at T_N p_N ~ ________ bar

*** Requested fields, which are necessary for the first design.**
(The more informations we get about the technical conditions and the applicationarea, the more specific will be our consulting and design for you.)

Notes

DUESTERLOH has been developing fluid technology products for more than 100 years.
The drives, controls and hydraulic power units from Hattingen are appreciated throughout the world for their complete reliability; including under extreme conditions. The owner-managed company´s own development and construction department and the wide range of products cater for distinctive flexibility and customer-orientation.

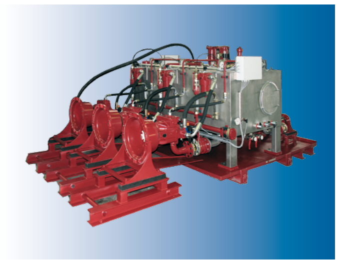
Products

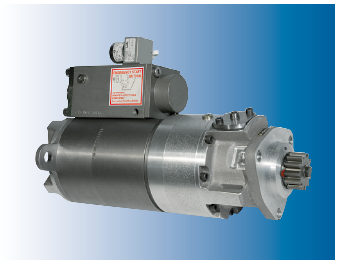
- Hydraulic radial piston motors
- Hydraulic axial piston motors
- Hydraulic high precision motors
- Pneumatic motors
- Pneumatic starters
- Hydraulic and pneumatic controls
- Hydraulic power units

Designing controls and hydraulic power units specific to the customer is our company´s major strength. Vast product diversity is also available for standardized products.

Industrial areas of application

- Machine tools
- Smelting and rolling mill equipment
- Foundry machines
- Testing machines
- Shipbuilding (diesel engines)
- Offshore technology
- Printing and paper technology
- Vehicle construction
- Manipulators
- Environmental technology
- Mining equipment
- Materials handling equipment





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Internet: www.duesterloh.de

Certified acc. to ISO 9001