HYDRAULIC MOTORS

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➢ HYDRAULIC MOTORS

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➢ APPLICATION SPECIFICATION AND GENERAL INFORMATION

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HYDRAULIC MOTORS

The operating principle of the motors is based on an internal gear design, consisting of a stator and rotor through which the output torque and speed are transmitted. The distributor valve is driven synchronously by the rotor through a cardan shaft ensuring that each one of the chambers of the motor are filled and emptied precisely.

SPOOL VALVE -The distributor valve has been integrated with the output shaft. The valve has hydrodynamic bearings, and has infinite life when load ratings are not exceeded. OM, OP, OPL, OR, ORL and OH motors have a Spool Valve.

DISC VALVE 's function is to distribute fluid to the Roller Gear Set. The pressure balanced sealing surface on the valve face and the separately driven maintains minimal leakage and mechanical losses. These gives the motors high efficiency - even at high pressures, and good starting characteristics.

GEAR SET- There are two forms of stator, hence and of gear set:
OM, OP and OPL have plain teeth. These types motors are suitable for long operating periods at moderate pressures - or short operating periods at high pressures.
OR, ORL and OH have teeth fitted with rollers. The rollers reduce local stress and the tangential reaction forces on the rotor reducing friction to a minimum. This gives long operating life and better efficiency even at continuous high pressures. Roller Gear Sets are recommended for operation with thin oil and for applications having continually reversing loads.
OS, OT and OV are suitable for continuous operation under rough operating conditions - high pressures, thin oil, or frequentreversals.The Tapered roller bearings permit high radial loads.

Standard Motor The standard motor mounting flange is located as close to the output shaft as possible. This type of mounting supports the motor close to the shaft load. This mounting flange is also compatible with many standard gear boxes.

Wheel Motor This type mounting flange makes the motor possible to fit a wheel hub or a winch drum so that the radial load acts midway between the two motor bearings. This gives the best utilization of the bearing capacity and is a very compact solution.

Needle Bearing OP and OR have an output shaft supported in needle bearing. These types motors are suitable for absorbing static and dynamic radial loads.

Short Motor This motor is assembled without the output shaft, bearings and bearing housing and has the same drive components as the standard and wheel motors. The short motor is especially suited for applications such as gear boxes, winch, reel and roll drives. Short motor applications must be designed with a bearing supported internal spline to mate with the bearing less motor drive. Product designs using these hydraulicmotors provide considerable cost savings.

Low Leakage **LL** Series hydraulic motors have been designed to operate at the whole standard range of working conditions (pressure drop and frequency of rotation) , but with considerable decreased volumetric losses in the drainage ports. Their main purpose is to operate as series-connected motors in hydraulic systems. For this version is permissible decreasing of the maximal torque with up to 5% (at middle speed) and up to 10 % (at high speed) in comparison to the standard versions of motors.

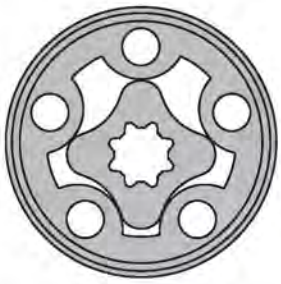
Low Speed Valve **LSV** Series hydraulic motors have been designed to operate with normal pressure drop and to ensure smooth run at low speed (up to 200 min), as the best security for operation is guaranteed at frequency of rotation 20 ÷ 50 min^{-1}. They have an increased starting pressure drop and are not recommended for using at pressure less than 40 bar.

Free Running **FR** Series hydraulic motors have been designed to operate with high frequencies of rotation (over than 300 min^{-1}) and low pressure drop. These motors are produced with increased clearance at all friction parts.
Additional advantages of "FR" version are prolonging of the life of the hydraulic motors at high frequencies of rotation, as well as the possibility to use them in systems with big variation of the loading. Volumetric efficiency can be affected.

HYDRAULIC MOTORS OM

APPLICATION

- » Conveyors;
- » Textile machines;
- » Mining machinery;
- » Machine tools;
- » Ventilators;
- » Construction plant equipment and access platforms etc.



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Order code OM-10

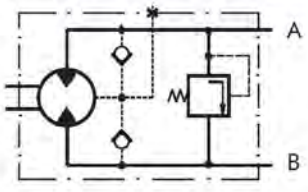
OPTIONS

- » Model - Spool valve, gerotor;
- » With or without flange;
- » Side and rear ports;
- » Series with pressure valve(s)
- » Shafts - straight and splined;
- » Metric and BSPP ports;
- » Other special features.

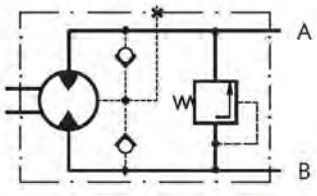
GENERAL

Displacement, [cm^3/rev.]	8,2÷50
Max. Speed, [RPM]	1950÷400
Max. Torque, [daNm]	1,1÷4,5
Max. Output, [kW]	1,8÷2,4
Max. Pressure Drop, [bar]	100÷70
Max. Oil Flow, [l/min]	16÷20
Min. Speed, [RPM]	50÷20
Pressure fluid	**Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)**
Temperature range, [°C]	-30÷90
Optimal Viscosity range, [mm^2/s]	20÷75
Filtration	**ISO code 20/16 (Min. recommended fluid filtration of 25 micron)**

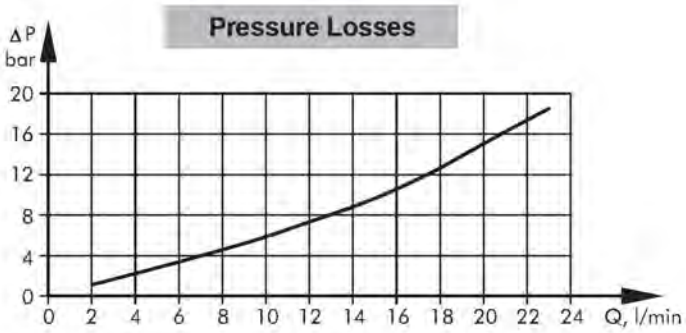
OMP Series with Integrated Internal Crossover Relief Valve A⟶B, Δp=100 bar (50 bar)



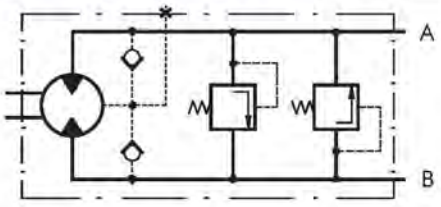
OMP Series with Integrated Internal Crossover Relief Valve B⟶A, Δp=100 bar (50 bar)



Pressure Losses



OMD Series with Integrated Internal Crossover Relief Valves A⟷B, Δp=100 bar (50 bar)



SPECIFICATION DATA

Type		OM 8	OM 12,5	OM 20	OM 32	OM 40	OM 50
Displacement [cm³/rev.]		8,2	12,9	20	31,8	40	50
Max. Speed,	cont.	1950	1550	1000	630	500	400
[RPM]	int.*	2440	1940	1250	790	625	500
Max. Torque	cont.	1,1	1,6	2,5	4	4,1	4,5
[daNm]	int.*	1,5	2,3	3,5	5,7	5,7	5,8
	peak**	2,1	3,3	5,1	6,4	6,6	8
Max. Output	cont.	1,8	2,4	2,4	2,4	1,8	1,7
[kW]	int.*	2,6	3,2	3,2	3,2	3,0	2,1
Max. Pressure Drop	cont.	100	100	100	100	80	70
[bar]	int.*	140	140	140	140	110	90
	peak**	200	200	200	200	140	125
Max. Oil Flow	cont	16	20	20	20	20	20
[l/min]	int.*	20	25	25	25	25	25
Max. Inlet Pressure,	cont.	140	140	140	140	140	140
[bar]	int.*	175	175	175	175	175	175
	peak**	225	225	225	225	225	225
Max. Return Pressure	cont. 0-100 RPM	140	140	140	140	140	140
w/o Drain Line or	cont. 100-400 RPM	100	100	100	100	100	100
Max. Pressure in	cont. 400-800 RPM	50	50	50	50	50	-
Drain Line, [bar]	cont. >800 RPM	20	20	20	-	-	-
	int.* 0-max. RPM	140	140	140	140	140	140
Max. Return Pressure	cont.	140	140	140	140	140	140
with Drain Line	int.*	175	175	175	175	175	175
[bar]	peak**	225	225	225	225	225	225
Max. Starting Pressure with Unloaded Shift, [bar]		4	4	4	4	4	4
Min. Starting Torque	at max. press. drop cont.	0,7	1,2	2,1	3,4	3,3	3,7
[daNm]	at max. press. drop int.*	1,0	1,7	2,9	4,8	4,6	4,8
Min. Speed*, [RPM]**		50	40	30	30	25	20
Weight, avg. [kg]	**OM**	1,9	2	2,1	2,2	2,3	2,5
	OMF(S)	2,3	2,4	2,5	2,6	2,7	2,9
	OMFS	2,7	2,8	2,9	3,0	3,1	3,3
	OMP	2,5	2,6	2,7	2,8	2,9	3,1
	OMPF	2,7	2,8	2,9	3,0	3,1	3,3
	OMD	2,6	2,7	2,8	2,9	3,0	3,2
	OMDF	2,8	2,9	3,0	3,1	3,2	3,4

* Intermittent operation: the permissible values may occur for max. 10% of every minute.

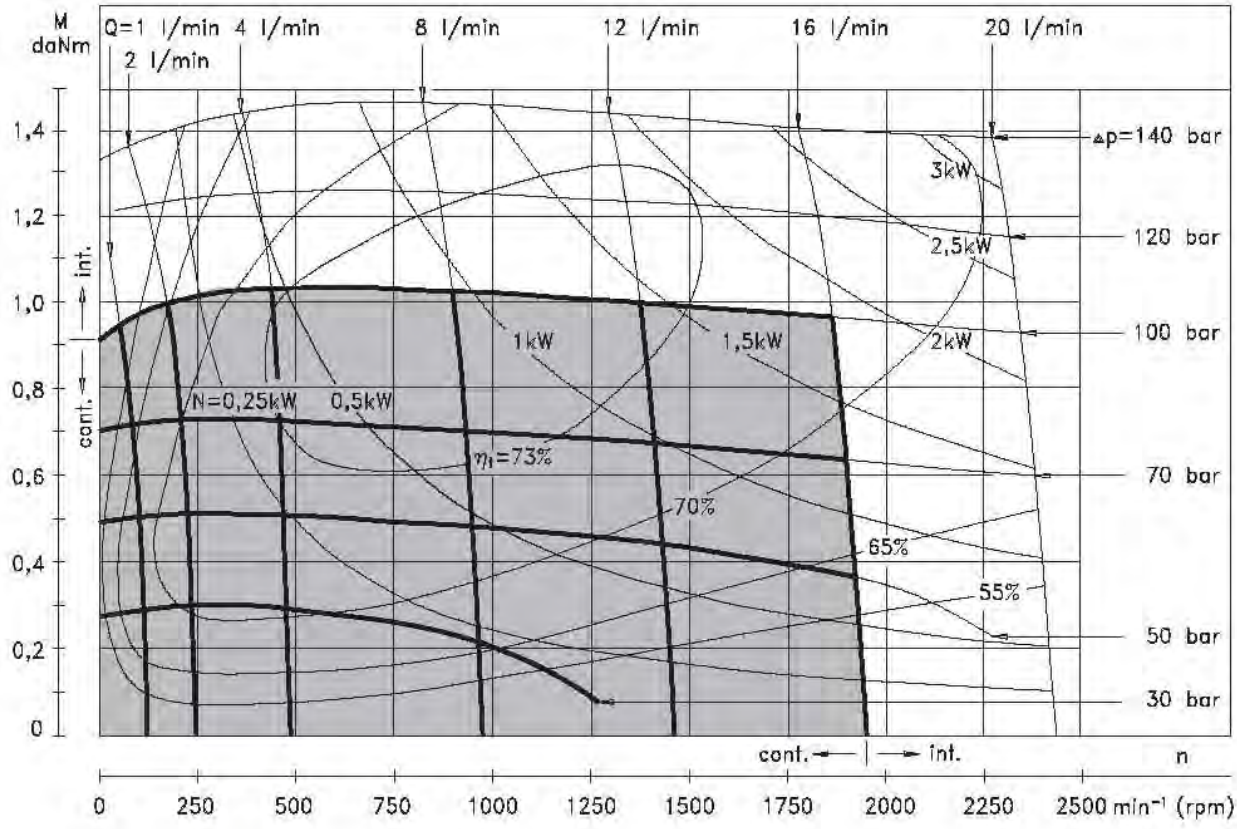
** Peak load: the permissible values may occur for max. 1% of every minute.

*** For speeds of 30 RPM or lower, consult factory or your regional manager.

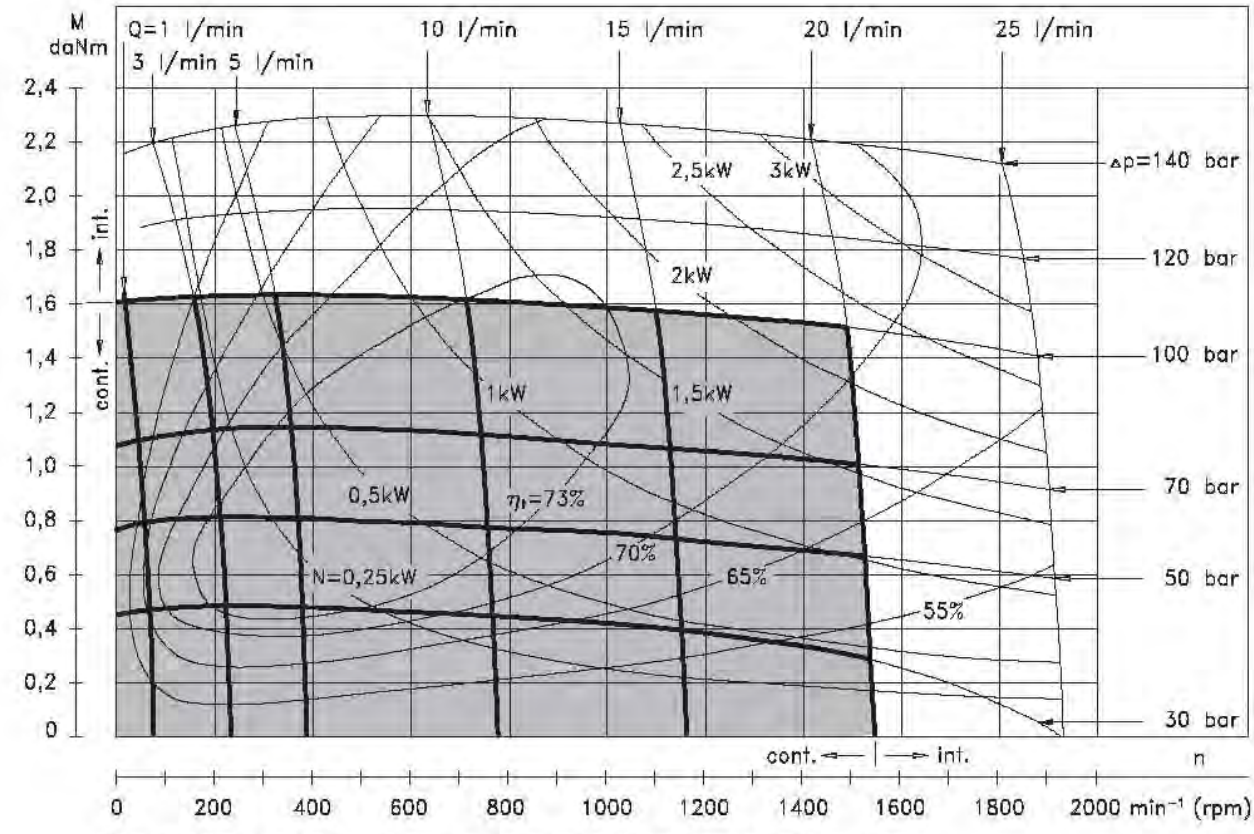
1. Intermittent speed and intermittent pressure drop must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm²/s at operating temperature 50°C.
5. Recommended maximum system operating temperature is 82°C.
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 15-30 min.

FUNCTION DIAGRAMS

OM 8



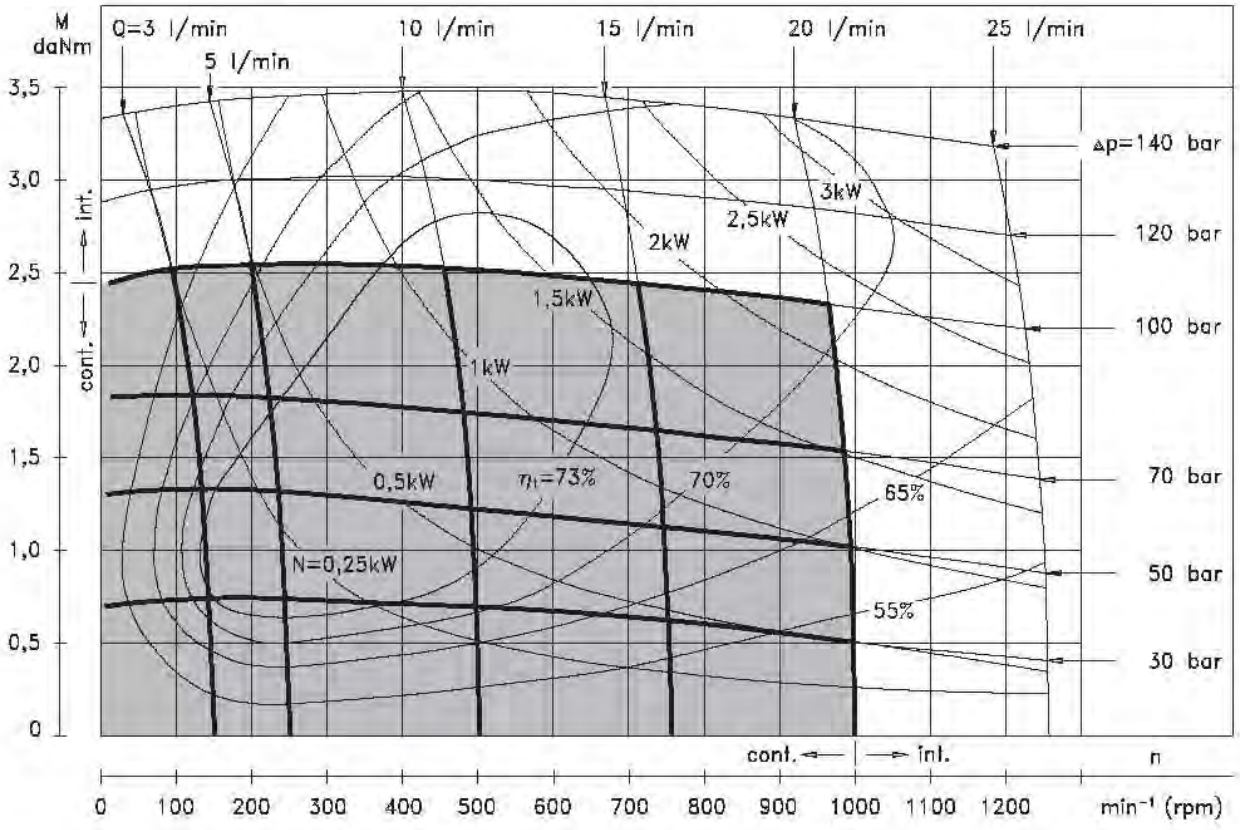
OM12,5



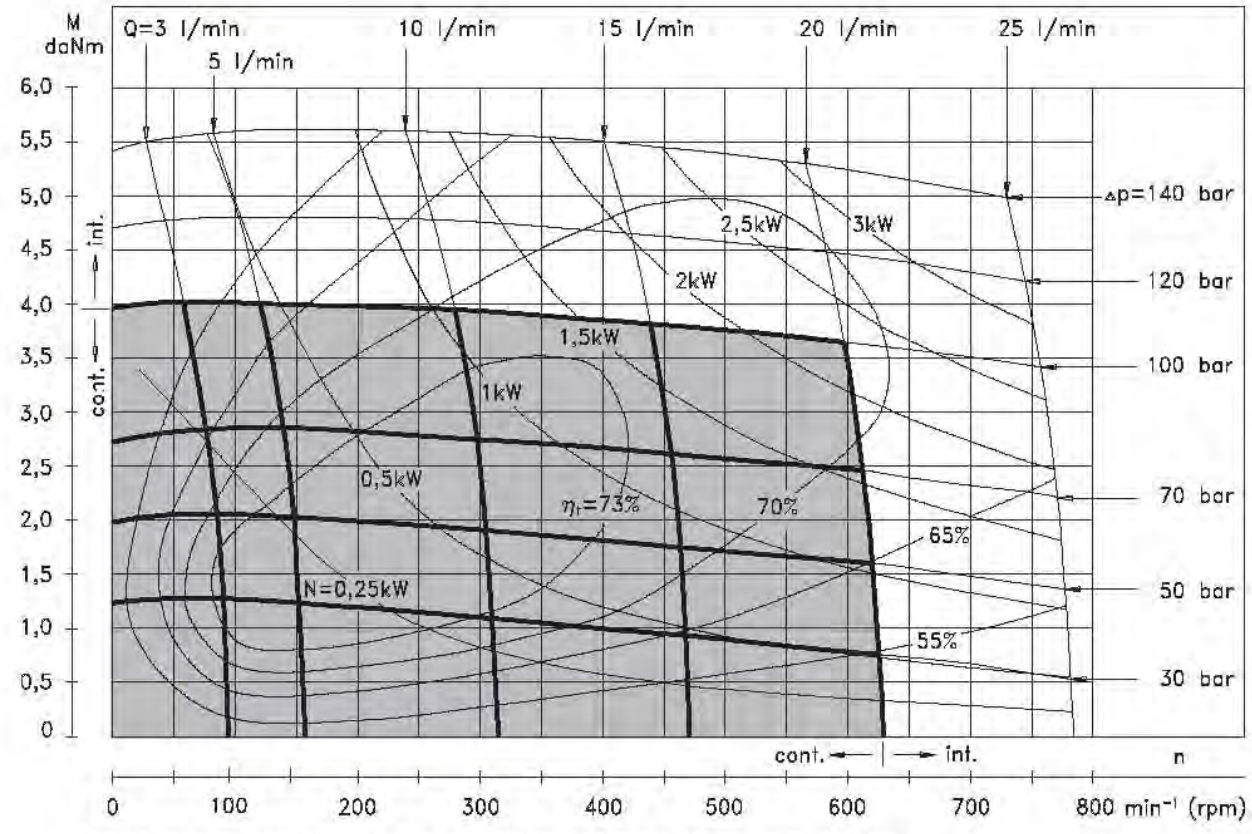
The function diagrams data was collected at back pressure 5÷10 bar
and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAMS

OM 20



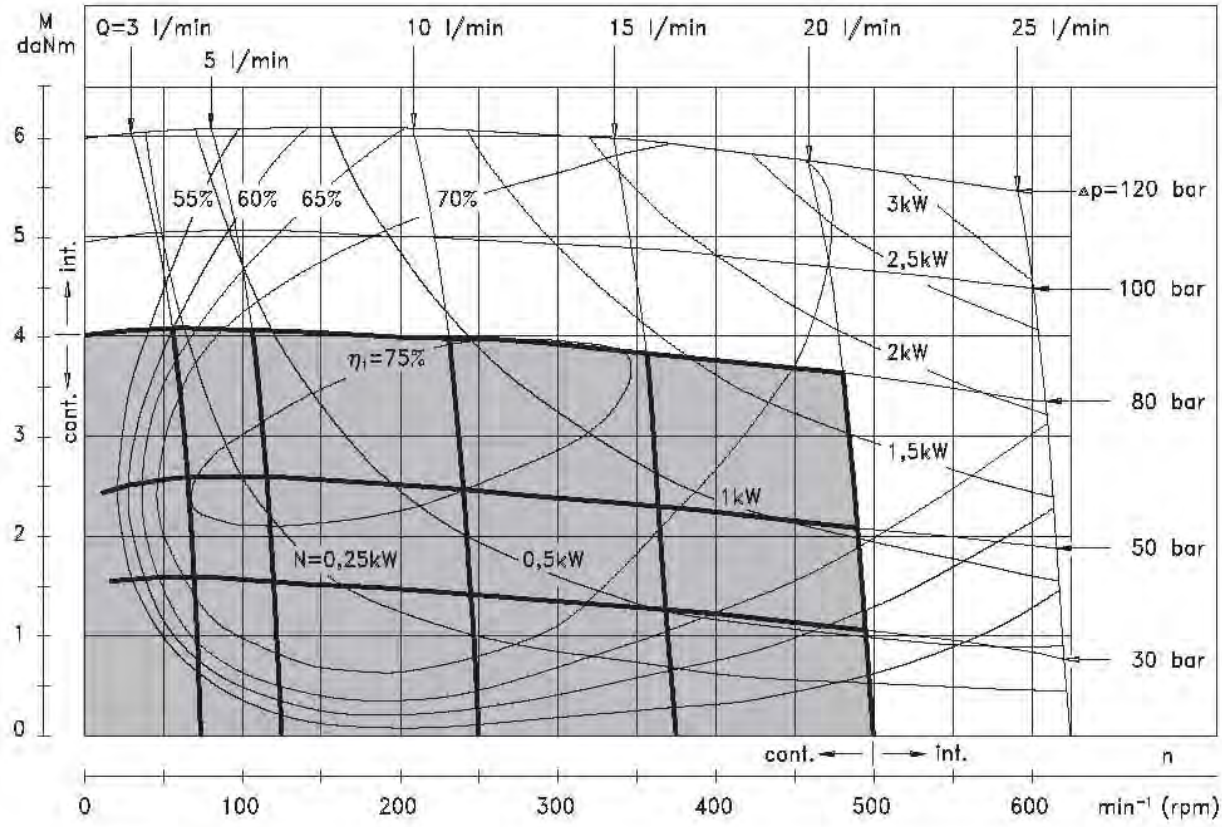
OM 32



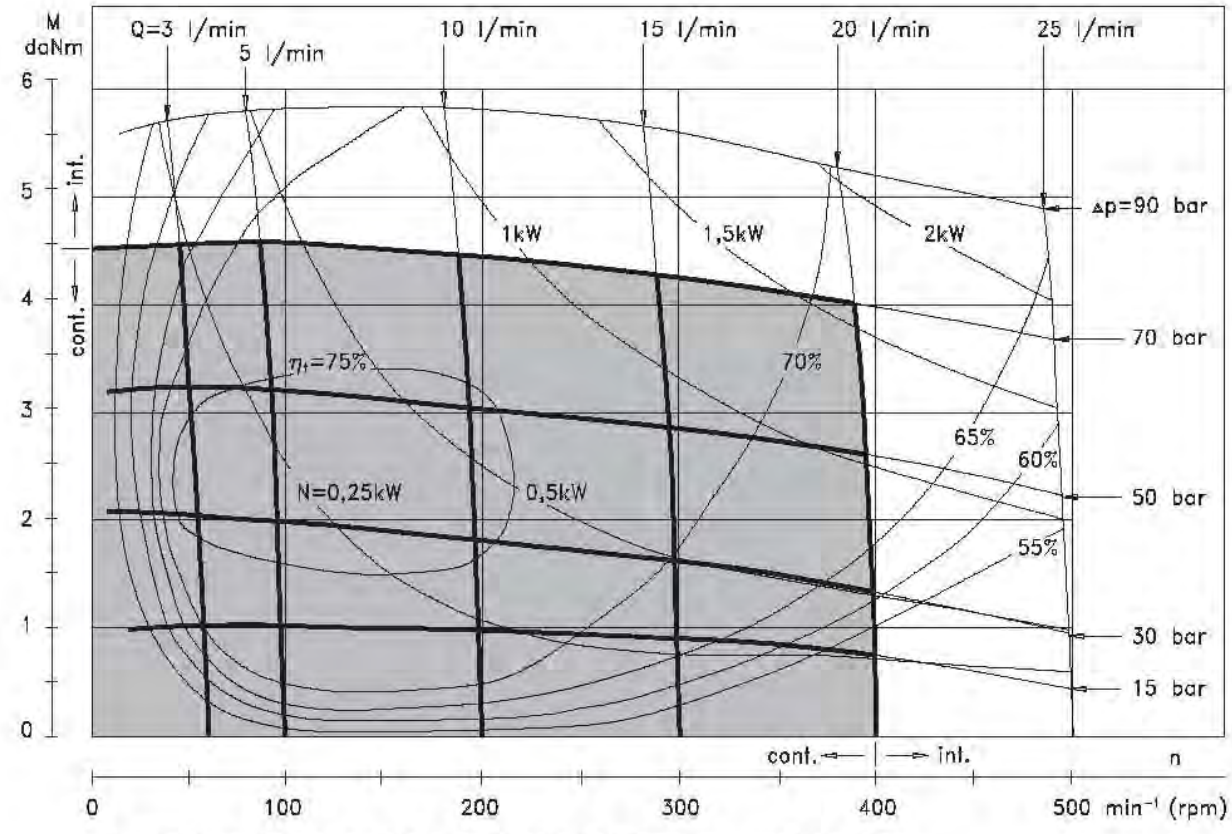
The function diagrams data was collected at back pressure 5÷10 bar and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAMS

OM 40

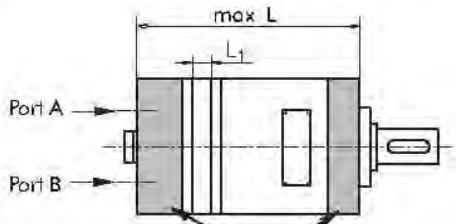


OM 50



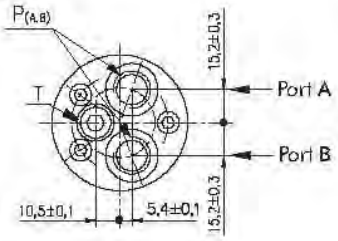
The function diagrams data was collected at back pressure 5÷10 bar and oil with viscosity of 32 mm²/s at 50° C.

DIMENSIONS AND MOUNTING DATA

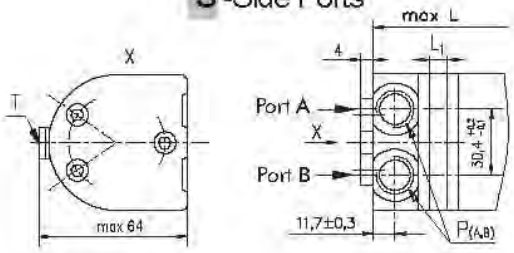


Porting

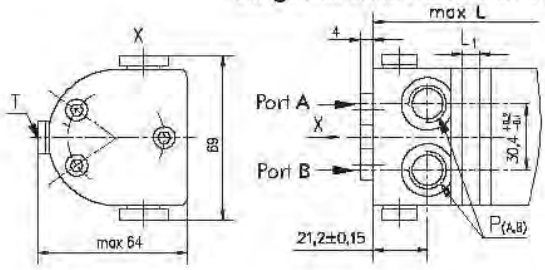
Rear Ports



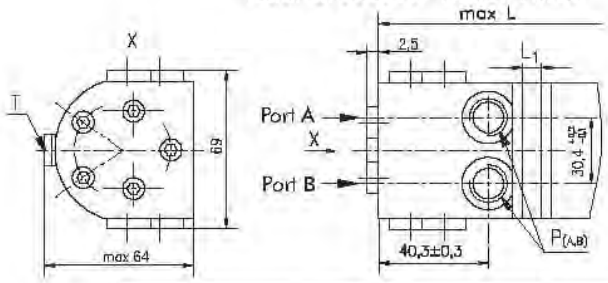
S -Side Ports



P -Side Ports with
Single Crossover Relief Valve

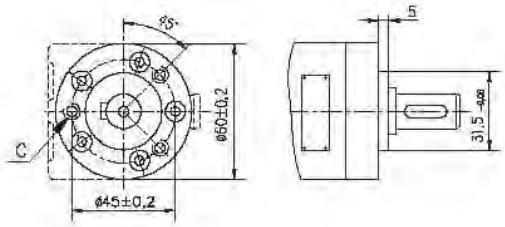


D - Side Ports with
Dual Crossover Relief Valve

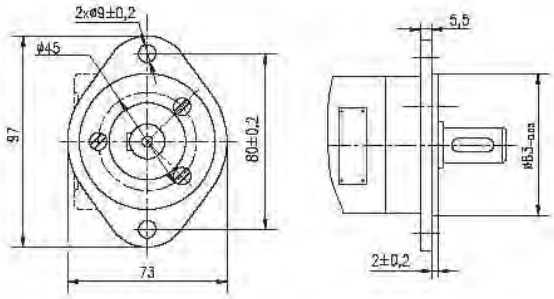


Mounting

Three Bolts Mount



F - Oval Mount (2 Holes)



C : 3xM6-12mm depth
$P_{(A,B)}$:2xG3/8 or (M18x1,5)-12mm depth
T :G1/8 or (M10x1)-10mm depth

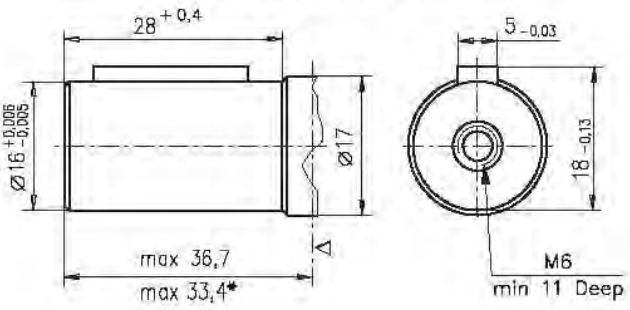
Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

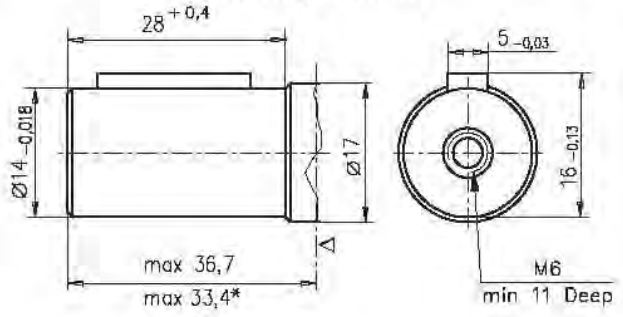
Type	L,mm	Type	L,mm	Type	L,mm	Type	L,mm	L_1 mm
OM 8	104	**OMS 8**	105	**OMP 8**	115	**OMD 8**	134	3,5
OM 12,5	106	**OMS 12,5**	107	**OMP 12,5**	117	**OMD 12,5**	136	5,5
OM 20	109	**OMS 20**	110	**OMP 20**	120	**OMD 20**	139	8,5
OM 32	114	**OMS 32**	115	**OMP 32**	125	**OMD 32**	144	13,5
OM 40	117,5	**OMS 40**	118,5	**OMP 40**	128,5	**OMD 40**	147,5	17
OM 50	121,5	**OMS 50**	122,5	**OMP 50**	132,5	**OMD 50**	151,5	21

SHAFT EXTENSIONS

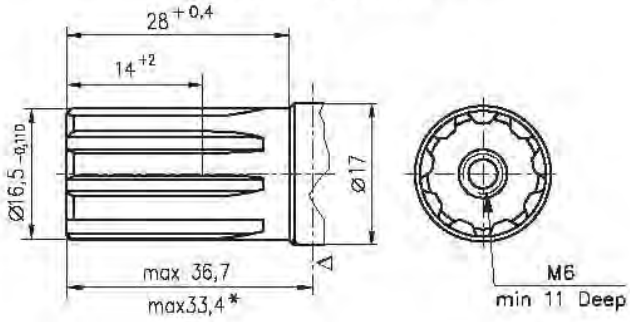
C - ø16 straight, Parallel key 5x5x16 DIN 6885
Max. Torque 3,9 daNm



CK - ø14 Straight,Parallel key 5x5x16 DIN 6885
Max. Torque 3 daNm



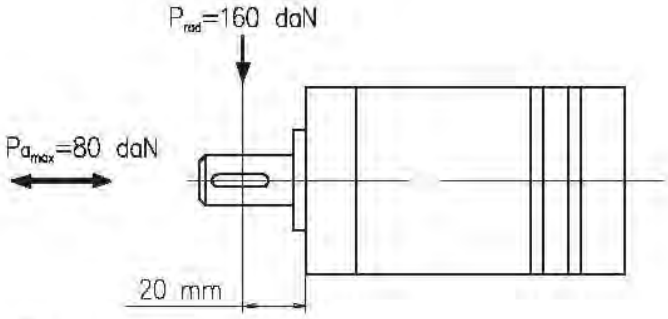
SH - ø16,5 Splined, B17x14 DIN 5482
Max. Torque 4,4 daNm



▽- Motor Mounting Surface

* For **F** Mounting

PERMISSIBLE SHAFT LOAD



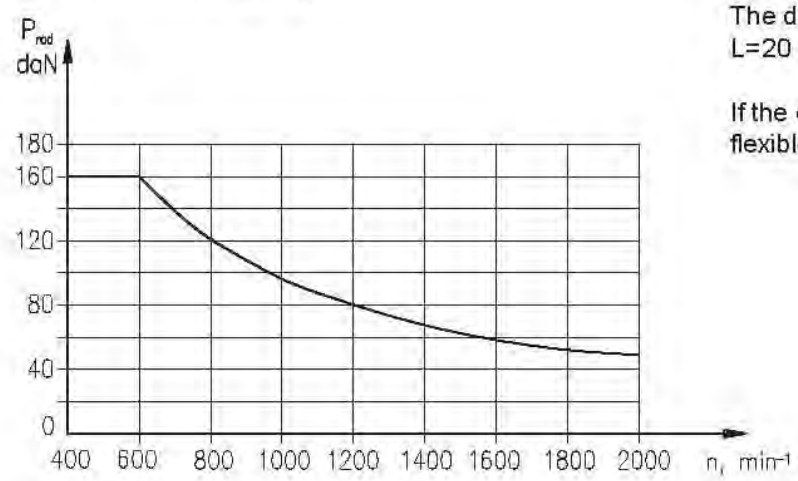
The permissible radial shaft load [Prad] is calculated from the distance [L] between the point of load application and the mounting surface:

$$P_{rad} = \frac{13040}{(61,5+L)}\ ,\ [daN]$$

[L in mm; L≤80]

The drawing shows the permissible radial load when L=20 mm.

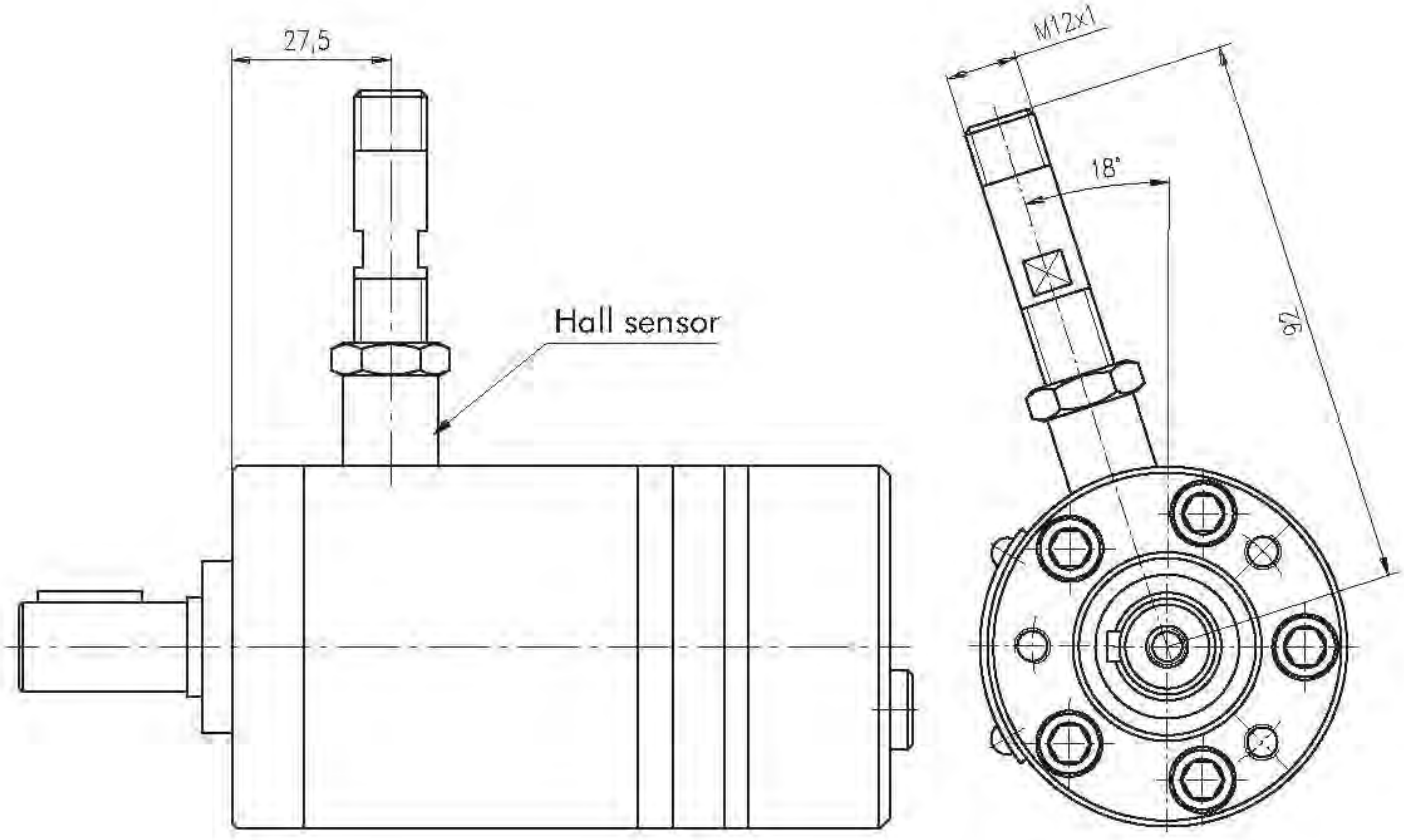
If the calculated shaft load exceeds the permissible, a flexible coupling must be used.



Hydraulic motors with speed sensor type OM...RS

Fer Hydraulic is introducing hydraulic motor with a new generation of speed sensor. The electric output signal is a standard voltage signal that can be used for regulating the speed of a motor.

The speed is measured by a sensor in accordance with the Hall principle. Signal processing and amplification are performed in the sensor housing. A connection is provided in the housing by a Plug connector M12 Series.



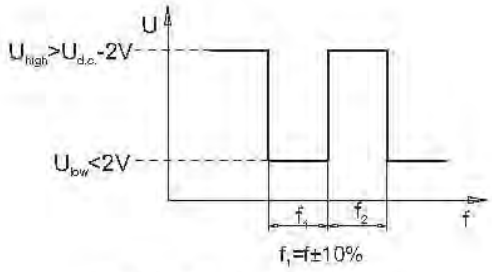
This performance is applicable for all motors of OM series. The main technical features correspond to the standard motors series OM.

DIFFERENTIAL HALL SENSOR

Technical data

Frequency range	3...20 000 Hz
Output	PNP
Power supply	10...36 VDC
Current input	20 mA (@24 VDC)
Current load	500 mA (@24 VDC;24°C)
Ambient Temperature	minus 40... plus 125°C
Protection	IP 67
Plug connector	M12-Series
Mounting principle	ISO 6149
Pulses per revolution	30

Output signal



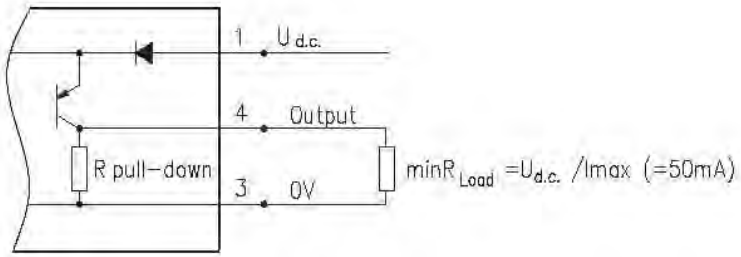
$f_1=f\pm10\%$

Load max.: $I_{high}=I_{low}<50mA$

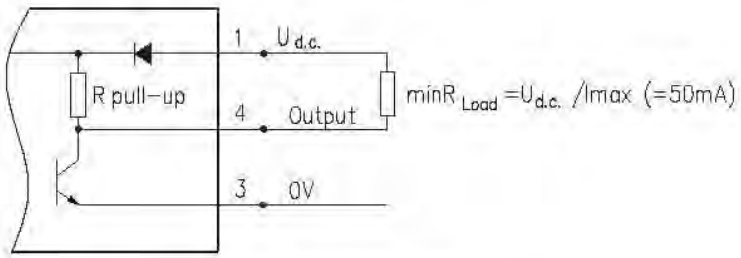
No load current, max: 20 mA

Wiring diagram

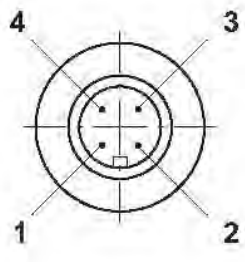
PNP



NPN



Stik type



Terminal No.	Connection
1	$U_{d.c.}$
2	No connection
3	0V
4	Output signal

ORDER CODE

	1	2	3	4	5	6	7	8	9	10	11	12
OM												

Pos.1 - Adjustment Option

omit - without valve
P - Side ports with single crossover relief valve
D - Side ports with dual crossover relief valve

Pos.2 - Mounting Flange

omit - Three bolts mount
F -Oval mount, two holes

Pos.3 - Port type (not valid for P and D version)

omit - Rear ports
S - Side ports

Pos.4 - Displacement code

8 - 8,2 [cm³/rev]
12,5 - 12,9 [cm³/rev]
20 - 20,0[cm³/rev]
32 - 31,8[cm³/rev]
40 - 40,0[cm³/rev]
50 - 50,0[cm³/rev]

Pos. 5 - Shaft Extensions*

C - ø16 straight Parallel key 5x5x16 DIN 6885
VC - ø16 straight Parallel key 5x5x16 DIN 6885 with corrosion resistant bushing
CK - ø14 straight, Parallel key 5x5x16 DIN 6885
SH - ø16,5 splined, B17x14 DIN 5482

Pos. 6 - Ports

omit - BSPP (ISO 228)
M - Metric (ISO 262)

Pos. 7 - Line to controled ** (see page OM - 01)

L - B→A (left running)
R - A→B (right running)

Pos. 8 - Valve Rated Pressure ***

/50 - Δp=50 bar
/100 - Δp=100 bar

Pos. 9 - Speed Monitoring

omit - none
RS-P - with speed sensor (PNP pull-down resistor)
RS-N - with speed sensor (NPN pull-up resistor)

Pos.10 - Rotation

omit - Standard Rotation
R - Reverse Rotation

Pos.11 - Option (Paint)****

omit - no paint
P - Painted
PC - Corrosion Protected Paint

Pos.12 - Design Series

omit - Factory specified

NOTES:

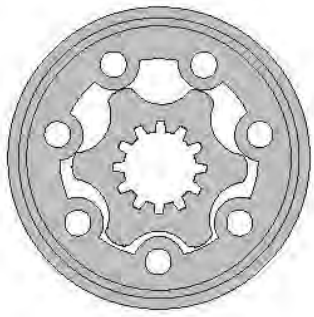
* The permissible output torque for shafts must be not exceeded!
** For **"P"** option useful only.
*** For **"P"** and **"D"** option useful only.
**** Color at customer's request.

The hydraulic motors are mangano-phosphatized as standard.

HYDRAULIC MOTORS OP

APPLICATION

» Conveyors;
» Feeding mechanism of robots and manipulators;
» Metal working machines;
» Textile machines;
» Machines for agriculture;
» Food industries;
» Grass cutting machinery etc.



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Function diagrams .....OP-05÷09
Dimensions and mounting OP-10
Wheel motor OP-11
Shaft extensions OP-12
Permissible shaft loads OP-13
Order code OP-17

OPTIONS

» Model- Spool valve, gerotor;
» Flange and wheel mount;
» Motor with needle bearing
» Side and rear ports;
» Shafts- straight, splined and tapered;
» Shaft seal for high and low pressure;
» Metric and BSPP ports;
» Other special features.

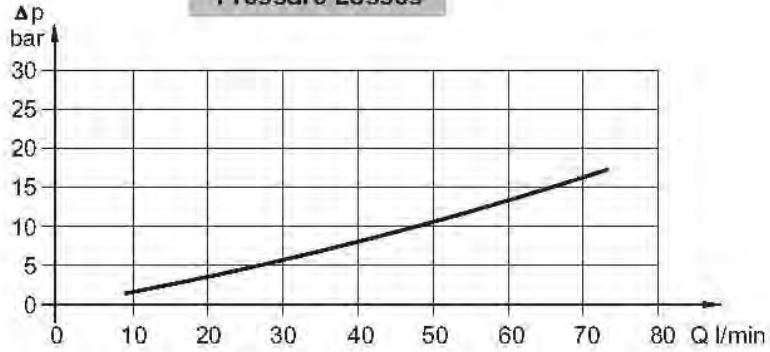
GENERAL

Displacement, [cm^3/rev.]	25÷623,6
Max. Speed, [RPM]	1600÷95
Max. Torque, [daNm]	3,3÷50
Max. Output, [kW]	3,3÷10,5
Max. Pressure Drop, [bar]	140÷55
Max. Oil Flow, [l/min]	40÷60
Min. Speed, [RPM]	10
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, [°C]	-30÷90
Optimal Viscosity range, [mm^2/s]	20÷75
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 micron)

Oil flow in drain line

Pressure drop (bar)	Viscosity (mm^2/s)	Oil flow in drain line (l/min)
100	20	2,5
	35	1,8
140	20	3,5
	35	2,8

Pressure Losses



SPECIFICATION DATA

Type		OP 25	OP 32	OP 40	OP(W) 50	OP 50...B...	OP(W) 80	OP 80...B...	OP(W) 100	OP 100...B...
Displacement [cm3/rev.]		25	32,0	40,0	49,5	49,5	79,2	79,2	99	99
Max. Speed,	cont.	1600	1560	1500	1210	1210	755	755	605	605
[RPM]	int.*	1800	1720	1750	1515	1515	945	945	755	755
Max. Torque,	cont.	3,3	4,3	6,2	9,4	9,4	15,1	15,1	19,3	19,3
[daNm]	int.*	4,7	6,1	8,2	11,9	11,9	19,5	19,5	23,7	23,7
	peak**	6,7	8,6	10,7	14,3	14,3	22,4	22,4	27,5	27,5
Max. Output,	cont.	4,5	5,8	8,4	10,1	10,1	10,2	10,2	10,5	10,5
[kW]	int.*	6,1	7,8	11,6	12,2	12,2	12,5	12,5	12,8	12,8
Max. Pressure	cont.	100	100	120	140	140	140	140	140	140
Drop,	int.*	140	140	155	175	175	175	175	175	175
[bar]	peak**	225	225	225	225	225	225	225	225	225
Max. Oil Flow,	cont.	40	50	60	60	60	60	60	60	60
[lpm]	int.*	45	55	70	75	75	75	75	75	75
Max. Inlet	cont.	175	175	175	175	175	175	175	175	175
Pressure,	int.*	200	200	200	200	200	200	200	200	200
[bar]	peak**	225	225	225	225	225	225	225	225	225
Max. Return	cont. 0-100 RPM	150	150	150	150	100	150	100	150	100
Pressure w/o	cont. 100-300 RPM	75	75	75	75	30	75	30	75	30
Drain Line or	cont. 300-600 RPM	50	50	50	50	15	50	15	50	15
Max. Pressure in	cont. >600 RPM	20	20	20	20	-	20	-	20	-
Drain Line, [bar]	int.* 0-max RPM	150	150	150	150	100	150	100	150	100
Max. Return	cont.	175	175	175	175	175	175	175	175	175
Pressure with	int.*	200	200	200	200	200	200	200	200	200
Drain Line, [bar]	peak**	225	225	225	225	225	225	225	225	225
Max. Starting Pressure with Unloaded Shaft [bar]		10	10	10	10	10	10	10	10	10
Min. Starting Torque	at max. press. drop cont.	3	4	5.4	7,8	7,8	13,2	13,2	16,6	16,6
[daNm]	at max. press. drop int.*	4.2	5,6	6.9	10	10	16,8	16,8	21	21
Min. Speed [RPM]		20	15	10	10	10	10	10	10	10
Weight [kg]	OPF	5,6	5,6	5,7	5,8		5,9		6,1	
	OP(F)(E)..B...					5,9 (6,4)		6 (6,5)		6,2 (6,7)
	OPQ(N)				5,2		5,3		5,5	
	OP(F)(N)E				6,3		6,4		6,6	
	OPW(N)				5,5		5,6		5,8	
	OPQ(N)E				5,7		5,8		6,0	

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% of every minute.
*** For speeds of 10 RPM or lower, consult factory or your regional manager.

1. Intermittent speed and intermittent pressure drop must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommended using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm^2/s at operating temperatures.
5. Recommended maximum system operating temperature is 82°C.
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

SPECIFICATION DATA (continued)

Type		OP 125 OPW 125	OP 125...B...	OP 160 OPW 160	OP 160...B...	OP 200 OPW 200	OP 200...B...
Displacement, [cm ^{3}/rev.]		123,8	123,8	158,4	158,4	198	198
Max. Speed,	cont.	486	486	378	378	303	303
[RPM]	int.*	605	605	472	472	378	378
Max.	cont.	23,7	23,7	31,3	31,3	36,6	36,6
Torque	int.*	29,8	29,8	37,8	37,8	45,6	45,6
[daNm]	peak**	36,5	36,5	43,8	43,8	55	55
Max. Output,	cont.	10	10	10,1	10,1	10	10
[kW]	int.*	12	12	12,1	12,1	12	12
Max. Pressure	cont.	140	140	140	140	140	140
Drop	int.*	175	175	175	175	175	175
[bar]	peak**	225	225	225	225	225	225
Max. Oil Flow	cont.	60	60	60	60	60	60
[l/min]	int.*	75	75	75	75	75	75
Max. Inlet	cont.	175	175	175	175	175	175
Pressure	int.*	200	200	200	200	200	200
[bar]	peak**	225	225	225	225	225	225
Max. Return Pressure	cont. 0-100 RPM	150	100	150	100	150	100
w/o Drain Line or	cont. 100-300 RPM	75	30	75	30	75	30
Max. Pressure in	cont. 300-600 RPM	50	15	50	15	50	15
Drain Line,	cont. >600 RPM	-	-	-	-	-	-
[bar]	int.* 0-max. RPM	150	100	150	100	150	100
Max. Return Pressure	cont.	175	175	175	175	175	175
with Drain Line	int.*	200	200	200	200	200	200
[bar]	peak**	225	225	225	225	225	225
Max. Starting Pressure with Unloaded Shaft, [bar]		9	9	8	8	7	7
Min. Starting Torque	at max. press drop cont.	20,7	20,7	28,2	28,2	33,5	33,5
[daNm]	at max. press. drop int.*	26,6	26,6	35,5	35,5	42,6	42,6
Min. Speed***, [RPM]		10	10	10	10	10	10
Weight, avg. [kg]	OPF	6,2		6,4		6,6	
	OP(F)(E)... B...		6,3(6,8)		6,5(6,9)		6,7(7,2)
	OPQ(N)	5,6		5,8		6,0	
	OP(F)(N)E	6,7		6,9		7,1	
	OPW(N)	5,9		6,1		6,3	
	OPQ(N)E	6,1		6,3		6,5	

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% of every minute.
*** For speeds of 10 RPM or lower, consult factory or your regional manager.

1. Intermittent speed and intermittent pressure drop must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommended using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm^2/s at operating temperatures.
5. Recommended maximum system operating temperature is 82°C.
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

SPECIFICATION DATA (continued)

Type		OP(W) 250	OP 250...B...	OP(W) 315	OP 315...B...	OP(W) 400	OP 400...B...	OP 500	OP 630
Displacement, [cm³/rev.]		247,5	247,5	316,8	316,8	396	396	495	623,6
Max. Speed,	cont.	242	242	190	190	150	150	120	95
[RPM]	int.*	303	303	236	236	189	189	150	120
Max.	cont.	38	47	38	48,6	36	50	39	44
Torque	int.*	58,3	58,3	56	56	59	59	57	64
[daNm]	peak**	68,5	68,5	85	85	85,4	85,4	78	82
Max. Output,	cont.	7,5	9,5	5,7	7,6	4,6	6,2	3,5	3,3
[kW]	int.*	12	12	9	9	7,8	7,8	7,2	5,6
Max. Pressure	cont.	110	140	90	120	70	95	60	55
Drop	int.*	175	175	140	140	115	115	90	80
[bar]	peak**	225	225	225	225	180	180	130	110
Max. Oil Flow	cont.	60	60	60	60	60	60	60	60
[l/min]	int.*	75	75	75	75	75	75	75	75
Max. Inlet	cont.	175	175	175	175	175	175	140	140
Pressure	int.*	200	200	200	200	200	200	175	175
[bar]	peak**	225	225	225	225	225	225	225	225
Max. Return Pressure	cont. 0-100 RPM	150	100	150	100	150	100	150	150
w/o Drain Line or	cont. 100-300 RPM	75	30	75	30	75	30	75	-
Max. Pressure in	cont. 300-600 RPM	-	-	-	-	-	-	-	-
Drain Line,	cont. >600 RPM	-	-	-	-	-	-	-	-
[bar]	int.* 0-max. RPM	150	100	150	100	150	100	150	150
Max. Return Pressure	cont.	175	175	175	175	175	175	140	140
with Drain Line	int.*	200	200	200	200	200	200	175	175
[bar]	peak**	225	225	225	225	225	225	225	225
Max. Starting Pressure with Unloaded Shaft, [bar]		6	6	5	5	5	5	5	5
Min. Starting Torque	at max. press drop cont.	33,6	42,8	34,4	45,8	34,5	46,8	36	41,5
[daNm]	at max. press. drop int.*	54,2	54,2	61,9	61,9	60,8	60,8	54	62
Min. Speed*, [RPM]**		10	10	10	10	10	10	10	10
Weight, avg. [kg]	**OPF**	6,8		7,1		7,6		8,9	9,5
	OP(F)(E)... B...		6,9(7,4)		7,2(7,7)		7,7(8,2)		
	OPQ(N)	6,2		6,5		6,8		8,3	9,0
	OP(F)(N)E	7,3		7,6		8,1		9,3	10
	OPW(N)	6,5		6,8		7,2			
	OPQ(N)E	6,7		7,0		7,3		8,8	8,5

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% of every minute.
*** For speeds of 10 RPM or lower, consult factory or your regional manager.

1. Intermittent speed and intermittent pressure drop must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommended using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm²/s at operating temperatures.
5. Recommended maximum system operating temperature is 82°C.
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

SPECIFICATION DATA for OP...LSV

Low Speed Valve (LSV) "LSV" Series hydraulic motors have been designed to operate with normal pressure drop and to ensure smooth run at low speed (up to 200 RPM), as the best security for operation is guaranteed at frequency of rotation 20 ÷ 50 RPM . They have an increased starting pressure drop and are not recommended for using at pressure less than 40 bar.
Look at specification data for hydraulic motors standard version. The modification concerns only the following parameters: maximum speed, maximum output,maximum Oil flow and maximum starting pressure.

Type		OP 25	OP 32	OP 40	OP 50	OP 80	OP 100	OP 125	OP 160	OP 200	OP 250	OP 315	OP 400	OP 500	OP 630
Max. Speed	Cont.	200	200	200	200	200	200	200	200	200	200	190	150	80	64
[RPM]	Int.*	250	250	250	250	250	250	250	250	250	250	236	190	101	80
Max. Output	Cont.	0,7	0,9	1,2	2,0	3	3,8	4,9	6,1	7,0	5,2	4,2	3,4	2,9	2,6
[kW]	Int.*	1,2	1,5	2,0	3,2	5	6,0	7,2	9,5	9,8	9,1	7,2	6,0	5,0	4,2
Max. Oil Flow	Cont.	9,0	11,0	11	15	22	24	30	34	40	40	40	40	40	40
[lpm]	Int.*	13,5	16,5	14	20	29	33	38	46	50	50	50	50	50	50
Max. Starting Pressure with unloaded Shaft, [bar]		25	25	25	20	20	20	20	15	15	15	12	12	10	10

SPECIFICATION DATA for OP...LL

Low Leakage (LL) "LL" Series hydraulic motors have been designed to operate at the whole standard range of working conditions (pressure drop and frequency of rotation) , but with considerable decreased volumetric losses in the drainage ports. Their main purposeis to operateas series-connected motors in hydraulic systems.

For this version is permissible decreasing of the maximal torque with up to 5% (at middle speed) and up to 10% (at high speed) in comparison to the standard versions of motors.

Look at specification data for hydraulic motors series OP standard version. The modification concerns only the parameters: maximum torque,maximum output, minimum starting torque.

Type		OP 25	OP 32	OP 40	OP 50	OP 80	OP 100	OP 125	OP 160	OP 200	OP 250	OP 315	OP 400	OP 500	OP 630
Max. Torque	Cont.	3,1	4,1	5,8	9,0	14,4	18,4	22,5	29,8	34,8	44,6	46,2	47,5	38	42,8
[daNm]	Int.*	4,3	5,8	7,8	11,3	18,5	22,5	28,3	36,0	43,3	55,4	53,2	56,0	55	62,0
Max. Output	Cont.	4,3	5,6	8,2	10	10,1	10,4	9,9	10	9,9	9,4	7,5	6,1	3,4	3,2
[kW]	Int.*	6,0	7,7	11,5	12	12,3	12,6	11,8	12	11,8	11,8	8,9	7,7	7,1	5,5
Max. Pressure Drop	Cont.	100	100	120	140	140	140	140	140	140	140	120	95	60	55
[bar]	Int.*	140	140	155	175	175	175	175	175	175	175	140	115	90	80
Min. Starting Torque	Cont.	4,5	5,7	6,8	7,4	12,5	15,8	19,6	26,8	31,8	40,7	43,5	44,5	46	50
[daNm]	Int.*	6,0	7,0	8,0	9,5	16,0	20,0	25,2	33,7	40,5	51,5	58,8	57,8	52	60

SPECIFICATION DATA for OP...FR

Free Running version "FR" these are the hydraulic motors with reduced mechanical losses , for wich at disengaged condition (unconnected with driving mechanism) the rotation of the shaft could be realized by means of small torque. This advantage is especially usefull at operating with high frequencies of rotation (over than 300 min^{-1}) and low pressure drop, which is inbred for types with displacements of up to 200 cm_3. It is normal for these for the different condition of operation to have high torque, as well as high volume losses: the values of the volumetric efficiency are lower (up to 5 % for middle and up to 10 % for high values of the pressure drop), than these of the normal versions. That's why the recommended operatingfor "FR version is for applications with pressure drop up to 100 bar.

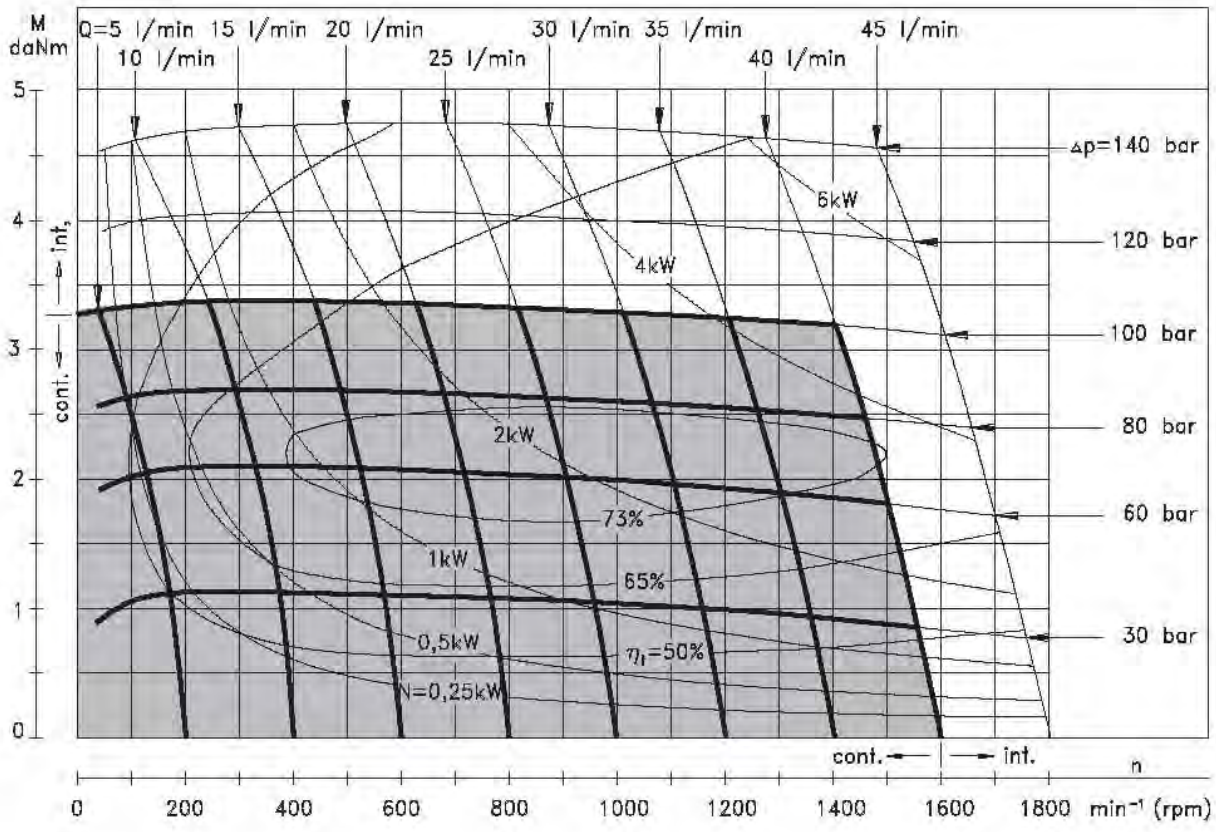
Additional advantages of "FR" version are prolonging of the life of the hydraulic motors at high frequencies of rotation, as well as the possibility to use them in systems with big variation of the loading.

Look at specification data for hydraulic motors series OP standard version. Only the parameter Starting Pressure is modified.

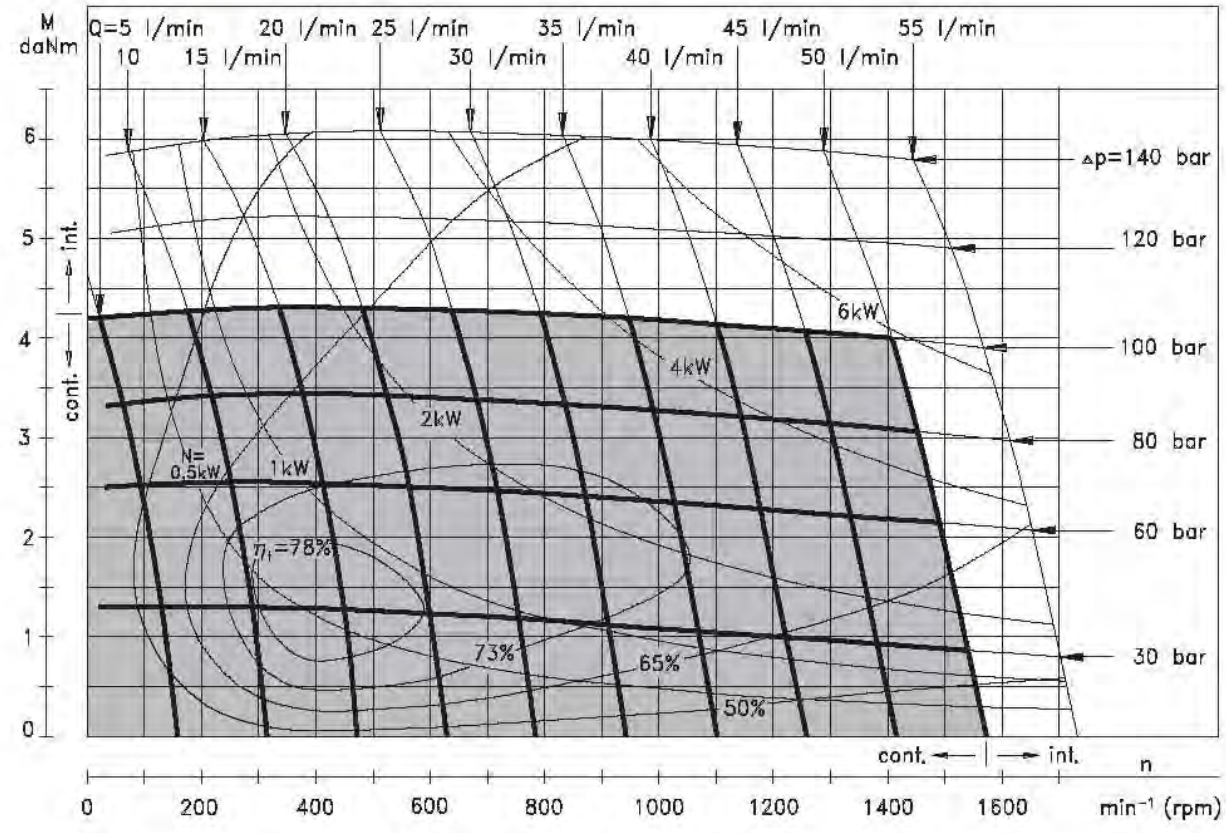
Type	OP 25	OP 32	OP 40	OP 50	OP 80	OP 100	OP 125	OP 160	OP 200
Max. Starting Pressure with Unloaded Shaft, [bar]	8	8	8	8	8	8	7,5	6,5	5,5

FUNCTION DIAGRAMS

OP 25



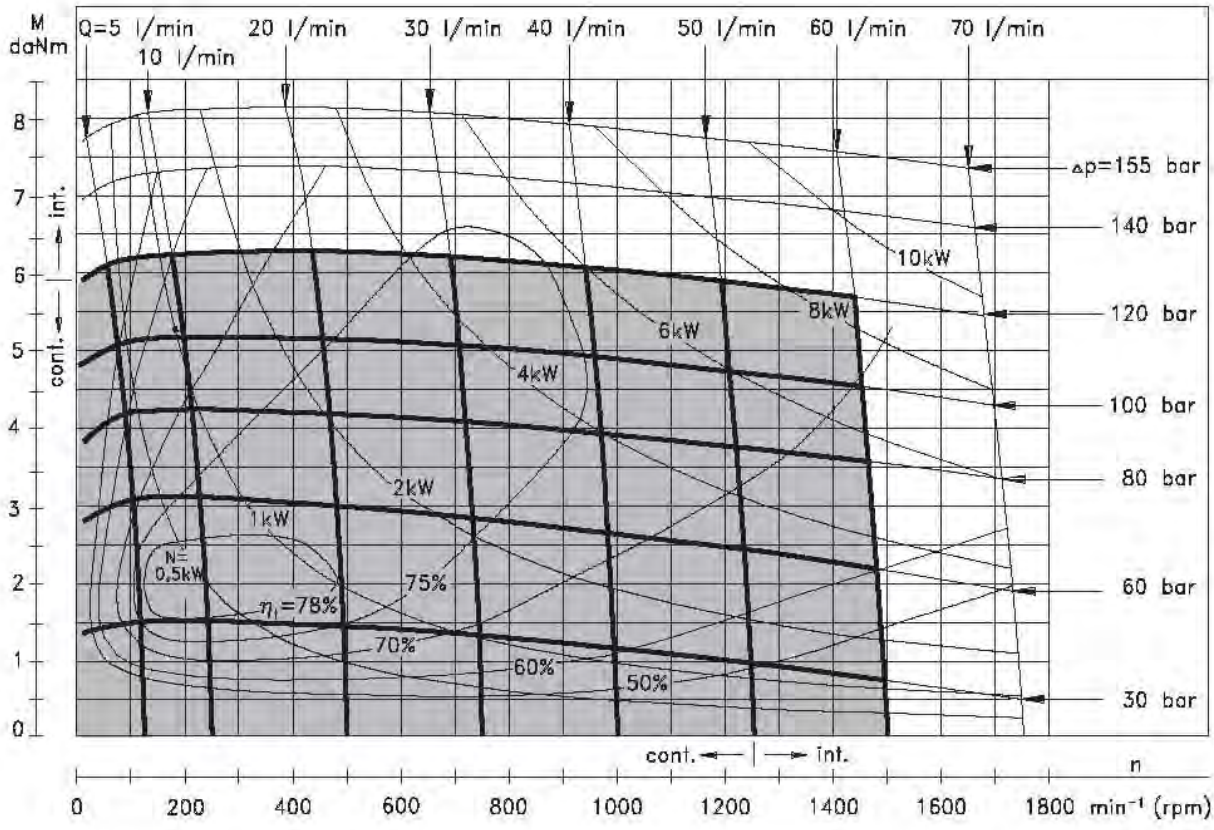
OP 32



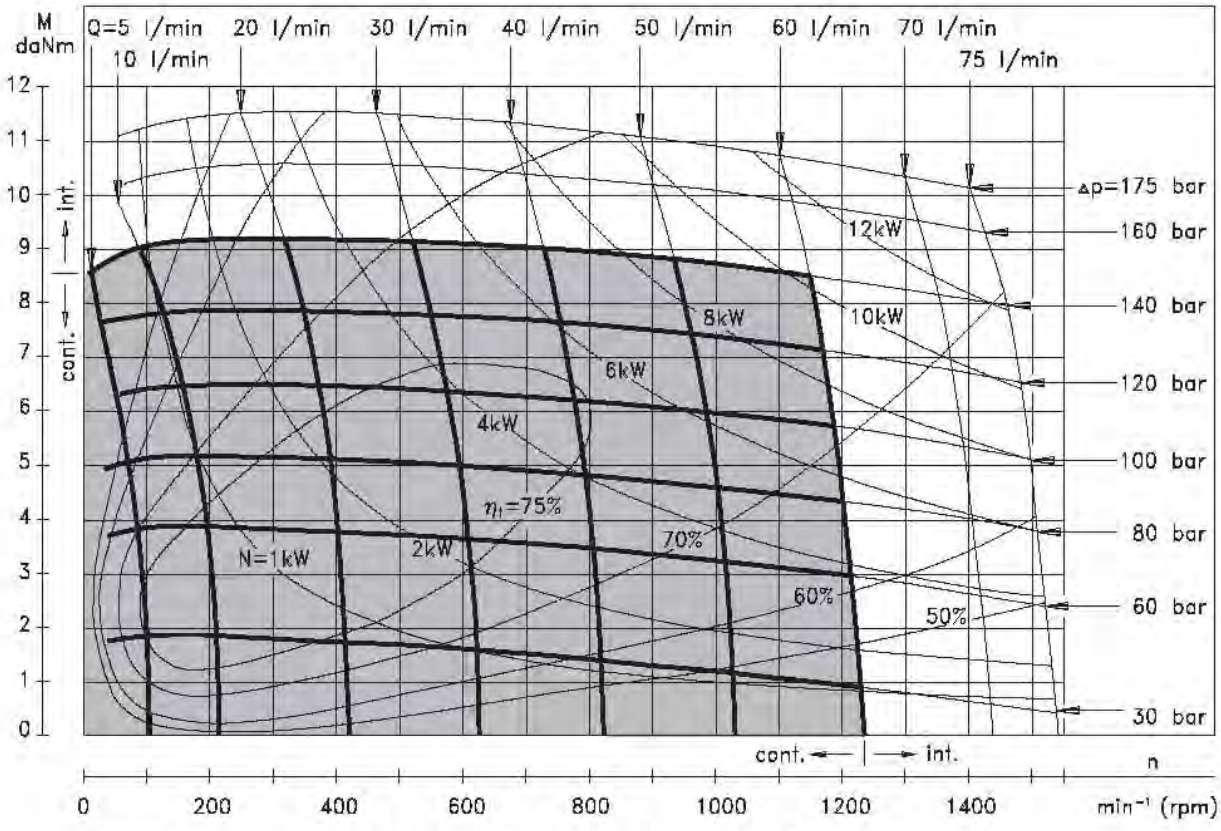
The function diagrams data was collected at back pressure 5÷10 bar and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAMS

OP 40



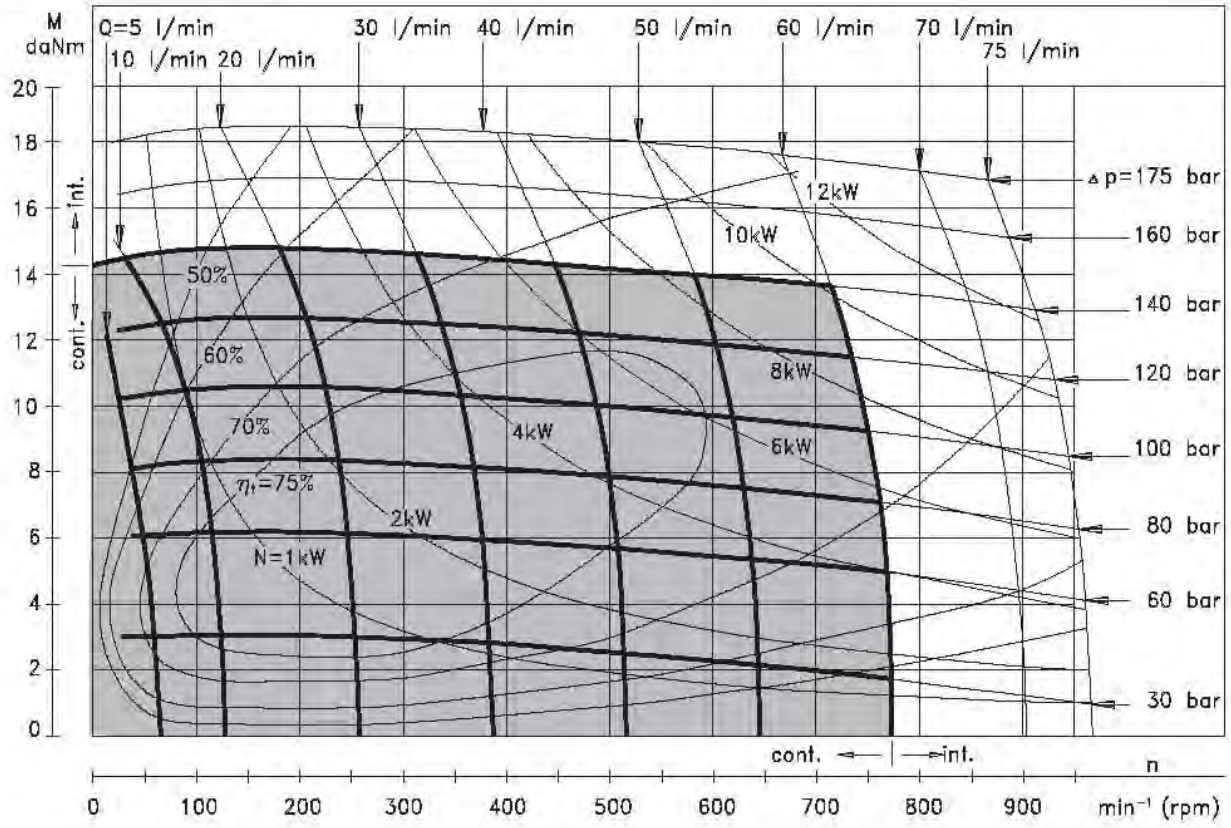
OP 50



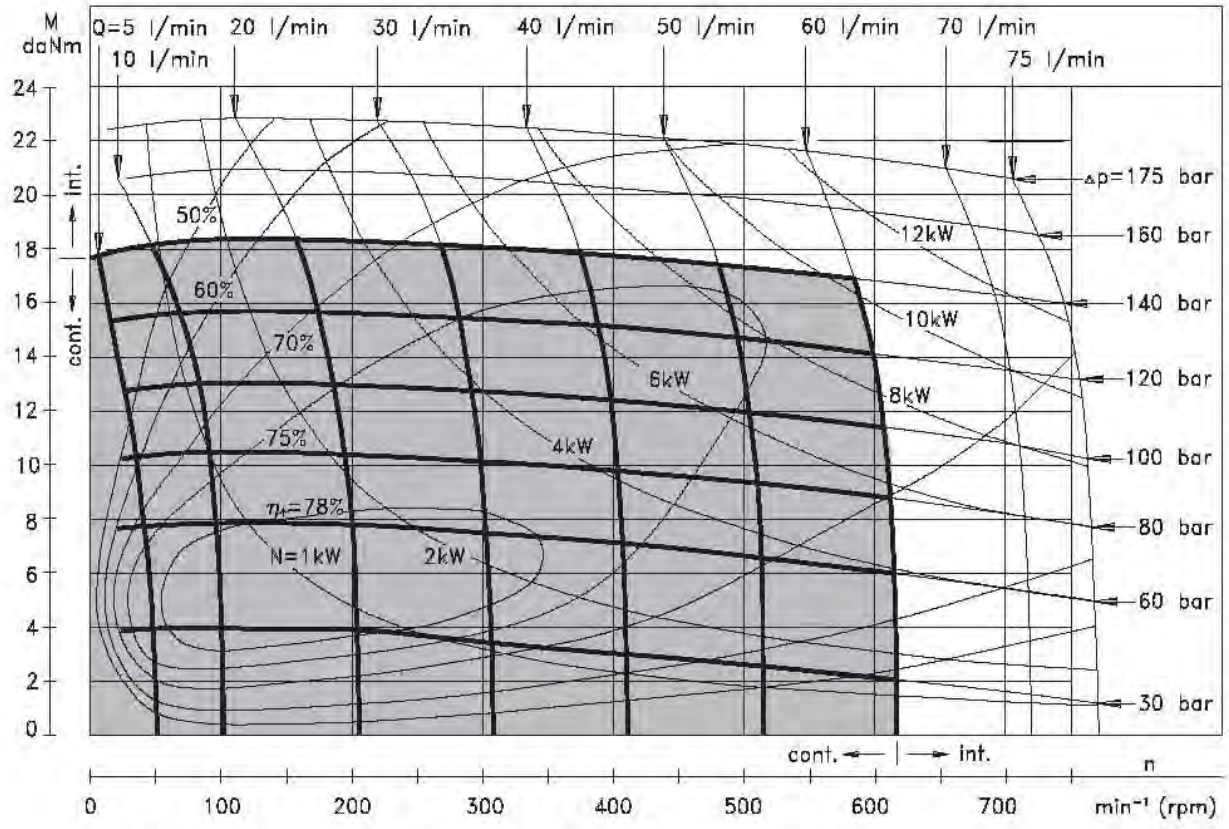
The function diagrams data was collected at back pressure 5÷10 bar and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAMS

OP 80



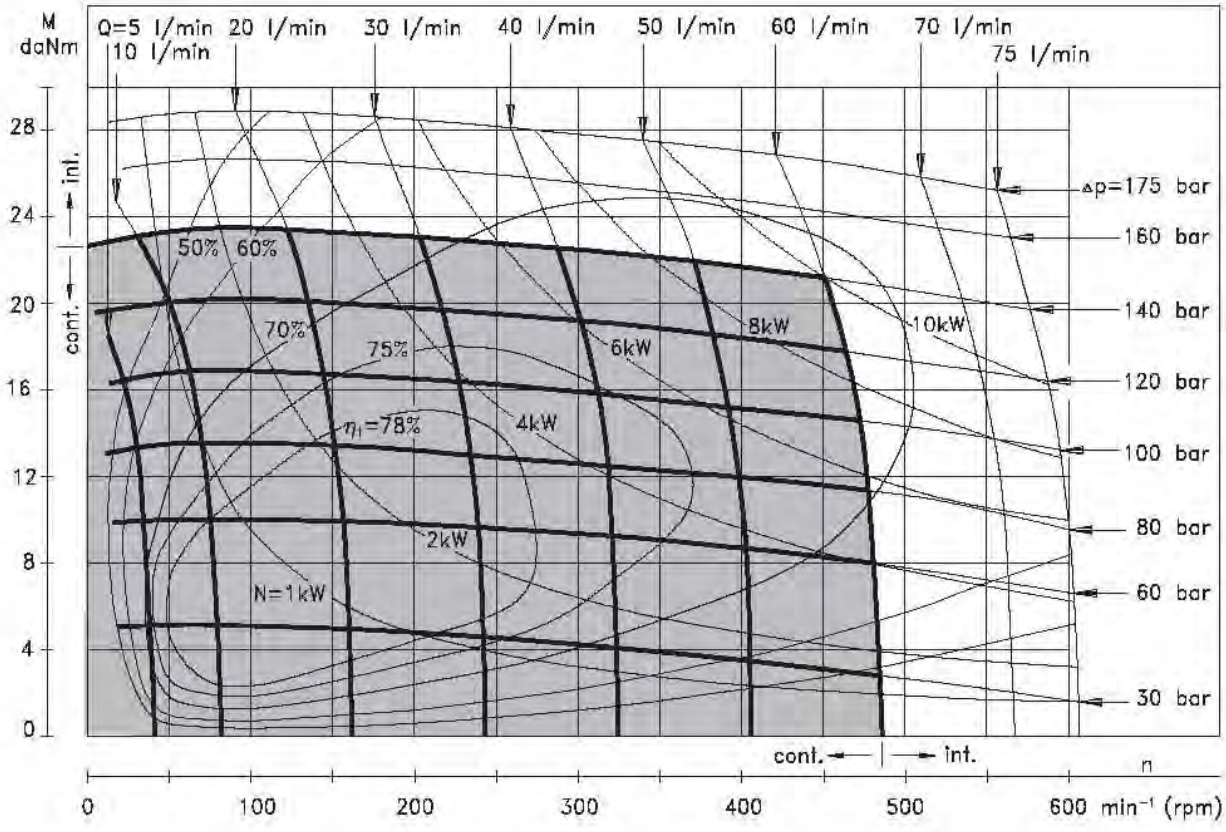
OP 100



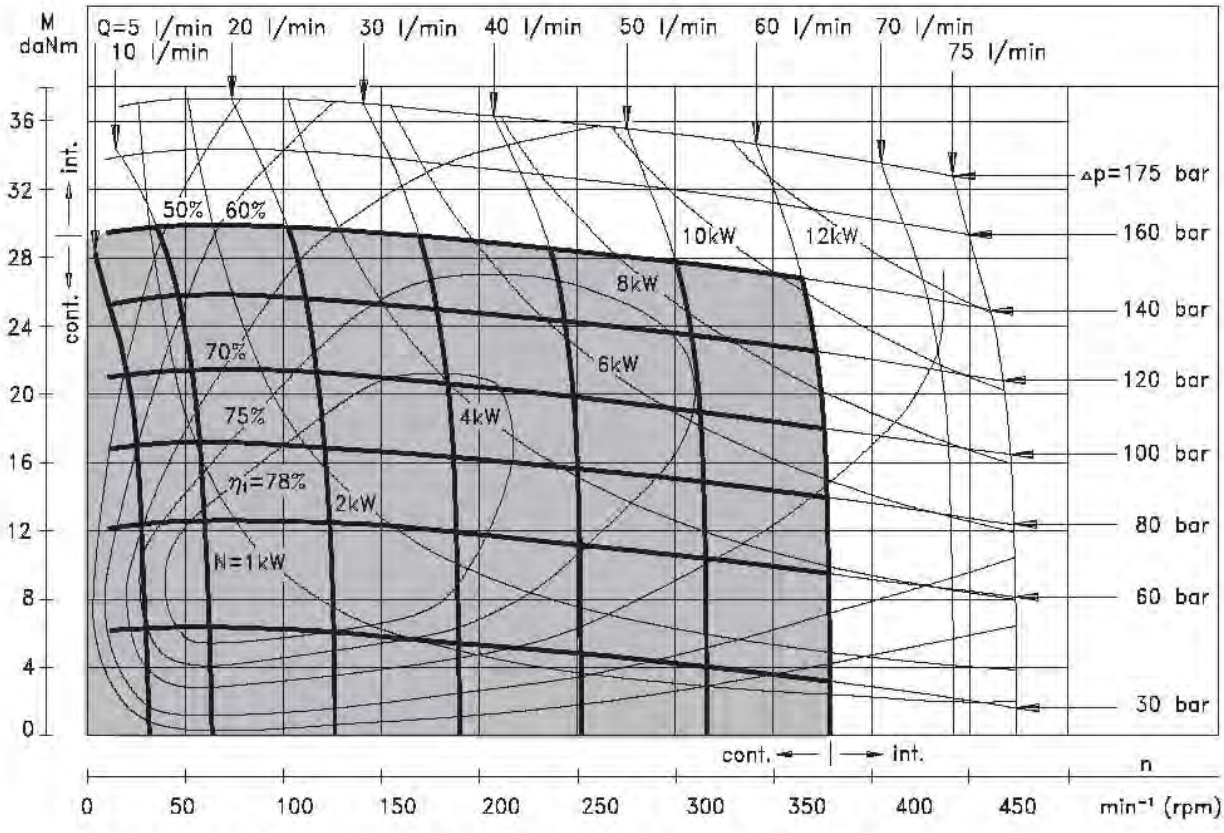
The function diagrams data was collected at back pressure 5÷10 bar and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAMS

OP 125



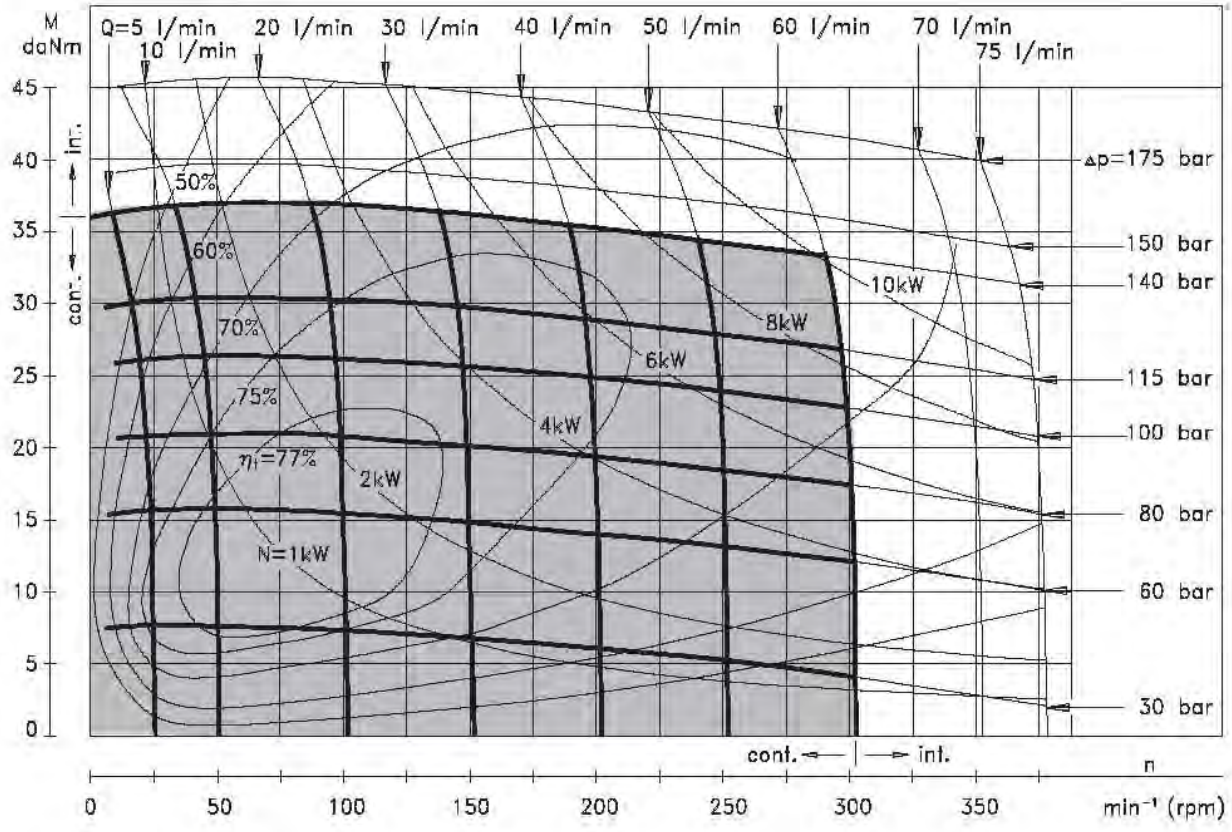
OP 160



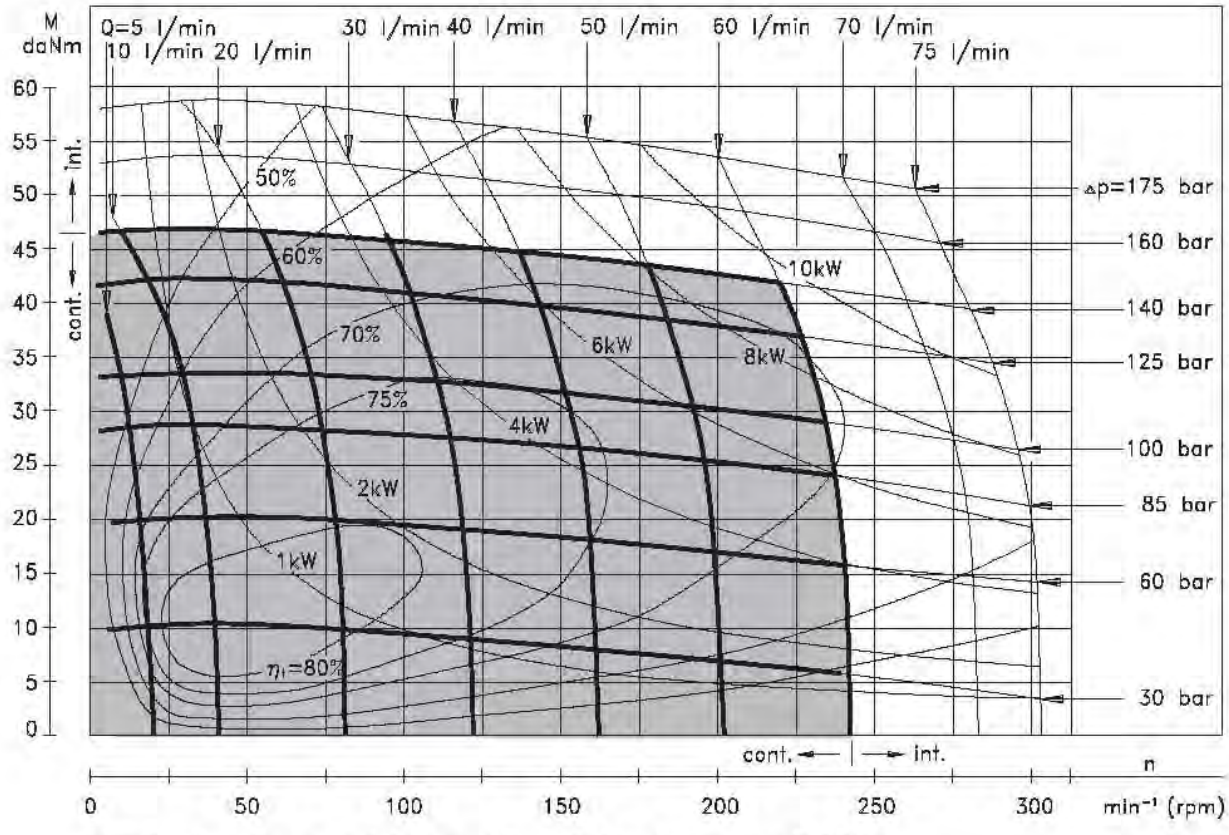
The function diagrams data was collected at back pressure 5÷10 bar
and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAMS

OP 200



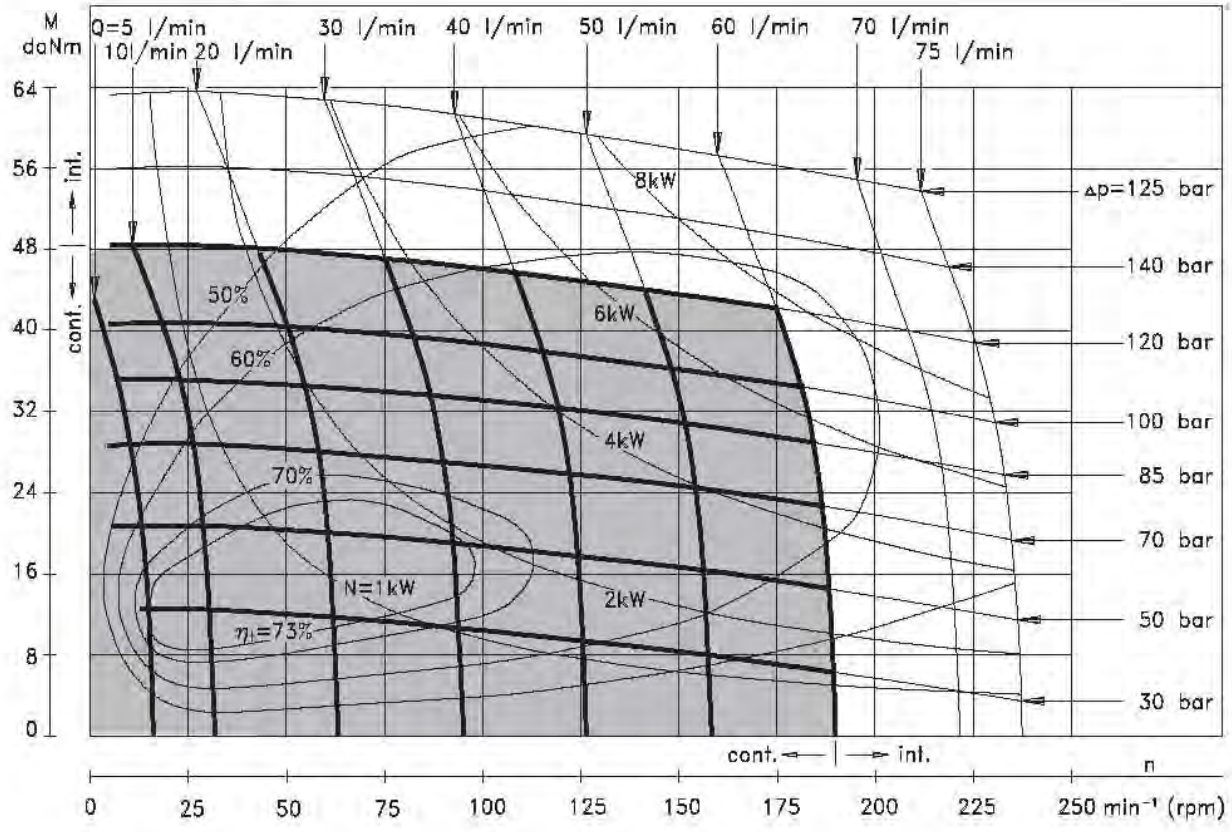
OP 250



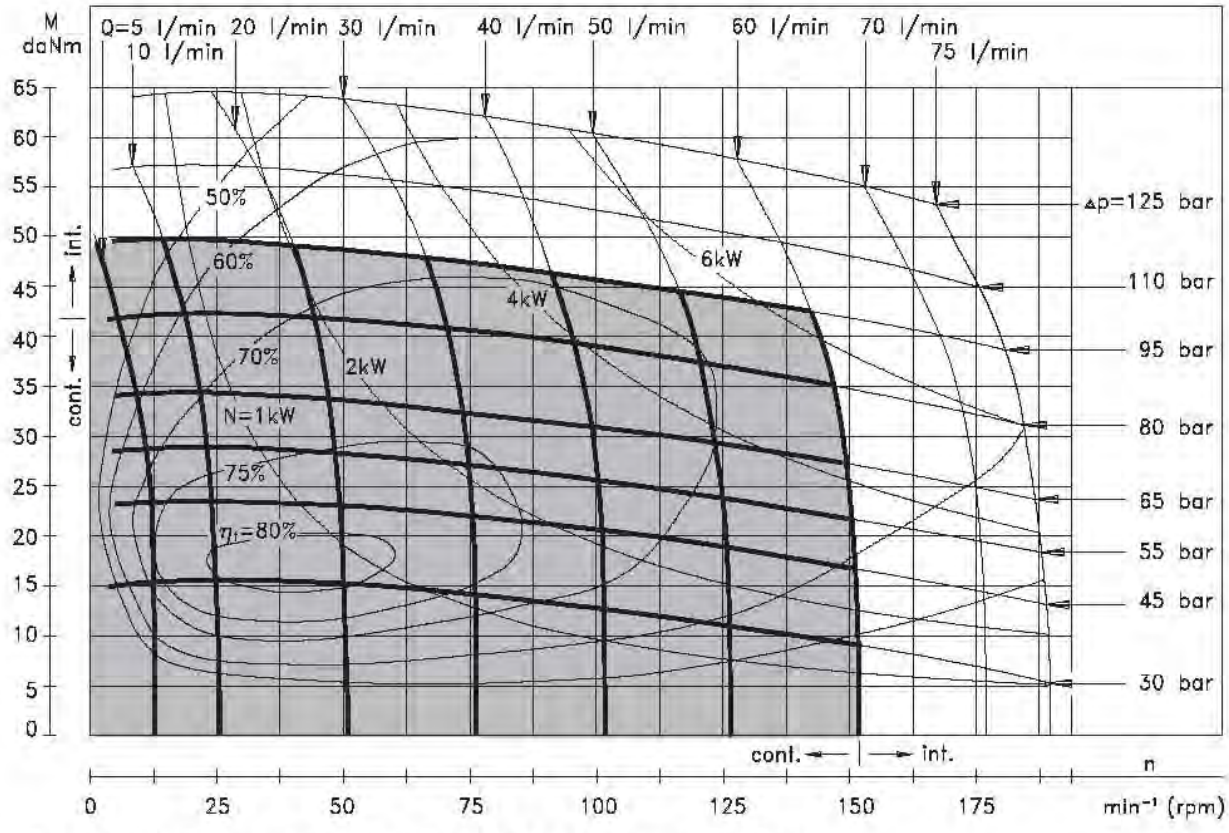
The function diagrams data was collected at back pressure 5÷10 bar and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAM

OP 315



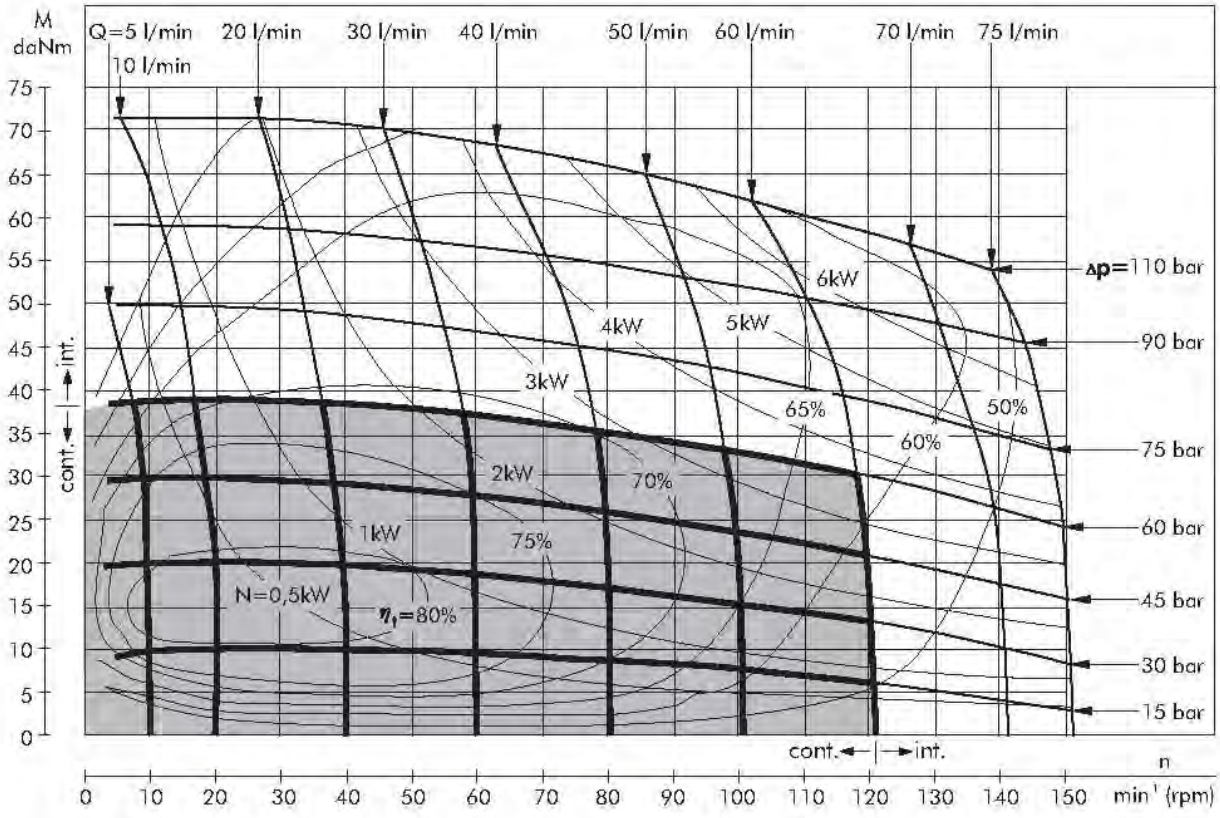
OP 400



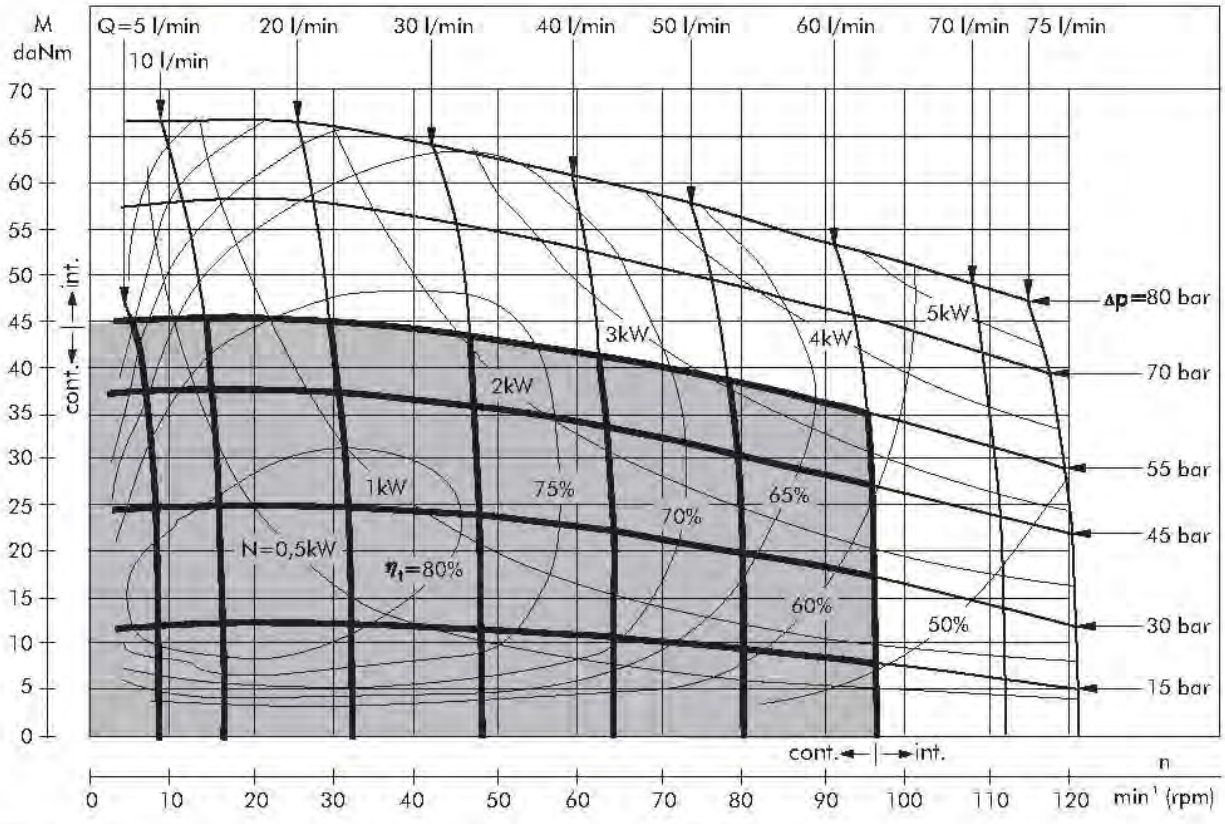
The function diagram data was collected at back pressure 5÷10 bar
and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAM

OP 500

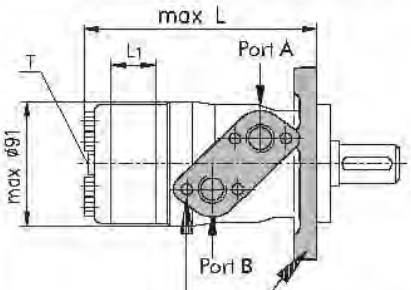


OP 630



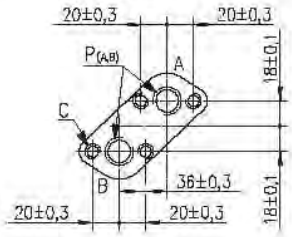
The function diagram data was collected at back pressure 5÷10 bar
and oil with viscosity of 32 mm²/s at 50° C.

DIMENSIONS AND MOUNTING DATA

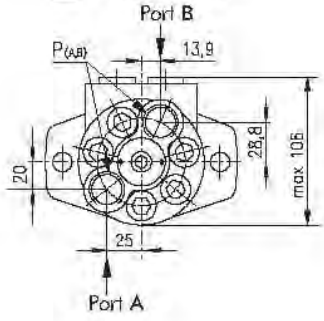


Porting

Side Ports

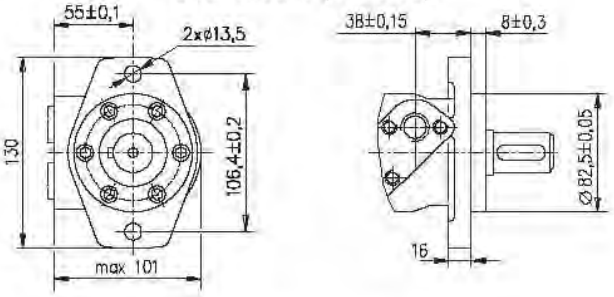


E -RearPorts

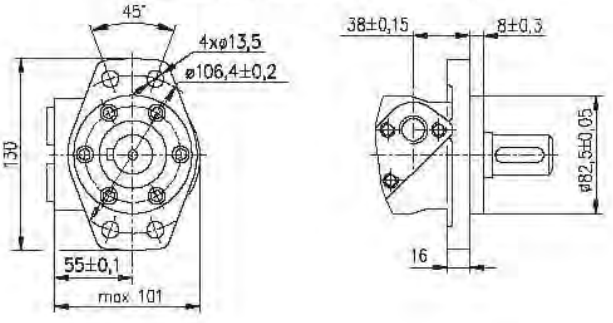


Mounting

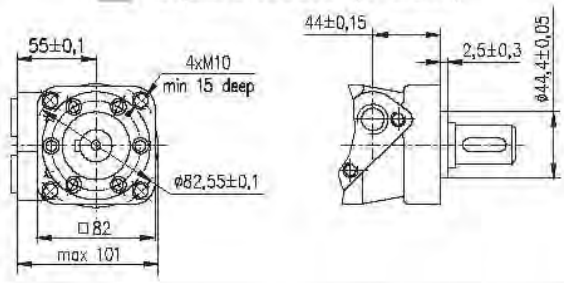
Oval Mount (2 Holes)



F - Oval Mount (4 Holes)



Q - Square Mount (4 Bolts)



C : 4xM8-13mm depth
$P_{(A,B)}$: 2xG1/2 or 2xM22x1,5-15mm depth
T : G1/4 or M14x1,5-12mm depth (plugged)

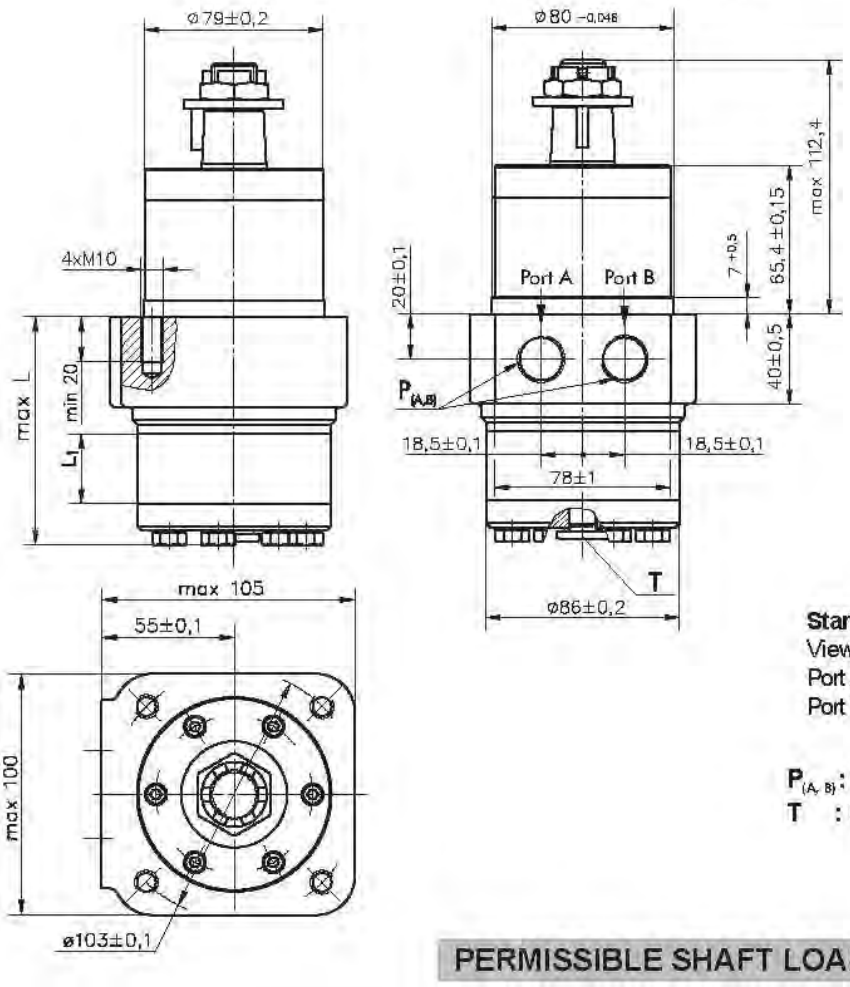
Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

Type	L,mm	Type	L,mm	Type	L,mm	Type	L,mm	L_1, mm
OPF 25	133,2	**OPQ 25**	139,4	**OP(F)E 25**	151,2	**OPQE 25**	157,4	4,60
OPF 32	134,5	**OPQ 32**	140,7	**OP(F)E 32**	152,5	**OPQE 32**	158,7	5,90
OPF 40	135,2	**OPQ 40**	141,4	**OP(F)E 40**	153,2	**OPQE 40**	159,4	7,40
OPF 50	135,6	**OPQ 50**	141,8	**OP(F)E 50**	155,8	**OPQE 50**	162,0	6,67
OPF 80	139,6	**OPQ 80**	145,8	**OP(F)E 80**	159,8	**OPQE 80**	166,0	10,67
OPF 100	142,2	**OPQ 100**	148,4	**OP(F)E 100**	162,4	**OPQE 100**	168,6	13,33
OPF 125	145,6	**OPQ 125**	151,8	**OP(F)E 125**	165,8	**OPQE 125**	172,0	16,67
OPF 160	150,2	**OPQ 160**	156,4	**OP(F)E 160**	170,4	**OPQE 160**	176,6	21,33
OPF 200	155,6	**OPQ 200**	161,8	**OP(F)E 200**	175,8	**OPQE 200**	182,0	26,67
OPF 250	162,2	**OPQ 250**	168,4	**OP(F)E 250**	182,4	**OPQE 250**	188,6	33,33
OPF 315	171,6	**OPQ 315**	177,8	**OP(F)E 315**	191,8	**OPQE 315**	198,0	42,67
OPF 400	182,2	**OPQ 400**	188,4	**OP(F)E 400**	202,4	**OPQE 400**	208,6	53,33
OPF 500	193,0	**OPQ 500**	199,0	**OP(F)E 500**	213,0	**OPQE 500**	219,0	66,63
OPF 630	210,5	**OPQ 630**	216,5	**OP(F)E 630**	230,5	**OPQE 630**	236,5	84,00

DIMENSIONS AND MOUNTING DATA - OPW

W - Wheel Mount



Type	L, mm	L_1, mm
OPW(N) 25	76,5	4,6
OPW(N) 32	78,0	5,9
OPW(N) 40	79,5	7,4
OPW(N) 50	78,0	6,67
OPW(N) 80	82,0	10,67
OPW(N) 100	85,0	13,33
OPW(N) 125	88,0	16,67
OPW(N) 160	93,0	21,33
OPW(N) 200	98,0	26,67
OPW(N) 250	105,0	33,33
OPW(N) 315	114,0	42,67
OPW(N) 400	125,0	53,33

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

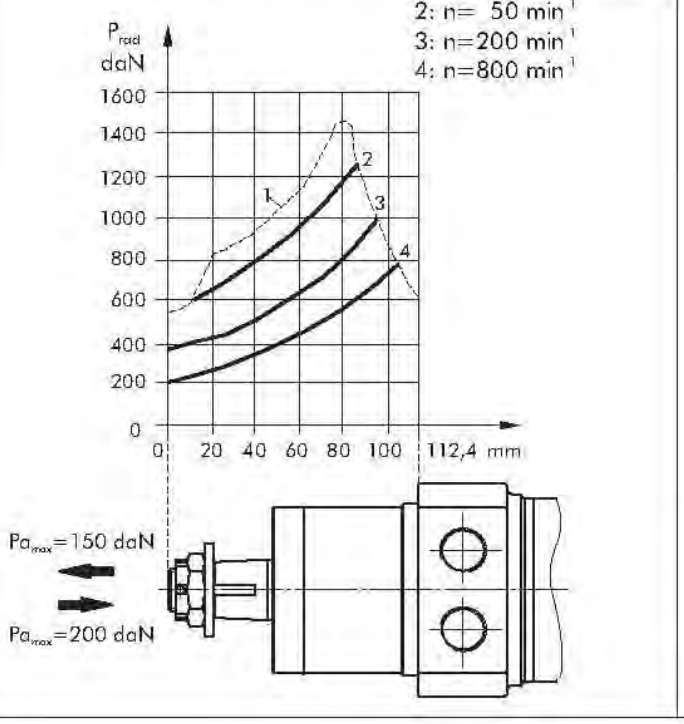
$P_{(A, B)}$: 2xG1/2 or 2xM22x1,5 - 15 mm depth
T : G1/4 or M14x1,5 - 12 mm depth (plugged)

PERMISSIBLE SHAFT LOADS

OPWN

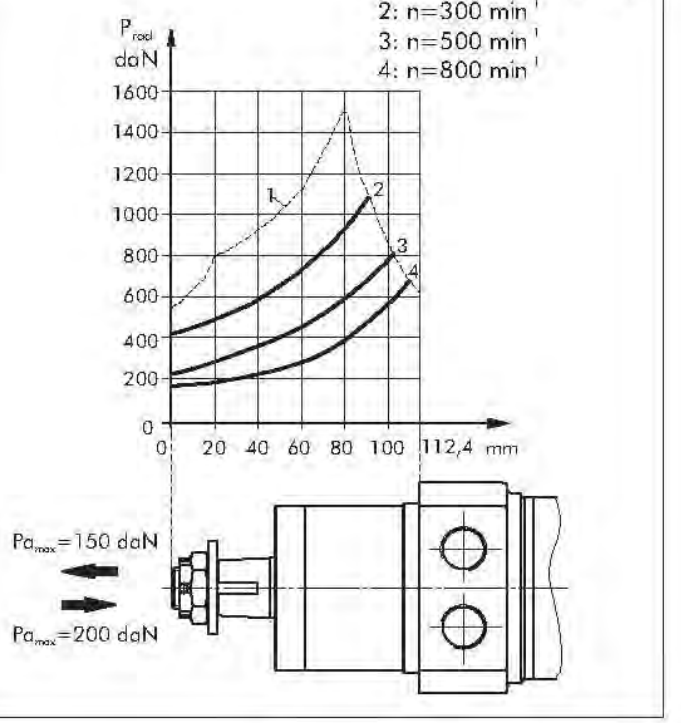
The curves apply to a B10 bearing life of 2000 hours.

1: Max. radial shaft load
2: n= 50 min^{-1}
3: n=200 min^{-1}
4: n=800 min^{-1}



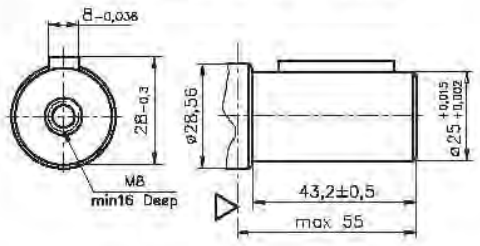
OPW

1: Max. radial shaft load
2: n=300 min^{-1}
3: n=500 min^{-1}
4: n=800 min^{-1}

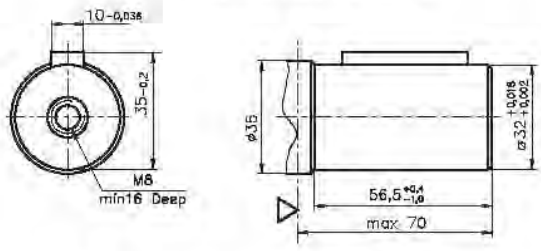


SHAFT EXTENSIONS FOR OP AND OR MOTORS

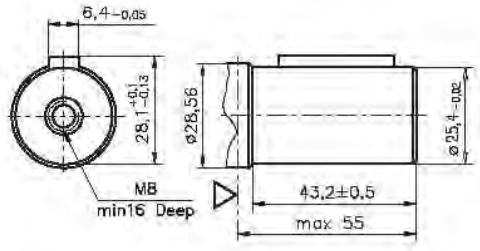
C - ø25 straight, Parallel key A8x7x32 DIN 6885
Max. Torque 44 daNm



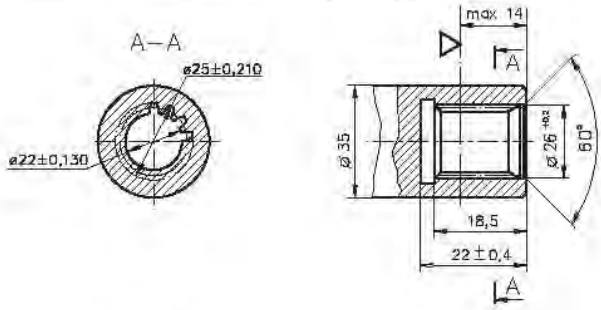
CB - ø32 straight, Parallel key A10x8x45 DIN 6885
Max. Torque 77 daNm



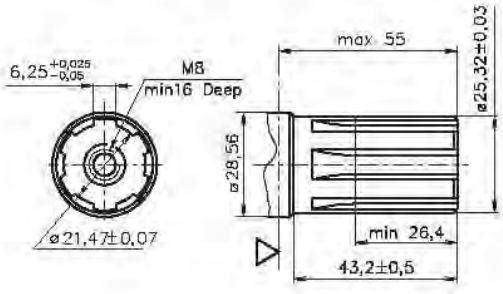
CO - ø1" straight, Parallel key ¼"x¼"x1¼" BS46
Max. Torque 44 daNm



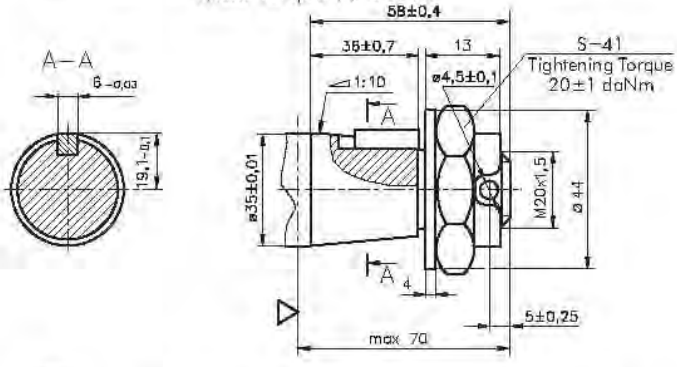
SB - splined A25x22xH10 DIN 5482
Max. Torque 44 daNm



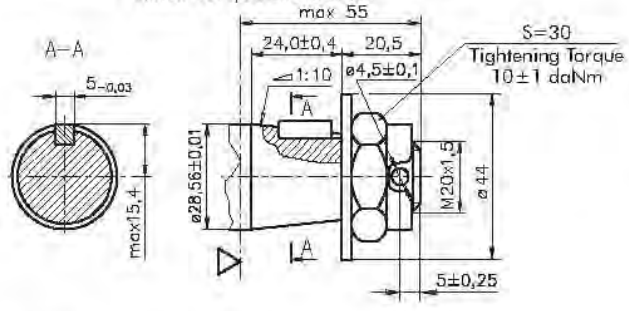
SH - splined, BS 2059 (SAE 6B)
Max. Torque 44 daNm



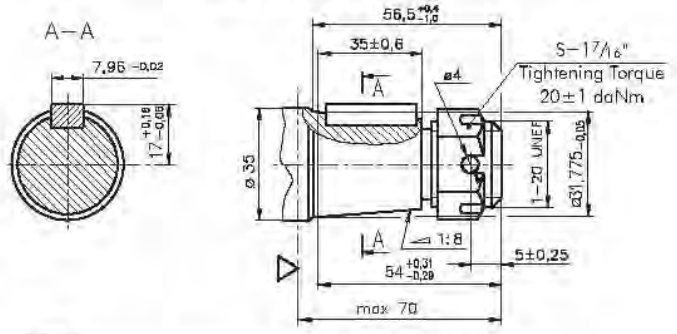
KB - tapered 1:10, Parallel key B6x6x20 DIN 6885
Max. Torque 77 daNm



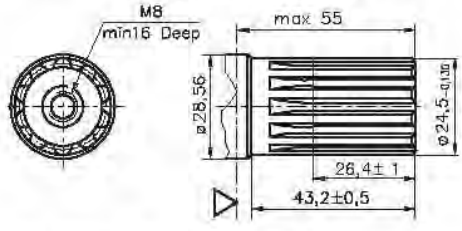
K - tapered 1:10, Parallel key B5x5x14 DIN 6885
Max. Torque 40 daNm



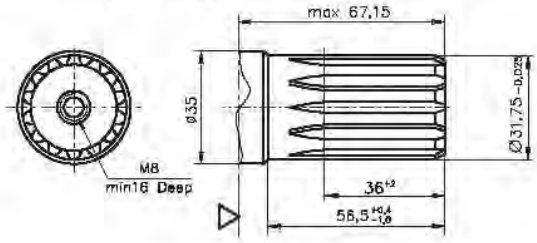
OB - tapered 1:8 SAEJ 501, Parallel key 5/16"x5/16"x1¼" BS46
Max. Torque 77 daNm



SA - splined, B25x22h9 DIN 5482
Max. Torque 40 daNm



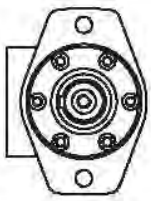
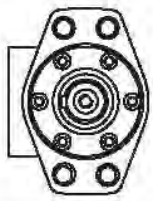
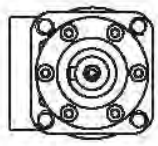
HB - ø1¼" splined 14T, ANSI B92.1-1976 Norm
Max. Torque 77 daNm



∇- Motor Mounting Surface

PERMISSIBLE SHAFT LOADS FOR OP MOTORS

The permissible radial shaft load P_{rad} depends on the speed (RPM) and distance (L) from the point of load to the mounting flange.

Mounting Flange			
Shaft Version	cylindrical - C, CO tapered - K, splined - SH	splined - HB cylindrical - CB	cylindrical - C, CO
Radial Shaft Load P^{*}_{rad}	$\frac{800}{n} \times \frac{25000}{95+L}$, daN	$\frac{800}{n} \times \frac{18750}{95+L}$, daN	$\frac{800}{n} \times \frac{25000}{101+L}$, daN

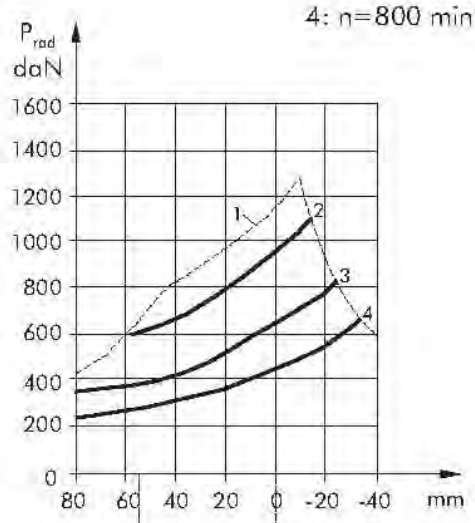
$n<200\ min^{-1}$; max P_{rad} =800 daN

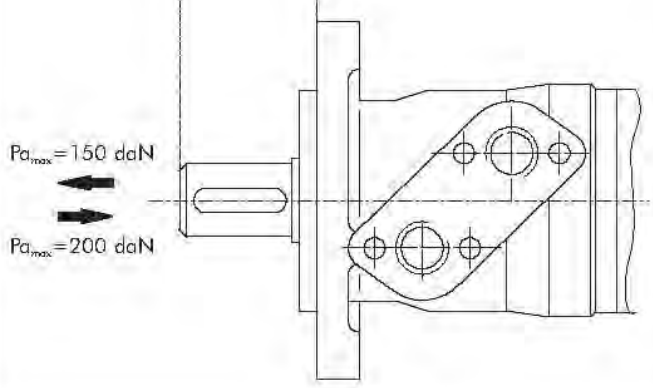
*$n \geq 200\ min^{-1}$; L<55 mm

OPN

The curves apply to a B_{10} bearing life of 2000 hours.

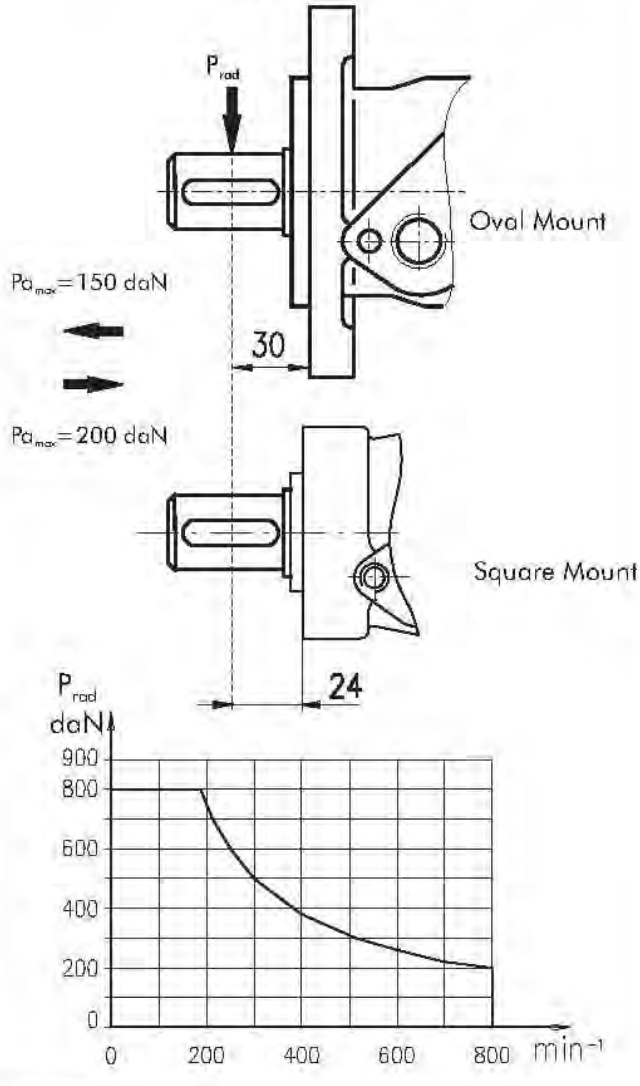
1: Max. radial shaft load
2: n= 50 min^{-1}
3: n=200 min^{-1}
4: n=800 min^{-1}





OP

Radial Shaft Load P_{rad} for C, CO Shaft Extensions by L=30 (24) mm

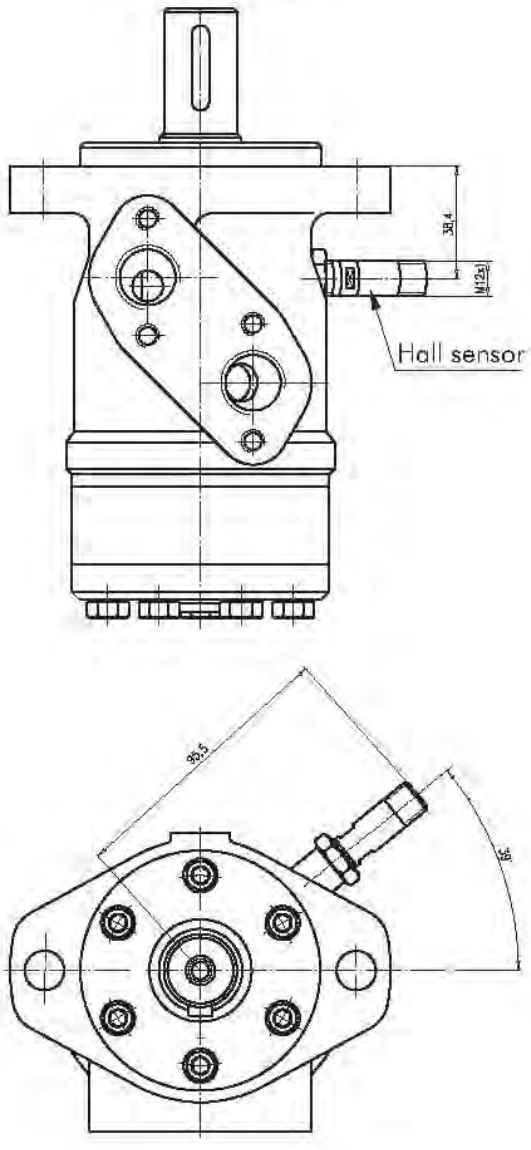


HYDRAULIC MOTORS WITH SPEED SENSOR TYPE OP...RS

Fer Hydraulic is introducing hydraulic motor with a new generation of speed sensor. The electric output signal is a standard voltage signal that can be used for regulating the speed of a motor.

The speed is measured by a sensor in accordance with the Hall principle. Signal processing and amplification are performed in the sensor housing. A connection is provided in the housing by a Plug connector M12 Series.

OP...RS



This performance is applicable for all motors of OP and OR series. The main technical features correspond to the standard motors series OP and OR.

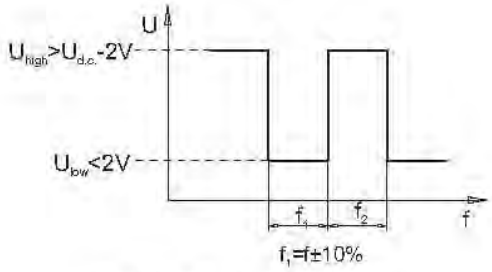
For detail technical and mounting data please refer to Meta catalogue.

DIFFERENTIAL HALL SENSOR

Technical data

Frequency range	3...20 000 Hz
Output	PNP
Power supply	10...36 VDC
Current input	20 mA (@24 VDC)
Current load	500 mA (@24 VDC;24°C)
Ambient Temperature	minus 40... plus 125°C
Protection	IP 67
Plug connector	M12-Series
Mounting principle	ISO 6149

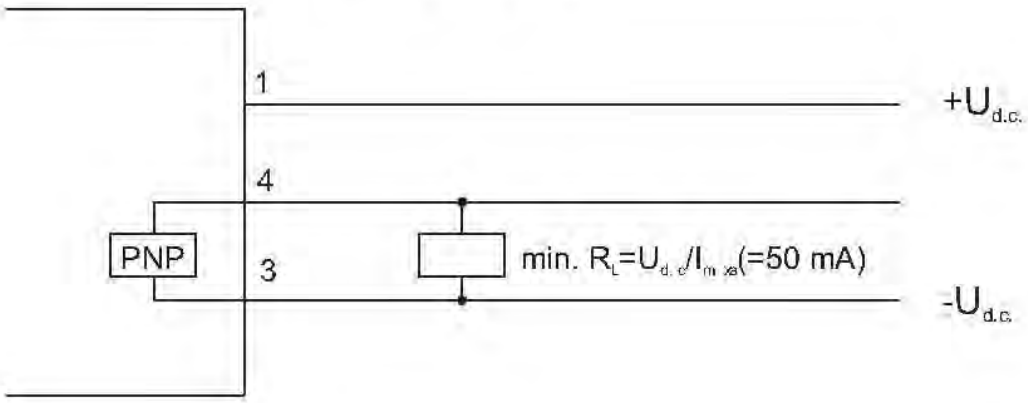
Output signal



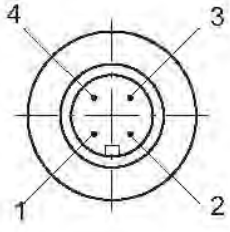
Load max.:I_{high}=I_{low}<50mA

No load current, max: 20 mA

Wiring diagram



Stik type



Terminal No.	Connection
1	$U_{d.c.}$ (+supply)
2	No connection
3	$U_{d.c.}$ (-supply)
4	Output signal

ORDER CODE

	1	2	3	4	5	6	7	8	9	10	11	12
O P												

Pos.1 - Shaft Seal Version (see page OR-10)

omit	- Low pressure seal or Seal for "...B" shaft
D	- High pressure seal not for "...B" shaft

Pos.2 - Case Drain

omit	- with drain port
U	- without drain port

Pos.3 - Mounting Flange

omit - Oval mount, two holes

F	- Oval mount, four holes
Q	- Square mount, four bolts
W	- Wheel mount

Pos.4 - Option (needle bearings)

omit - none

N*	- with needle bearings

Pos.5 - Port type

omit - Side ports

E	- Rear ports

Pos.6 - Displacement code

25*	- 25,0 [cm ^{3}/rev]
32*	- 32,0 [cm ^{3}/rev]
40*	- 40,0 [cm ^{3}/rev]
50	- 49,5 [cm ^{3}/rev]
80	- 79,2 [cm ^{3}/rev]
100	- 99,0 [cm ^{3}/rev]
125	- 123,8 [cm ^{3}/rev]
160	- 158,4 [cm ^{3}/rev]
200	- 198,0 [cm ^{3}/rev]
250	- 247,5 [cm ^{3}/rev]
315	- 316,8 [cm ^{3}/rev]
400	- 396,0 [cm ^{3}/rev]
500	- 495,0 [cm ^{3}/rev]
630	- 623,6 [cm ^{3}/rev]

Pos. 7 - Shaft Extensions** (see page OP - 13)

C	- ø25 straight, Parallel key A8x7x32 DIN6885
VC	- ø25 straight, Parallel key A8x7x32 DIN6885 with corrosion resistant bushing
CO	- ø1" straight, Parallel key ¼"x¼"x1¼" BS46
VCO	- ø1" straight, Parallel key ¼"x¼"x1¼" BS46 with corrosion resistant bushing
SH	- ø25,32 splined BS 2059 (SAE 6B)
VSH	- ø25,32 splined BS 2059 (SAE 6B) with corrosion resistant bushing
K	- ø28,56 tapered 1:10, Parallel key B5x5x14 DIN6885
SA	- ø24,5 splined B 25x22 DIN 5482
VSA	- ø24,5 splined B 25x22 DIN 5482 with corrosion resistant bushing
CB	- ø32 straight, Parallel key A10x8x45 DIN6885
KB	- ø35 tapered 1:10, Parallel key B6x6x20 DIN6885
SB	- splined A 25x22 DIN 5482
OB	- ø1¼" tapered1:8, Parallel key 5/16"x 5/16"x1¼" BS46
HB	- ø1¼" splined 14T ANSI B92.1 - 1976

Pos. 8 - Ports

omit - BSPP (ISO 228)

M	- Metric (ISO 262)

Pos. 9 - Special Features (see Specification data on page OP - 05)

omit - none

LL	-Low Leakage
LSV	- Low Speed Valve
FR	- Free Running

Pos.10 - Rotation

omit - Standard Rotation

R	- Reverse Rotation

Pos.11 - Option (Paint)***

omit - no Paint

P	- Painted
PC	- Corrosion Protected Paint

Pos.12 - Speed Monitoring

omit - none

RS-P	- with speed sensor (PNP pull-down resistor)
RS-N	- with speed sensor (NPN pull-up resistor)

NOTES:

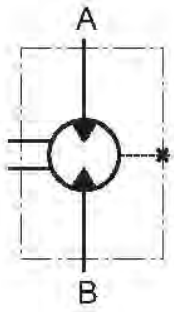
* Only with **"D"** Shaft Seal Versions!

** The permissible output torque for shafts must be not exceeded!
The following combinations are not allowed- **Q, W, N** options with **"...B"** shafts

***Color at customer's request.

The hydraulic motors are mangano-phosphatized as standard.

LOW SPEED HIGH TORQUE MOTORS OP.../NA



INTRODUCTION

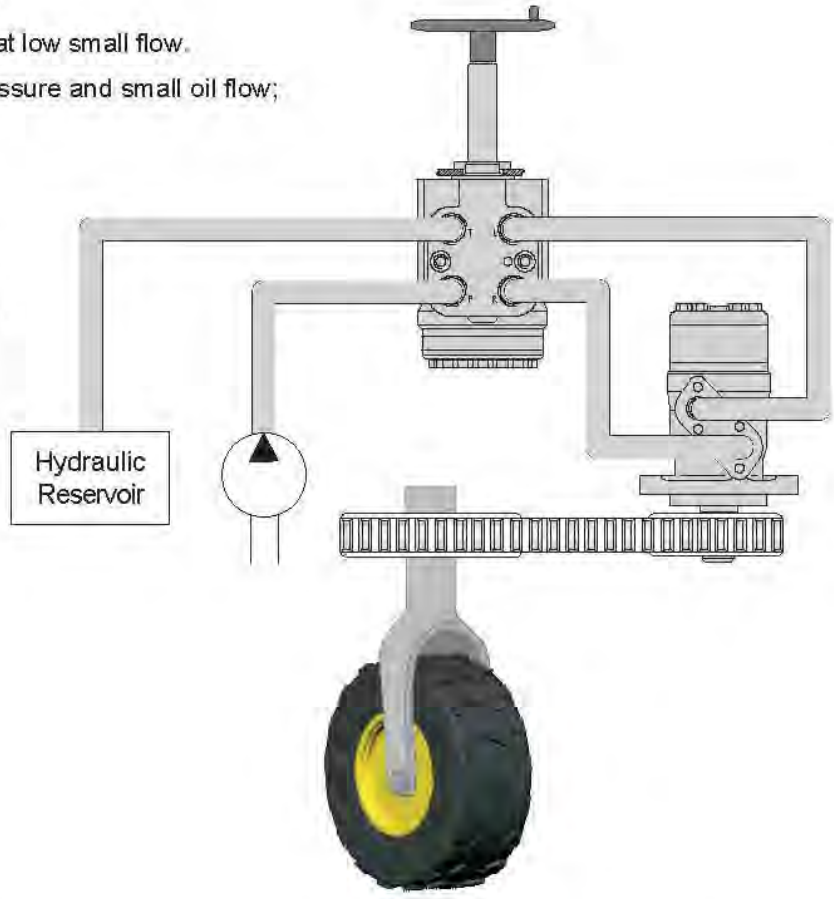
Meta Hydraulic presents the new hydraulic motor OP.../NA, which is modification of the hydraulic motor type OP. Dimension and pressure range are same as OP hydraulic motor.

OP.../NA is suitable for driven mechanism where is demand smooth operation low speed and high pressure. It is designed with separated output shaft and spool valve and can be specified with low internal leakage, thereby:

- Good start-up characteristics;
- Precise control of the Torque at low small flow.
- Smooth operation at high pressure and small oil flow;
- High volumetric efficiency.

APPLICATION

- Actuator motor as driving-motor for steering mechanism of the the three-wheel vehicles;
- For conveyors (series connection);
- Dosing motor etc.



SPECIFICATION DATA

Code	Displa-cement [cm³/rev]	Max. Speed [RPM]	Max. Torque [daNm]		Max. Output [kW]		Max. Pressure Drop [bar]		Max. Oil Flow [lpm]
		cont.	cont.	int*	cont.	int*	cont.	int*	cont.
OP50/NA	49,5	200	9,4	11,9	1,5	2,0	140	175	10
OP80/NA	79,2	200	15,1	19,5	2,5	3,0	140	175	16
OP100/NA	99,0	200	19,3	23,7	4,0	4,5	140	175	20
OP125/NA	123,8	200	23,7	29,8	5,0	5,5	140	175	25
OP160/NA	158,4	200	26,4	37,8	4,5	5,5	120	175	32
OP200/NA	198,0	200	30,0	36,5	5,0	6,5	115	140	40
OP250/NA	247,5	200	33,0	40,5	5,5	6,0	100	125	50
OP315/NA	316,8	190	34,7	40,2	5,5	6,0	85	100	60
OP400/NA	396,0	15	33,5	41,0	4,5	6,0	65	80	60

* Intermittent operation: the permissible values may occur for max. 10% of every minute.

ORDER CODE

	1	2	3	4	5	6
OP						NA

Pos.1 - Displacement code

50	- 49,5 [cm³/rev]
80	- 79,2 [cm³/rev]
100	- 99,0 [cm³/rev]
125	- 123,8 [cm³/rev]
160	- 158,4 [cm³/rev]
200	- 198,0 [cm³/rev]
250	- 247,5 [cm³/rev]
315	- 316,8 [cm³/rev]
400	- 398,0 [cm³/rev]

Pos.2 - Shaft Extensions*

C	- ø25 straight, Parallel key A8x7x32 DIN6885
CO	- ø1" straight, Parallel key ¼"x¼"x1¼" BS46
SH	- ø28,32 splined BS 2059 (SAE 6B)
K	- ø28,56 tapered 1:10, Parallel key, B5x5x14 DIN6885
SA	- ø24,5 splined B25x22h9 DIN 5482

Pos. 3 - Ports

omit	- BSPP (ISO 228)
M	- Metric (ISO 262)

Pos. 4 - Rotation

omit	- Standard Rotation
R	- Reverse Rotation

Pos. 5 - Option (Paint)**

omit	- no Paint
P	- Painted
PC	- Corrosion Protected Paint

Pos. 6 - Design Series

NA	- Low speed, high pressure

NOTES:

* The permissible output torque for shafts must be not exceeded!

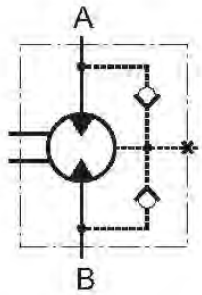
** Color at customer's request.

The hydraulic motors are mangano phosphatized as standard.

LOW SPEED HIGH TORQUE MOTORS OZ

INTRODUCTION

OZ Series have a spool valve: the distribution valve is integrated in the output shaft. The cardan shaft thus rotates the distribution valve and transfers mechanical energy from the gerotor set to the output shaft.

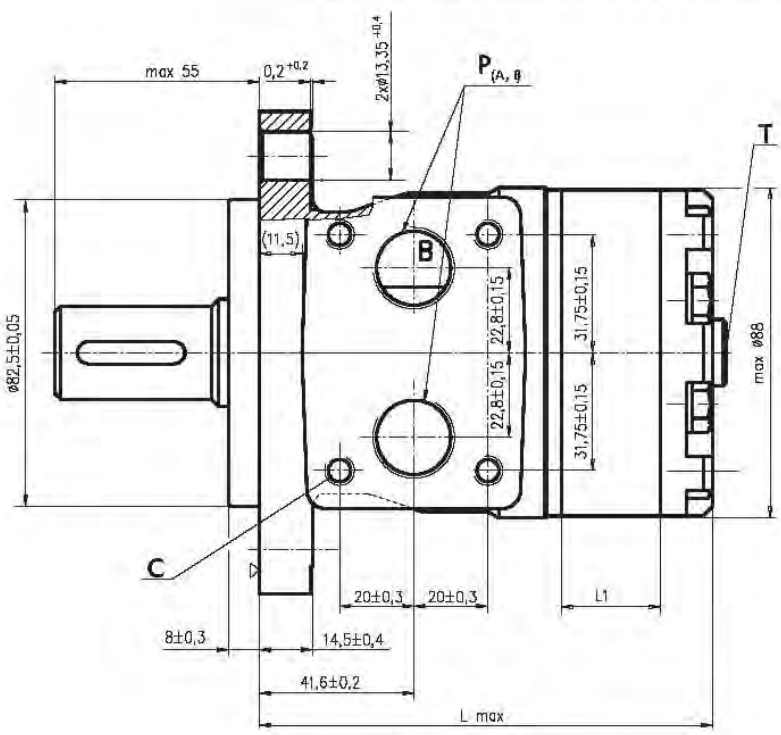


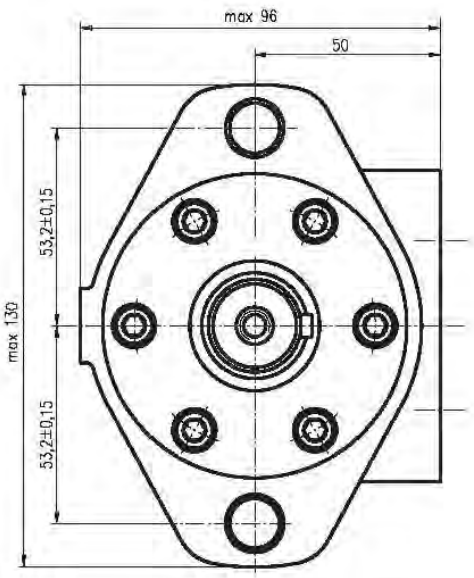
SPECIFICATION DATA

Code	Displa-cement [cm³/rev]	Max. Speed [RPM]	Max. Torque [daNm]		Max. Output [kW]		Max. Pressure Drop [bar]		Max. Oil Flow [lpm]
		cont.	cont.	int*	cont.	int*	cont.	int*	cont.
OZ 50	49,5	808	7	9,2	5,2	8,6	105	140	40
OZ 80	79,2	505	10,8	14,6	5,2	8,6	105	140	40
OZ 100	99	404	14,4	18,3	5,2	8,6	105	140	40
OZ 125	123,8	232	17	22,9	5,2	8,6	105	140	40
OZ 160	158,4	252	22	29,3	5,2	8,6	105	140	40
OZ 200	198	202	27,5	36,6	5,2	8,6	105	140	40
OZ 250	247,5	160	30,1	37,6	4,6	7,0	90	115	40
OZ 315	316,8	126	31,7	44,0	3,4	5,8	70	105	40
OZ 400	369	100	40,8	55,6	3,4	5,8	70	105	40

* Intermittent operation: the permissible values may occur for max. 10% of every minute.

OUTLINE DIMENSIONS REFERENCE





Type	L, mm	L1 ,mm
OZ 50	102,5	6,67
OZ 80	106,5	10,67
OZ 100	109	13,33
OZ 125	112,5	16,67
OZ 160	117	21,33
OZ 200	122,5	26,67
OZ 250	129	33,33
OZ 300	138,5	42,67
OZ 400	149	53,33

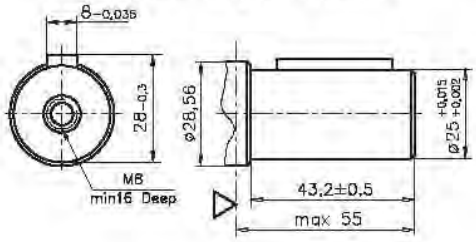
C : 2xM8-13mm depth
$P_{(A, B)}$: 2xG1/2 - 15 mm depth
T : G1/4 - 12 mm depth (plugged)

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

SHAFT EXTENSIONS

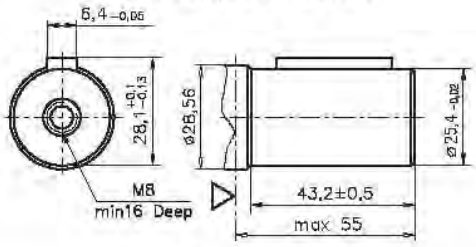
C

ø25 straight, Parallel key A8x7x32 DIN 6885
Max. Torque 44 daNm



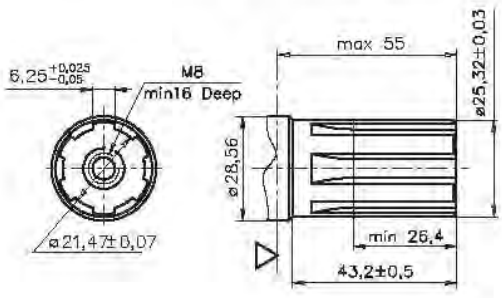
CO

ø25,4 straight, Parallel key 1/4"x1/4"x1 1/4" BS46
Max. Torque 44 daNm



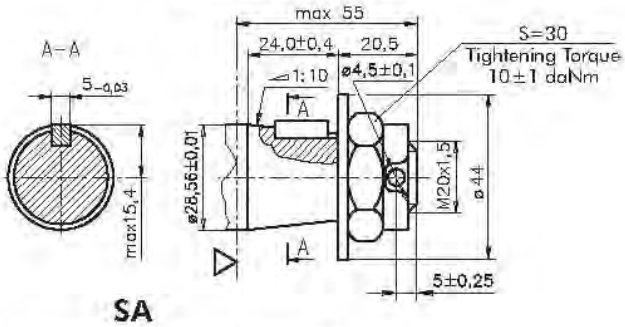
SH

ø28,56 Splined, BS 2059 (SAE 6B)
Max. Torque 44 daNm



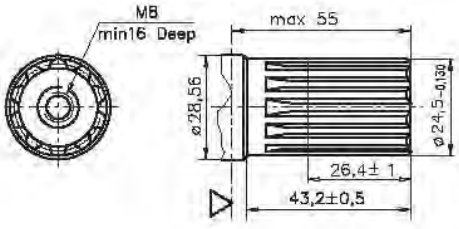
K

ø28,56; Tapered 1:10 Parallel key B5x5x14 DIN 6885
Max. Torque 44 daNm



SA

ø28,56 Splined, B25x22h9 DIN 5482
Max. Torque 44 daNm



▽- Motor Mounting Surface

ORDER CODE

	1	2	3	4	5	6	7
OZ							

Pos. 1 - Displacement

50	- 49,5 [cm³/rev]
80	- 79,2 [cm³/rev]
100	- 99,0 [cm³/rev]
125	- 123,8 [cm³/rev]
160	- 158,4 [cm³/rev]
200	- 198,0 [cm³/rev]
250	- 247,5 [cm³/rev]
315	- 316,8 [cm³/rev]
400	- 398,0 [cm³/rev]

Pos.2 - Shaft Extensions*

C	- ø25 straight, Parallel key A8x7x32 DIN6885
CO	- ø25 straight, Parallel key ¼"x¼"x1¼" BS46
SH	- ø28,56 splined BS 2059 (SAE 6B)
K	- ø28,56 tapered 1:10, Parallel key, B5x5x14 DIN6885
SA	- ø28,56 splined B25x22h9 DIN 5482

Pos. 3 - Ports

omit - BSPP (ISO 228)
M - Metric (ISO 262)

Pos. 4 - Rotation

omit - Standard Rotation
R - Reverse Rotation

Pos. 5 - Option (Paint)**

omit - no Paint
P - Painted Low Gloss Color
PC - Corrosion Protected Paint

Pos. 6 - Special Features

omit - none
FR - Free Running

Pos. 6 - Design Series

omit - Factory specified

NOTES:

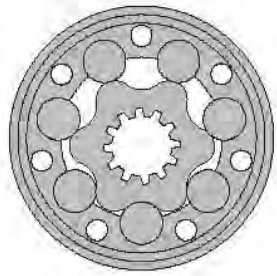
* The permissible output torque for shafts must be not exceeded!

** Color at customer's request.

HYDRAULIC MOTORS OR

APPLICATION

» Conveyors;
» Feeding mechanism of robots and manipulators;
» Metal working machines;
» Textile machines;
» Machines for agriculture;
» Food industries;
» Grass cutting machinery etc.



CONTENTS

Specification data .....OR-02÷05
Function diagrams .....OR-06÷10
Permissible shaft Seal Pressure ... OR-10
Dimensions and mounting OR-11
Wheel motor OR-12
Shaft versions OR-13
Permissible shaft loads OR-14
Order code OR-17

OPTIONS

» Model- Spool valve, roll-gerotor;
» Flange and wheel mount;
» Motor with needle bearing;
» Side and rear ports;
» Shafts- straight, splined and tapered;
» Shaft seal for high and low pressure;
» Metric and BSPP ports;
» Other special features.

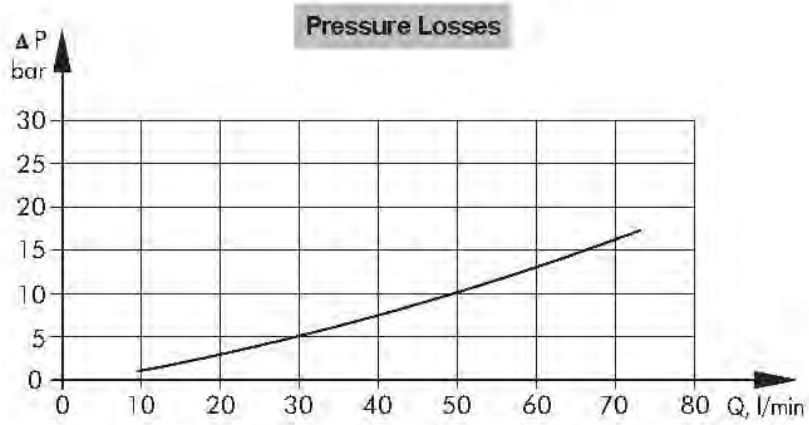
GENERAL

Displacement, [cm^3/rev.]	51,5÷397
Max. Speed, [RPM]	775÷150
Max. Torque, [daNm]	10,1÷61
Max. Output, [kW]	5÷13
Max. Pressure Drop, [bar]	175÷70
Max. Oil Flow, [l/min]	40÷60
Min. Speed, [RPM]	10
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, [°C]	-30÷90
Optimal Viscosity range, [mm^2/s]	20÷75
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 micron)

Oil flow in drain line

Pressure drop (bar)	Viscosity (mm^2/s)	Oil flow in drain line (l/min)
100	20	2,5
	35	1,8
140	20	3,5
	35	2,8

Pressure Losses



SPECIFICATION DATA

Type		OR 50	ORW 50 OR 50...B	OR 80	ORW 80 OR 80...B	OR 100	ORW 100 OR 100...B
Displacement, [cm³/u]		51,5	51,5	80,3	80,3	99,8	99,8
Max. Speed, [RPM]	cont.	775	775	750	750	600	600
	int.*	970	970	940	940	750	750
Max. Torque [daNm]	cont.	10,1	10,1	19,5	19,5	24	24
	int.*	13	13	22	22	28	28
	peak**	17	17	27	27	32	32
Max. Output, [kW]	cont.	7	7	12,5	12,5	13	13
	int.*	8,5	8,5	15	15	15	15
Max. Pressure Drop [bar]	cont.	140	140	175	175	175	175
	int.*	175	175	200	200	200	200
	peak**	225	225	225	225	225	225
Max. Oil Flow [l/min]	cont.	40	40	60	60	60	60
	int.*	50	50	75	75	75	75
Max. Inlet Pressure [bar]	cont.	175	175	175	175	175	175
	int.*	200	200	200	200	200	200
	peak**	225	225	225	225	225	225
Max. Return Pressure w/o Drain Line or max. Pressure in Drain Line, [bar]	cont.0-100 RPM	150	100	150	100	150	100
	cont.100-300 RPM	75	30	75	30	75	30
	cont.300-600 RPM	50	15	50	15	50	15
	cont.>600 RPM	20	-	20	-	20	-
	int.* 0-max. RPM	150	100	150	100	150	100
Max. Return Pressure with Drain Line [bar]	cont.	175	175	175	175	175	175
	int.*	200	200	200	200	200	200
	peak**	225	225	225	225	225	225
Max. Starting Pressure with Unloaded Shaft, [bar]		10	10	10	10	10	10
Min. Starting Torque [daNm]	at max. press. drop cont.	8	8	15	15	20	20
	at max. press. drop int.*	10	10	17	17	23	23
Min. Speed*, [RPM]**		10	10	10	10	10	10
Weight, avg., [kg]	OR(F)	6,8	6,9	6,9	7,0	7,2	7,3
	ORW	-	10,4	-	10,5	-	10,6
	ORQ	6,2		6,3		6,6	

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% for every minute.
*** For speeds of 10 RPM or lower, consult factory or your regional manager.
1. Intermittent speed and intermittent pressure drop must not occur simultaneously!
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommended using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm²/s at operating temperatures.
5. Recommended maximum system operating temperature - 82°C.
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 min.

SPECIFICATION DATA (continued)

Type		OR 125	ORW 100 OR 100...B	OR 160	ORW 160 OR 160...B	OR 200	ORW 200 OR 200...B
Displacement, [cm³/u]		125,7	125,7	159,6	159,6	199,8	199,8
Max. Speed, [RPM]	cont.	475	475	375	375	300	300
	int.*	600	600	470	470	375	375
Max. Torque [daNm]	cont.	30	30	39	39	38,5	45
	int.*	34	34	43	43	46	50
	peak**	37	37	46	46	56	56
Max. Output, [kW]	cont.	12,5	12,5	11,5	11,5	9	11
	int.*	14,5	14,5	14	14	11,5	13
Max. Pressure Drop [bar]	cont.	175	175	175	175	140	175
	int.*	200	200	200	200	175	200
	peak**	225	225	225	225	225	225
Max. Oil Flow [l/min]	cont.	60	60	60	60	60	60
	int.*	75	75	75	75	75	75
Max. Inlet Pressure [bar]	cont.	175	175	175	175	175	175
	int.*	200	200	200	200	200	200
	peak**	225	225	225	225	225	225
Max. Return Pressure w/o Drain Line or max. Pressure in Drain Line, [bar]	cont.0-100 RPM	150	100	150	100	150	100
	cont.100-300 RPM	75	30	75	30	75	30
	cont.300-600 RPM	50	15	50	15	50	15
	cont.>600 RPM	-	-	-	-	-	-
	int.* 0-max. RPM	150	100	150	100	150	100
Max. Return Pressure with Drain Line [bar]	cont.	175	175	175	175	175	175
	int.*	200	200	200	200	200	200
	peak**	225	225	225	225	225	225
Max. Starting Pressure with Unloaded Shaft, [bar]		9	9	7	7	5	5
Min. Starting Torque [daNm]	at max. press. drop cont.	25	25	32	32	33	41
	at max. press. drop int.*	28	28	37	37	40	46
Min. Speed*, [RPM]**		10	10	10	10	10	10
Weight, avg., [kg]	**OR(F)**	7,3	7,4	7,5	7,6	8	8,1
	ORW	-	10,8	-	11,1	-	11,6
	ORQ	6,8		7,6		7,2	

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% for every minute.
*** For speeds of 10 RPM or lower, consult factory or your regional manager.

1. Intermittent speed and intermittent pressure drop must not occur simultaneously!
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommended using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm²/s at operating temperatures.
5. Recommended maximum system operating temperature - 82°C.
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 min.

SPECIFICATION DATA (continued)

Type		OR 250	ORW 250 OR 250...B	OR 315	ORW 315 OR 315...B	OR 400	ORW 400 OR 400...B
Displacement, [cm³/u]		250,1	250,1	315,7	315,7	397	397
Max. Speed, [RPM]	cont.	240	240	190	190	150	150
	int.*	300	300	240	240	190	190
Max. Torque [daNm]	cont.	39	54	39	55	38	61
	int.*	58	61	57	63	60	69
	peak**	71	71	83	83	87	87
Max. Output, [kW]	cont.	6,5	10	6	9	4,8	7,8
	int.*	10,5	12	9,6	11	8,8	10,6
Max. Pressure Drop [bar]	cont.	110	175	90	135	70	115
	int.*	175	200	140	160	115	140
	peak**	225	225	210	210	175	175
Max. Oil Flow [l/min]	cont.	60	60	60	60	60	60
	int.*	75	75	75	75	75	75
Max. Inlet Pressure [bar]	cont.	175	175	175	175	175	175
	int.*	200	200	200	200	200	200
	peak**	225	225	225	225	225	225
Max. Return Pressure w/o Drain Line or max. Pressure in Drain Line, [bar]	cont.0-100 RPM	150	100	150	100	150	100
	cont.100-300 RPM	75	30	75	30	75	30
	cont.300-600 RPM	-	-	-	-	-	-
	int.* 0-max. RPM	150	100	150	100	150	100
Max. Return Pressure with Drain Line [bar]	cont.	175	175	175	175	175	175
	int.*	200	200	200	200	200	200
	peak**	225	225	225	225	225	225
Max. Starting Pressure with Unloaded Shaft, [bar]		4	4	3	3	3	3
Min. Starting Torque [daNm]	at max. press. drop cont.	31	50	33	50	30	49
	at max. press. drop int.*	48	55	58	66	50	61
Min. Speed*, [RPM]**		10	10	10	10	10	10
Weight, avg., [kg]	**OR(F)**	8,4	8,5	9,1	9,2	9,8	9,9
	ORW	-	12,1	-	12,6	-	13,3
	ORQ	7,8		8,6		9,3	

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% for every minute.
*** For speeds of 10 RPM or lower, consult factory or your regional manager.

1. Intermittent speed and intermittent pressure drop must not occur simultaneously!
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommended using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm²/s at operating temperatures.
5. Recommended maximum system operating temperature - 82°C.
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 min.

SPECIFICATION DATA for OR...LSV

Low Speed Valve (LSV) "LSV" Series hydraulic motors have been designed to operate with normal pressure drop and to ensure smooth run at low speed (up to 200 RPM), as the best security for operation is guaranteed at frequency of rotation 20 ÷ 50 RPM . They have an increased starting pressure drop and are not recommended for using at pressure less than 40 bar.
Look at specification data for hydraulic motors standard version. The modification concerns only the following parameters: maximum speed , maximum output,maximum Oil flow and maximum starting pressure.

Type		OR 50	OR 80	OR 100	OR 125	OR 160	OR 200	OR 250	OR 315	OR 400
Max. Speed	Cont.	200	200	200	200	200	200	160	126	100
[RPM]	Int.*	250	250	250	250	250	250	200	158	126
Max. Output	Cont.	2	4,0	5,0	6,2	7,0	6,8	6,2	5,8	5,2
[kW]	Int.*	3	5,7	7,3	8,5	8,8	8,3	7,8	7,6	6,8
Max. Oil Flow	Cont.	13	23	26	33	40	40	40	40	40
[lpm]	Int.*	16	31	34	45	50	50	50	50	50
Max. Starting Pressure with unloaded Shaft, [bar]		20	20	20	20	15	15	15	12	12

SPECIFICATION DATA for OR...LL

Low Leakage (LL) "LL" Series hydraulic motors have been designed to operate at the whole standard range of working conditions (pressure drop and frequency of rotation) , but with considerable decreased volumetric losses in the drainage ports. Their main purposeis to operateas series-connected motors in hydraulic systems.

For this version is permissible decreasing of the maximal torque with up to 5% (at middle speed) and up to 10% (at high speed) in comparison to the standard versions of motors.

Look at specification data for hydraulic motors series OR standard version. The modification concerns only the parameters: maximum torque,maximum output, minimum starting torque.

Type		OR 50	OR 80	OR 100	OR 125	OR 160	OR 200	OR 250	OR 315	OR 400
Max. Torque	Cont.	9,6	18,5	22,8	28,5	37,1	42,8	51,3	52,2	58,0
[daNm]	Int.*	12,4	20,9	26,6	32,3	40,9	47,5	58,0	60,0	65,6
Max. Output	Cont.	9,0	12,3	12,8	12,4	11,4	10,9	9,9	8,9	7,7
[kW]	Int.*	11,9	14,8	14,8	14,3	13,8	12,8	11,8	10,9	10,5
Max. Pressure Drop	Cont.	140	175	175	175	175	175	175	135	115
[bar]	Int.*	175	200	200	200	200	200	200	160	140
Min. Starting Torque	Cont.	7,6	14,2	19,0	23,8	30,4	39,0	47,5	47,5	46,5
[daNm]	Int.*	9,5	16,2	21,8	26,6	35,2	43,7	52,2	62,7	58,0

SPECIFICATION DATA for OR...FR

Free Running version "FR" these are the hydraulic motors with reduced mechanical losses , for wich at disengaged condition / unconnected with driving mechanism / the rotation of the shaft could be realized by means of small torque. This advantage is especially useful at operating with high frequencies of rotation /over than 300 min^{-1} / and low pressure drop , which is inbred for types with displacements of up to 200 cm^3. It is normal for these for the different condition of operation to have high torque , as well as high volume losses: the values of the volumetric efficiency are lower (up to 5 % for middle and up to 10% for high values of the pressure drop) , than these of the normal versions. That's why the recommended operatingfor "FR version is for applications with pressure dropup to 100 bar.

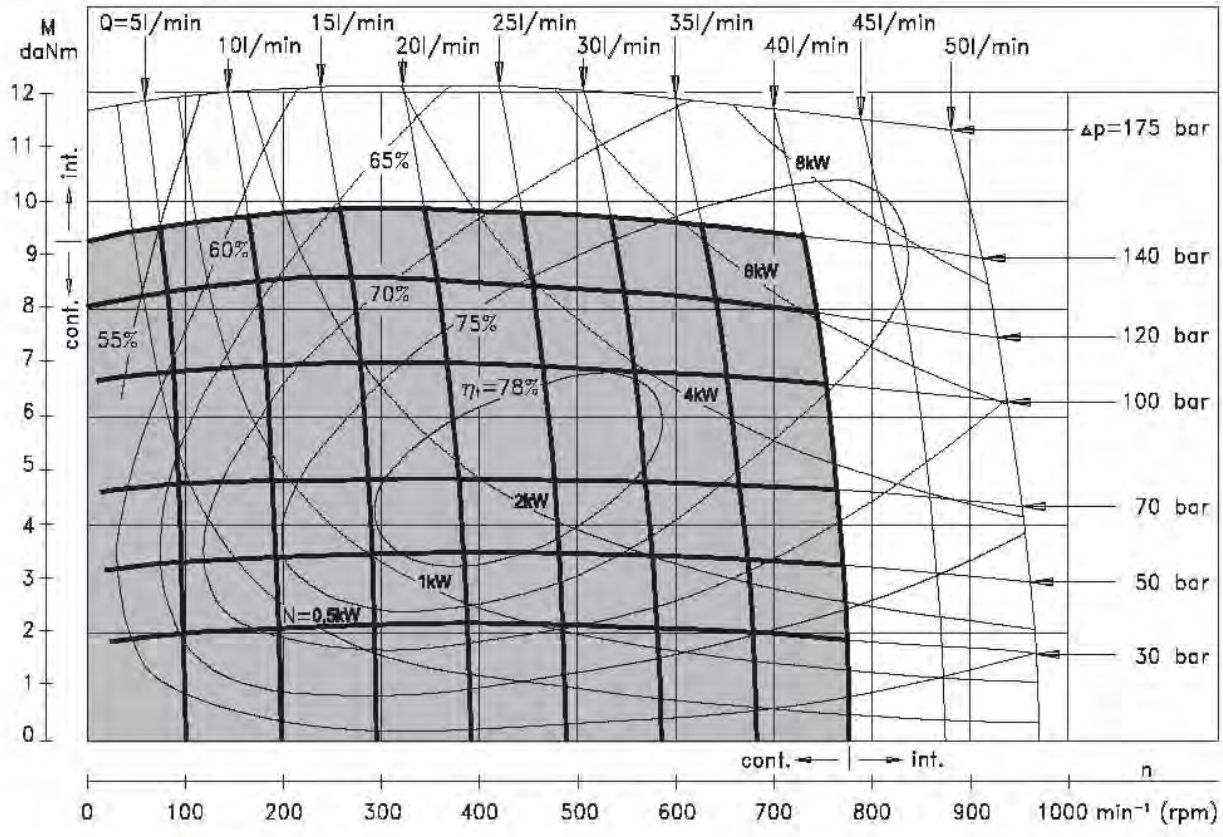
Additional advantages of "FR" version are prolonging of the life of the hydraulic motors at high frequencies of rotation, as well as the possibility to use them in systems with big variation of the loading.

Look at specification data for hydraulic motors series OR standard version. Only the parameter Starting Pressure is modified.

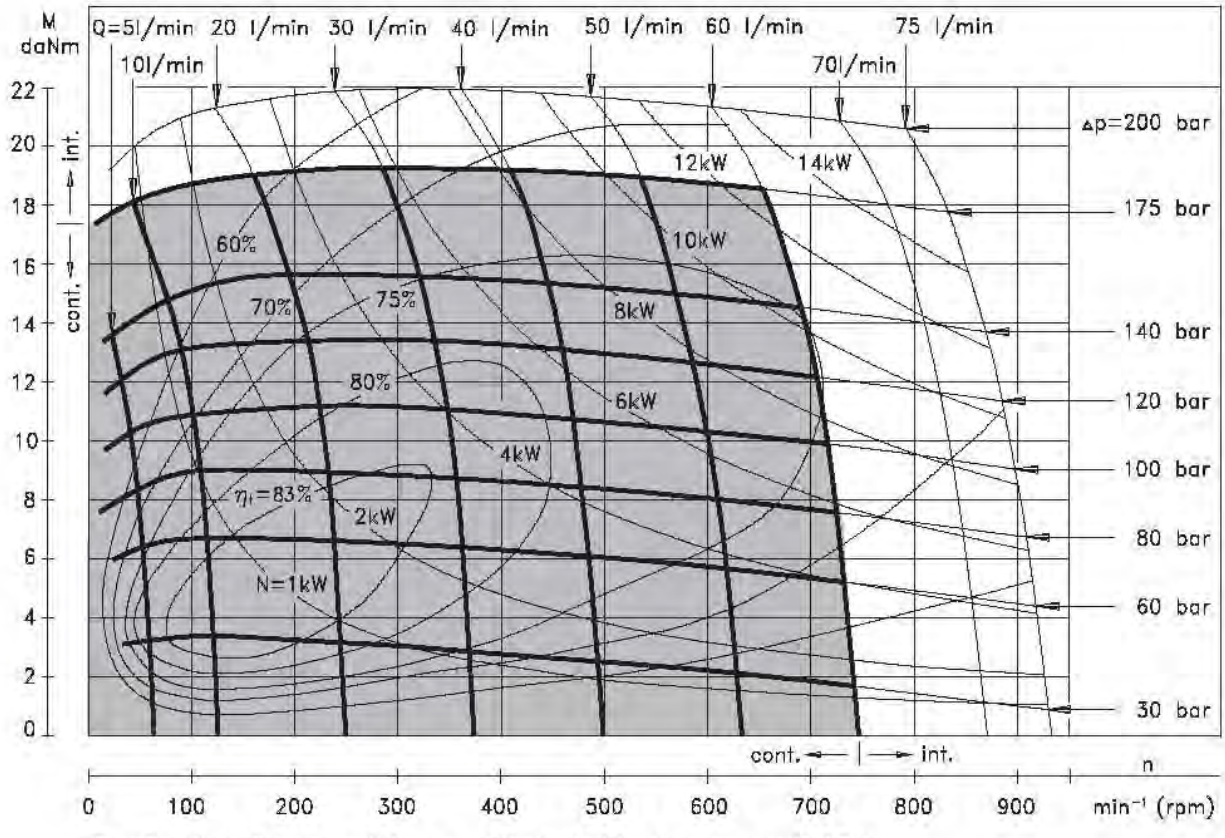
Type	OR 50	OR 80	OR 100	OR 125	OR 160	OR 200
Max. Starting Pressure with Unloaded Shaft, [bar]	8	8	8	7,5	5,5	4

FUNCTION DIAGRAMS

OR 50



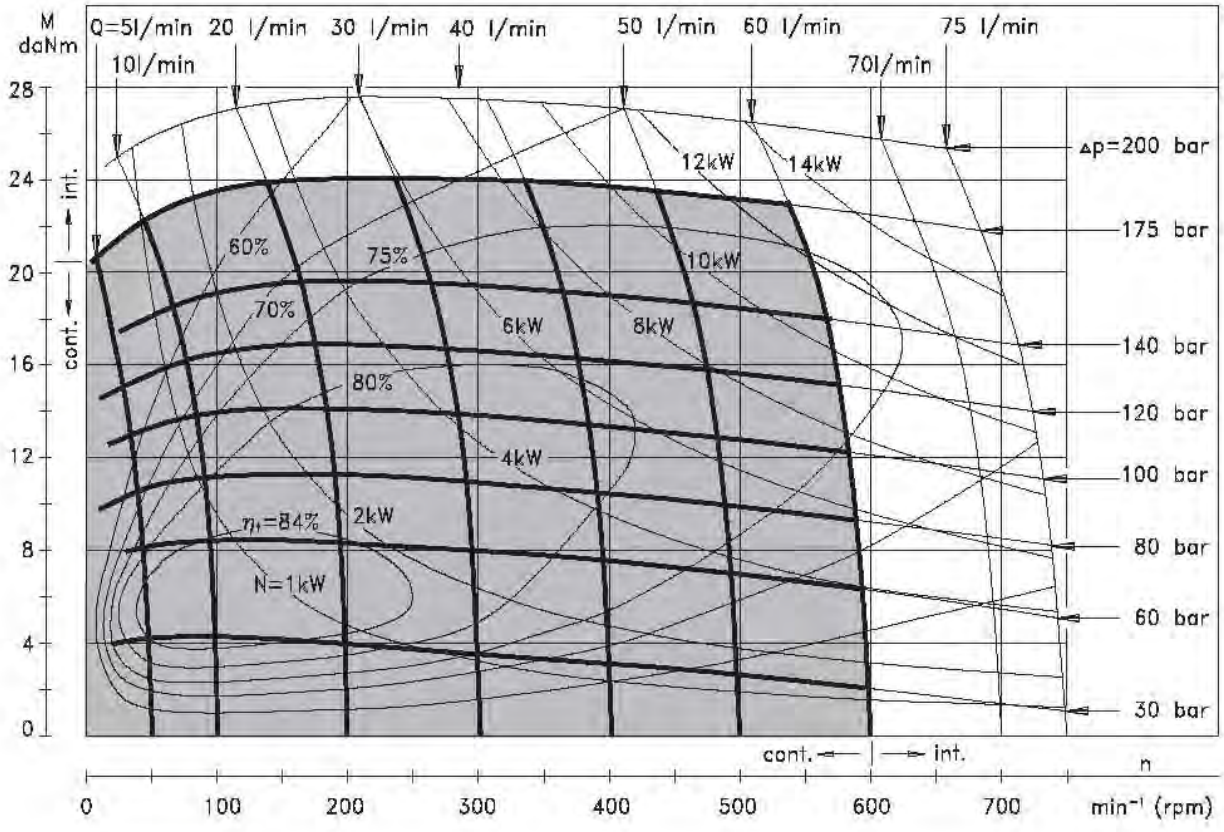
OR 80



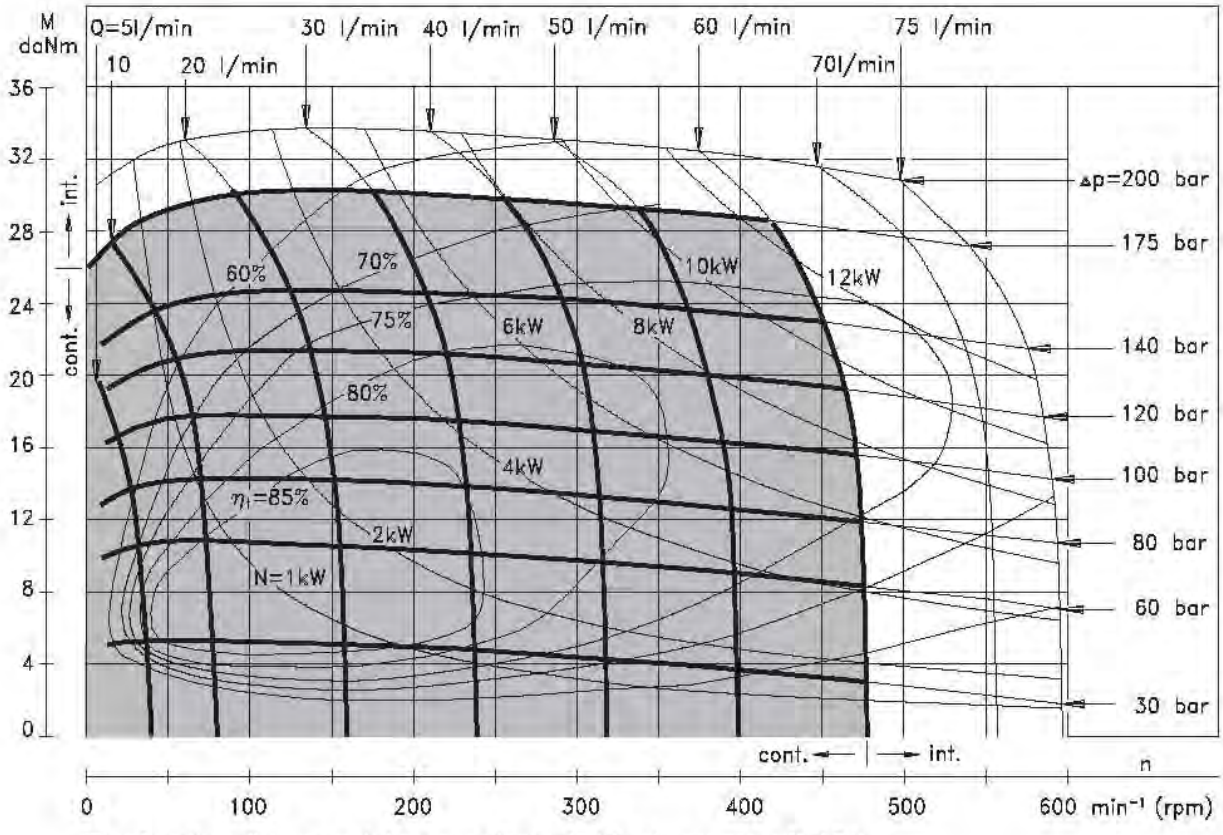
The function diagrams data was collected at back pressure 5÷10 bar
and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAMS

OR 100



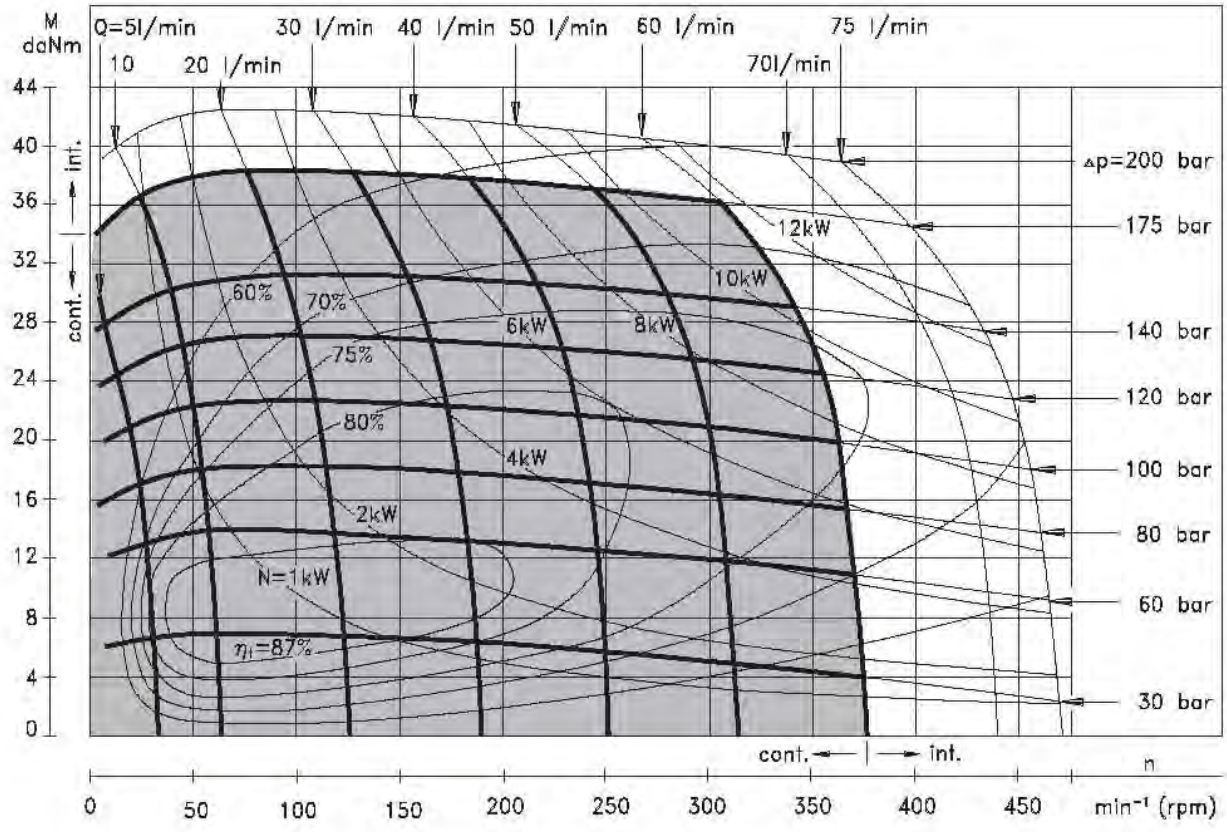
OR 125



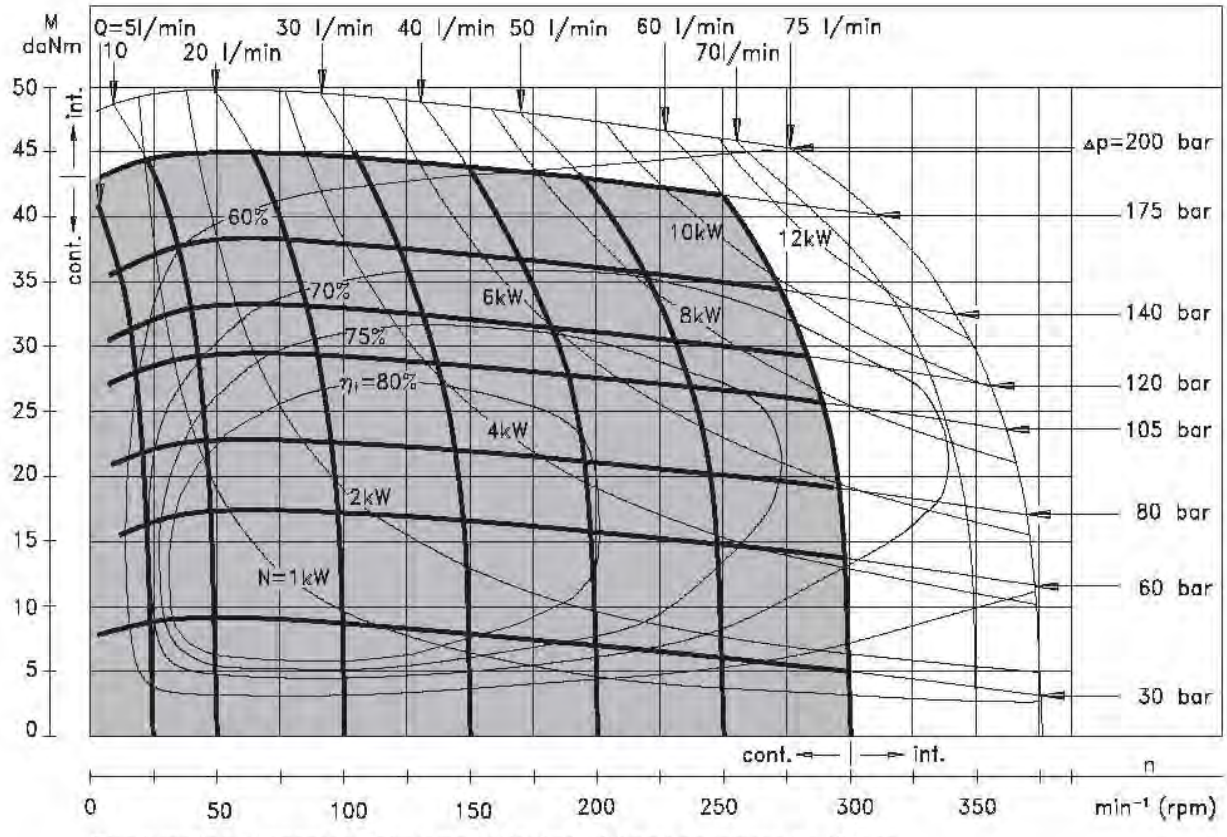
The function diagrams data was collected at back pressure 5÷10 bar and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAMS

OR 160



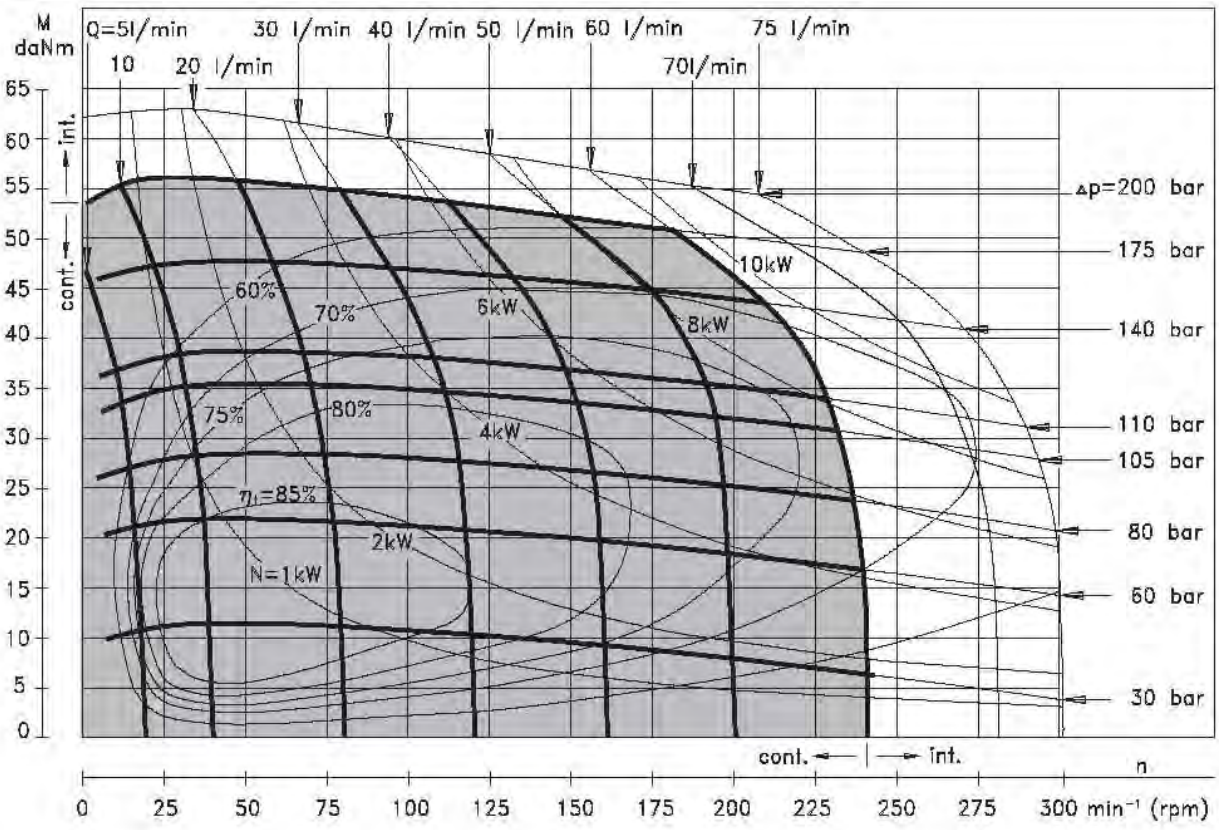
OR 200



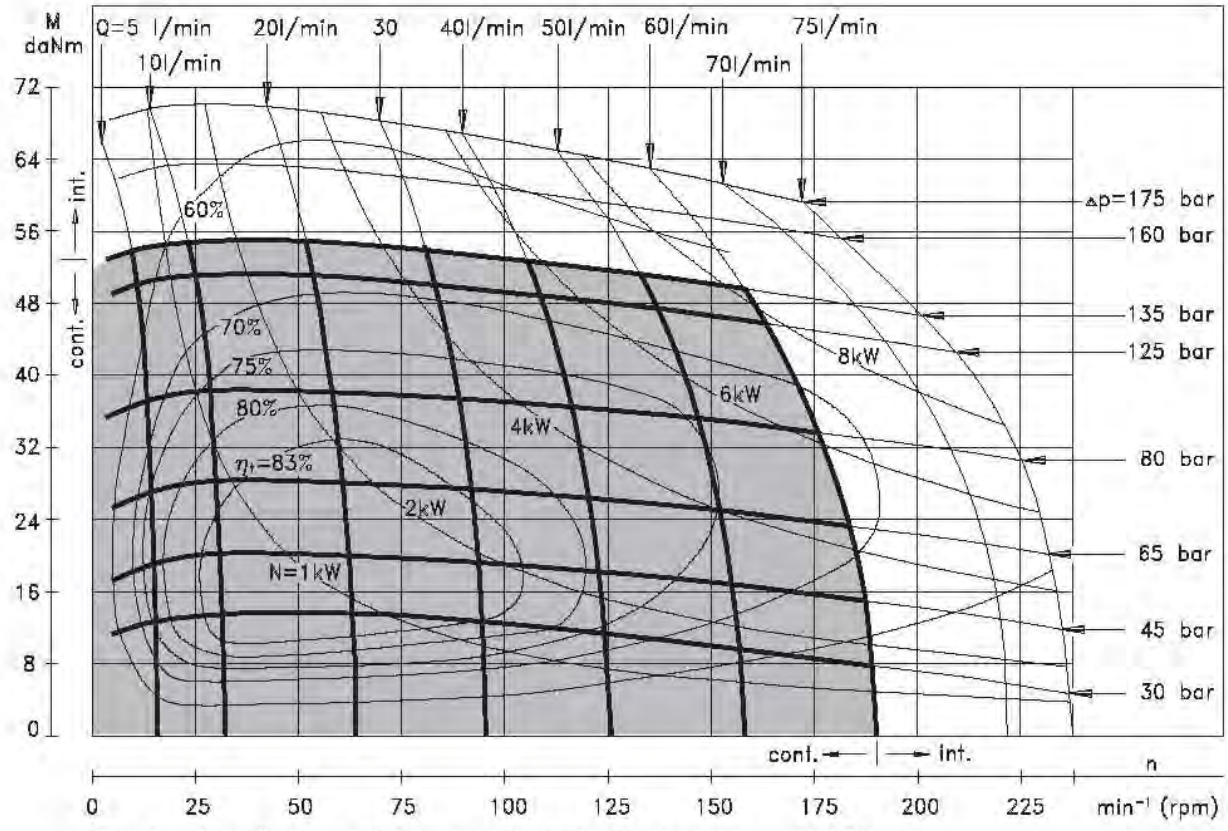
The function diagrams data was collected at back pressure 5÷10 bar and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAMS

OR 250



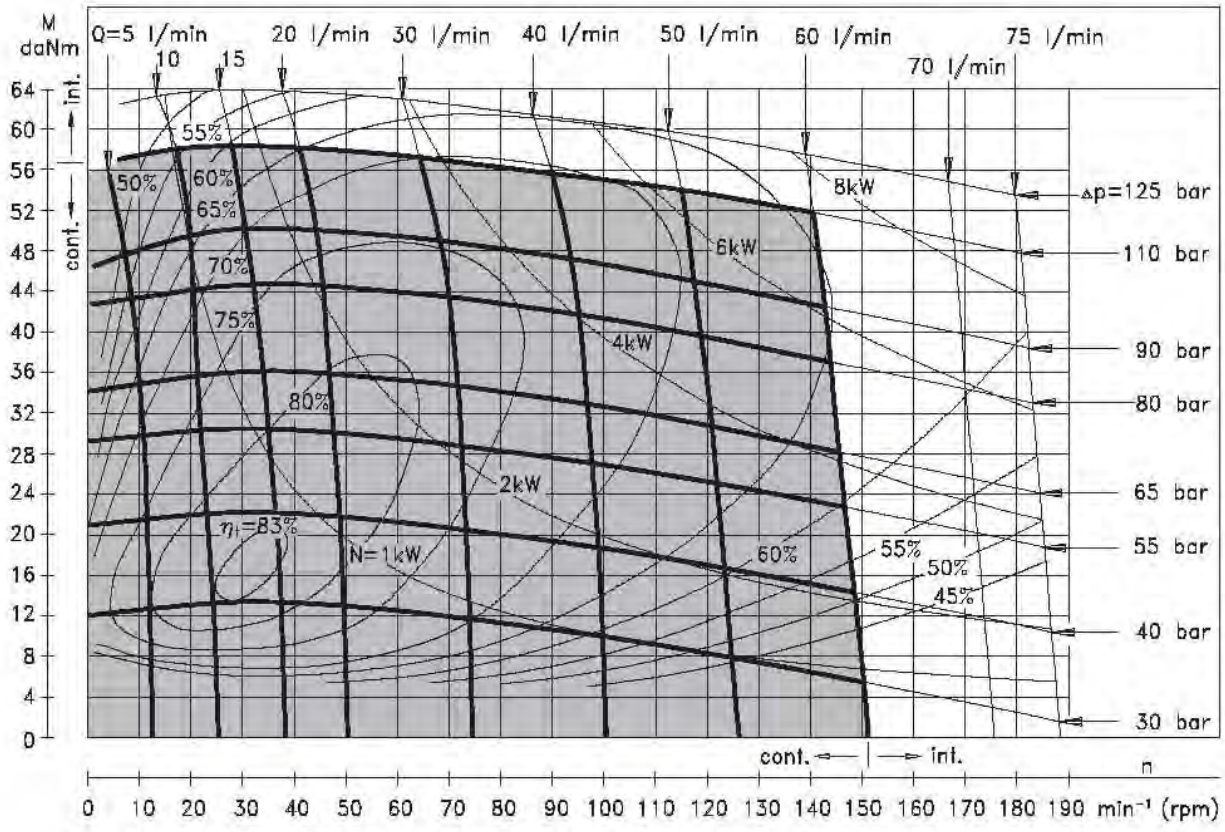
OR 315



The function diagrams data was collected at back pressure 5÷10 bar
and oil with viscosity of 32 mm²/s at 50° C.

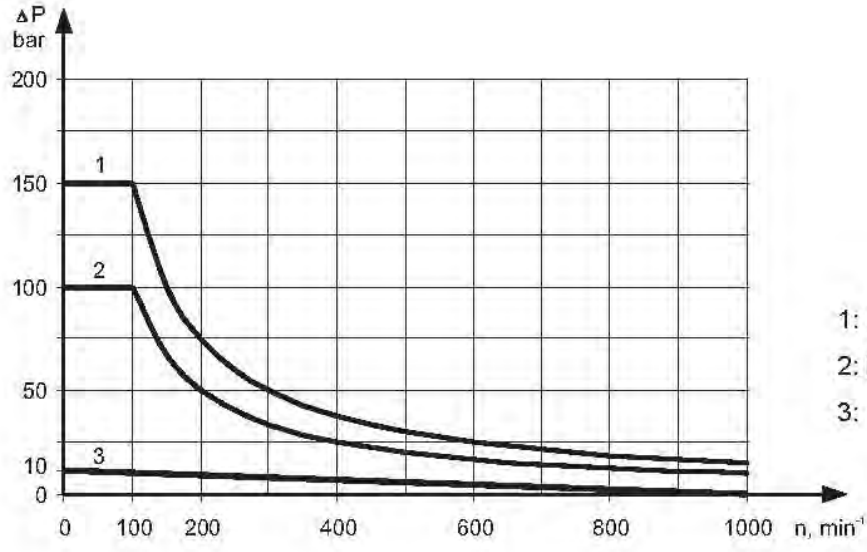
FUNCTION DIAGRAM

OR 400



The function diagram data was collected at back pressure 5÷10 bar and oil with viscosity of 32 mm²/s at 50° C.

Max. Permissible Shaft Seal Pressure for OP and OR Motors

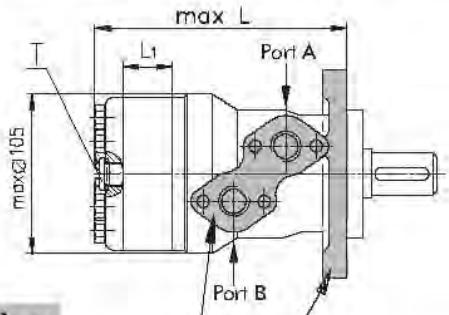


1: Drawing for "**D**" Seal

2: Drawing for "...**B**" Shaft Seal

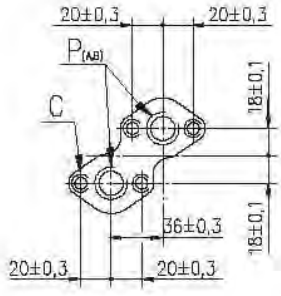
3: Drawing for Quadring

DIMENSIONS AND MOUNTING DATA

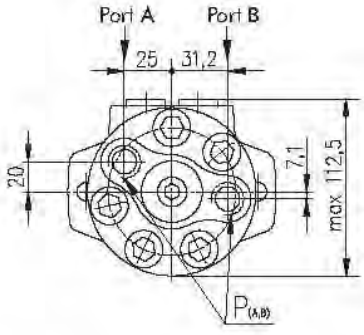


Porting

Side Ports

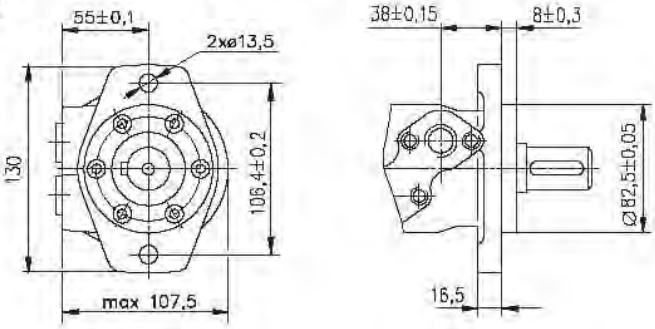


E Rear Ports

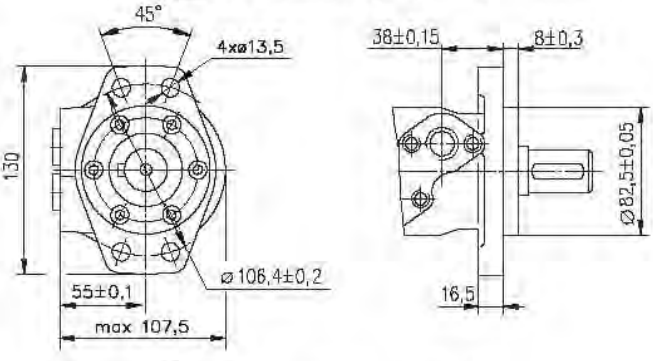


Mounting

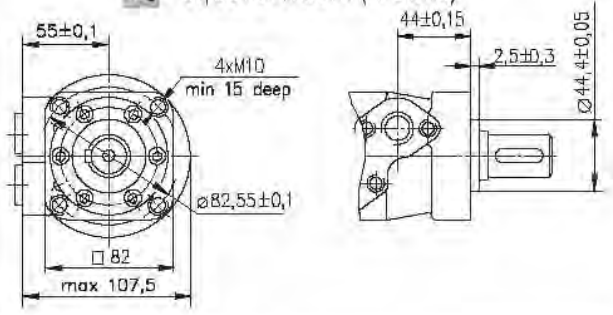
Oval Mount (2 Holes)



F - Oval Mount (4 Holes)



Q - Square Mount (4 Bolts)



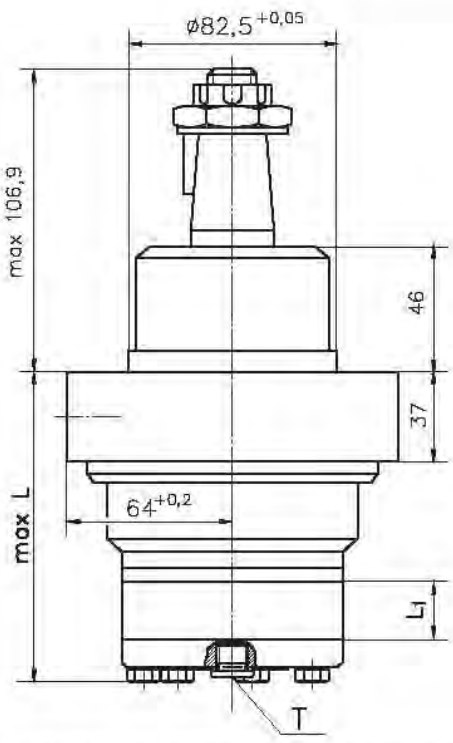
C : 4xM8 - 13 mm depth
P$_{(A,B)}$:2xG1/2 or 2xM22x1,5 - 15 mm depth
T : G1/4 or M14x1,5 - 12 mm depth (plugged)

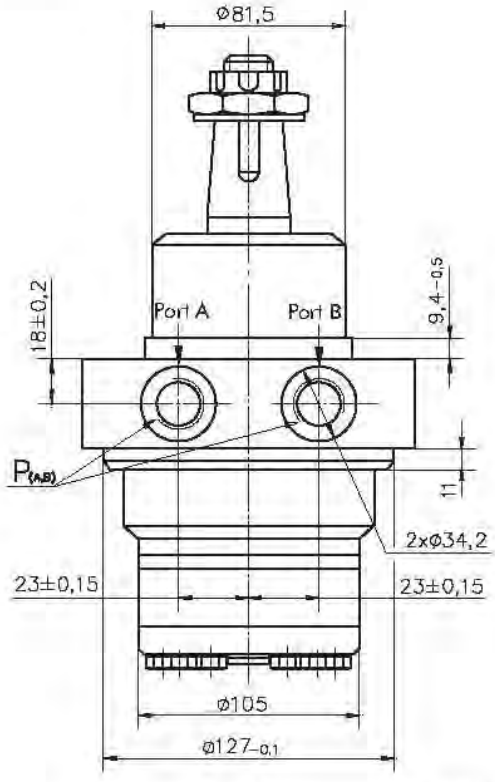
Standard Rotation	Reverse Rotation
Viewed from Shaft End	Viewed from Shaft End
Port **A** Pressurized - **CW**	Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CCW**	Port **B** Pressurized - **CW**

Type	L,mm	Type	L,mm	Type	L,mm	Type	L,mm	L_{1}, mm
ORF 50	138,0	**ORQ 50**	143,5	**ORFE 50**	157,5	**ORQE 50**	163,5	9,0
ORF 80	143,0	**ORQ 80**	148,5	**ORFE 80**	162,5	**ORQE 80**	168,5	14,0
ORF 100	146,0	**ORQ 100**	152,0	**ORFE 100**	165,5	**ORQE 100**	171,5	17,4
ORF 125	150,5	**ORQ 125**	156,5	**ORFE 125**	170,0	**ORQE 125**	176,0	21,8
ORF 160	156,5	**ORQ 160**	162,5	**ORFE 160**	176,0	**ORQE 160**	182,0	27,8
ORF 200	163,5	**ORQ 200**	169,5	**ORFE 200**	183,0	**ORQE 200**	189,0	34,8
ORF 250	172,0	**ORQ 250**	179,0	**ORFE 250**	192,0	**ORQE 250**	198,0	43,5
ORF 315	183,0	**ORQ 315**	189,0	**ORFE 315**	204,0	**ORQE 315**	210,0	54,8
ORF 400	198,0	**ORQ 400**	204,0	**ORFE 400**	218,0	**ORQE 400**	224,0	69,4

DIMENSIONS AND MOUNTING DATA - ORW

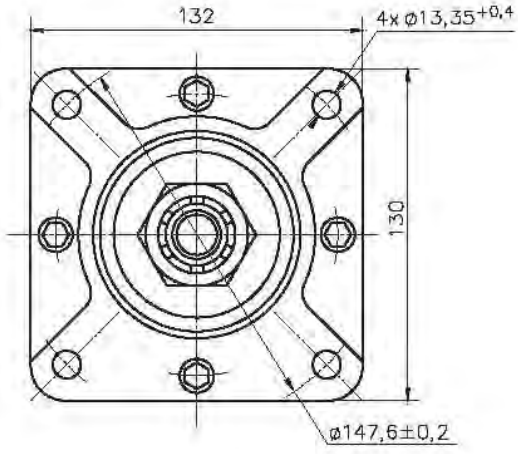
W Wheel Mount



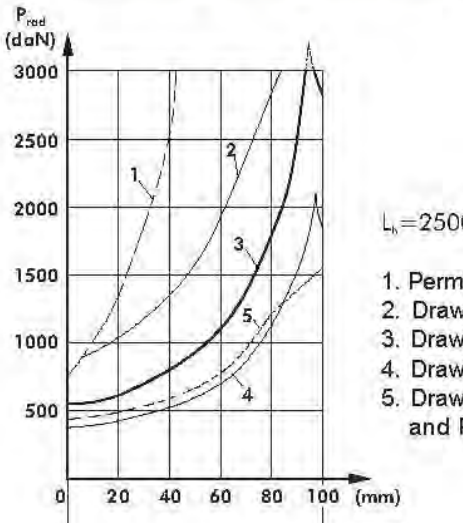


$P_{(A,B)}$: 2xG1/2 or 2xM22x1,5 - 15 mm depth
T : G1/4 or M14x1,5 - 12 mm depth (plugged)

Standard Rotation	**Reverse Rotation**
Viewed from Shaft End	Viewed from Shaft End
Port **A** Pressurized - **CW**	Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CCW**	Port **B** Pressurized - **CW**

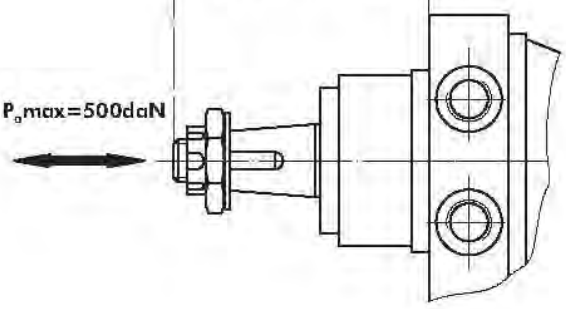


Permissible Shaft Loads ORW



L_h=2500 h

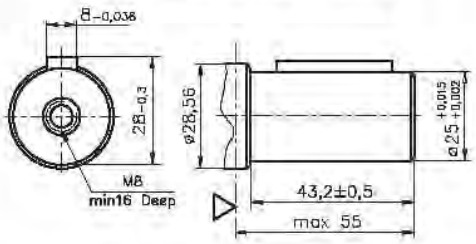
1. Permissible radial shaft load
2. Drawing by n= 50 min^{-1}
3. Drawing by n=200 min^{-1}
4. Drawing by n=800 min^{-1}
5. Drawing by n=200 min^{-1} and P_a max=500 daN



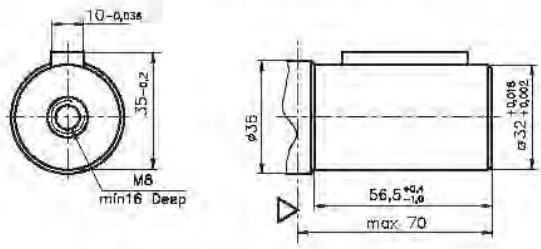
Type	L_1 mm	L_{11} mm
ORW 50	108,0	9,0
ORW 80	113,0	14,0
ORW 100	116,5	17,4
ORW 125	121,0	21,8
ORW 160	127,0	27,8
ORW 200	134,0	34,8
ORW 250	142,5	43,5
ORW 315	154,0	54,8
ORW 400	168,5	69,4

SHAFT EXTENSIONS FOR OP AND OR MOTORS

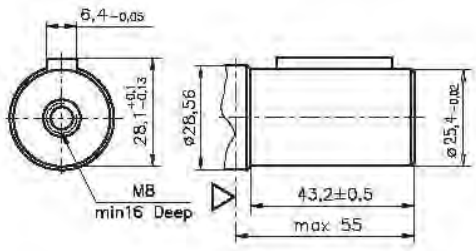
C - ø25 straight, Parallel key A8x7x32 DIN 6885
Max. Torque 44 daNm



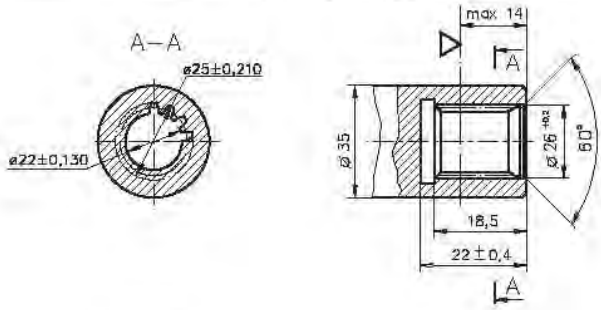
CB - ø32 straight, Parallel key A10x8x45 DIN 6885
Max. Torque 77 daNm



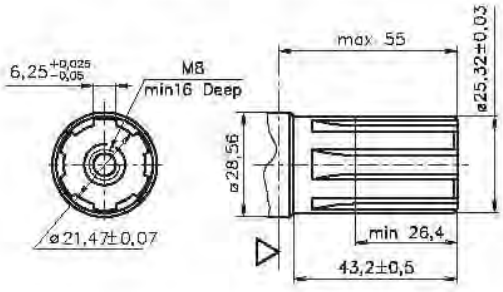
CO - ø1" straight, Parallel key ¼"x¼"x1¼" BS46
Max. Torque 44 daNm



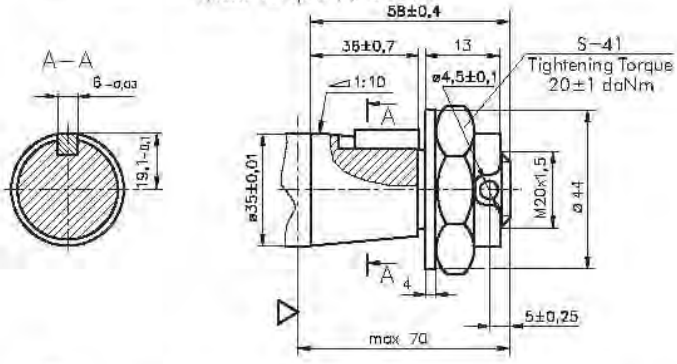
SB - splined A25x22xH10 DIN 5482
Max. Torque 44 daNm



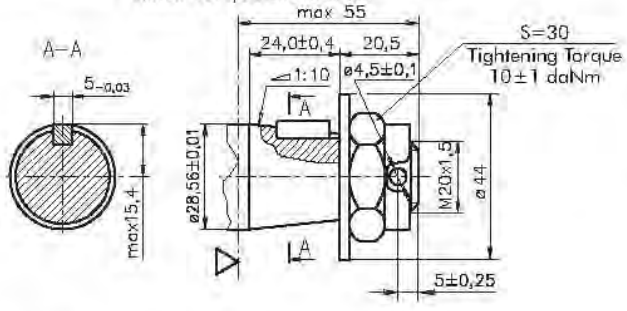
SH - splined, BS 2059 (SAE 6B)
Max. Torque 44 daNm



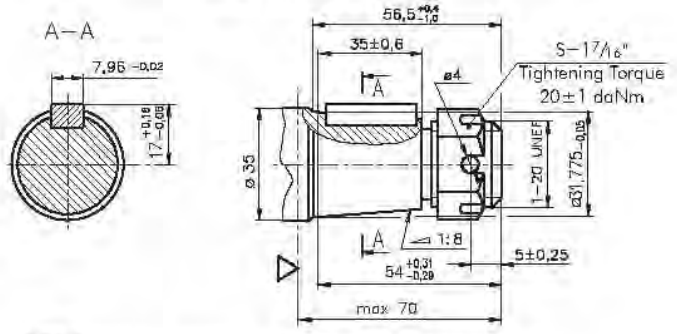
KB - tapered 1:10, Parallel key B6x6x20 DIN 6885
Max. Torque 77 daNm



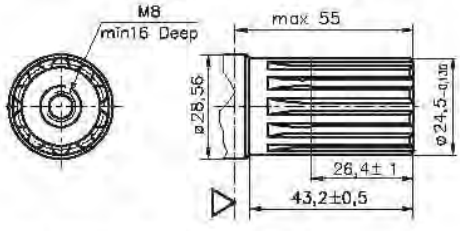
K - tapered 1:10, Parallel key B5x5x14 DIN 6885
Max. Torque 40 daNm



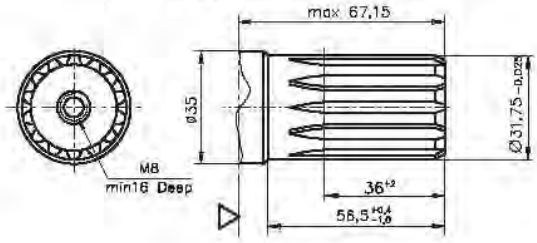
OB - tapered 1:8 SAEJ 501, Parallel key 5/16"x5/16"x1¼" BS46
Max. Torque 77 daNm



SA - splined, B25x22h9 DIN 5482
Max. Torque 40 daNm



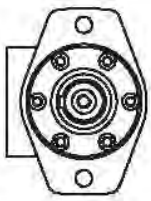
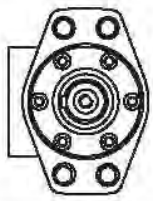
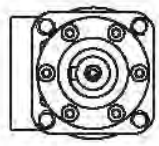
HB - ø1¼" splined 14T, ANSI B92.1-1976 Norm
Max. Torque 77 daNm



∇- Motor Mounting Surface

PERMISSIBLE SHAFT LOADS FOR OR MOTORS

The permissible radial shaft load P_{rad} depends on the speed (RPM) and distance (L) from the point of load to the mounting flange.

Mounting Flange			
Shaft Version	cylindrical - C, CO tapered - K, splined - SH	splined - HB cylindrical - CB	cylindrical - C, CO
Radial Shaft Load P^{*}_{rad}	$\frac{800}{n} \times \frac{25000}{95+L}$, daN	$\frac{800}{n} \times \frac{18750}{95+L}$, daN	$\frac{800}{n} \times \frac{25000}{101+L}$, daN

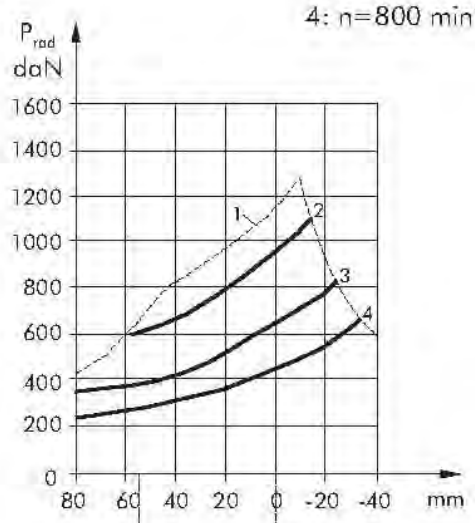
$n<200\ min^{-1}$; max P_{rad} =800 daN

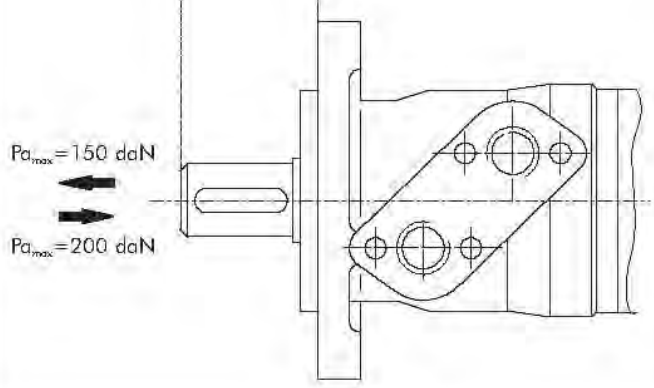
*$n \geq 200\ min^{-1}$; L<55 mm

ORN

The curves apply to a B_{10} bearing life of 2000 hours.

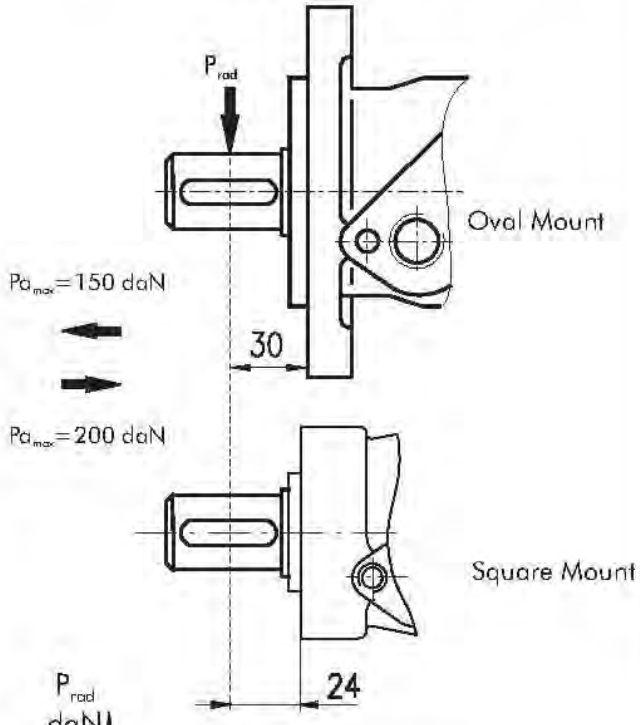
1: Max. radial shaft load
2: n= 50 min^{-1}
3: n=200 min^{-1}
4: n=800 min^{-1}

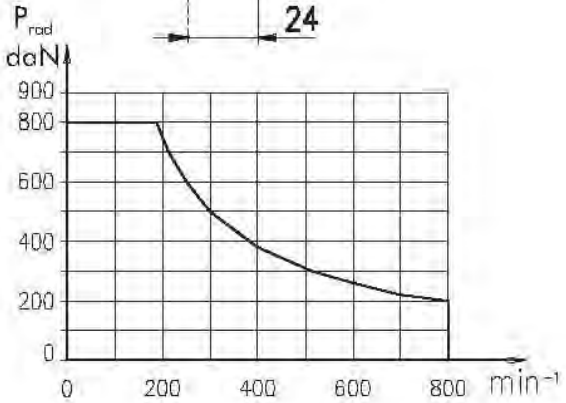




OR

Radial Shaft Load P_{rad} for C, CO Shaft Extensions by L=30 (24) mm



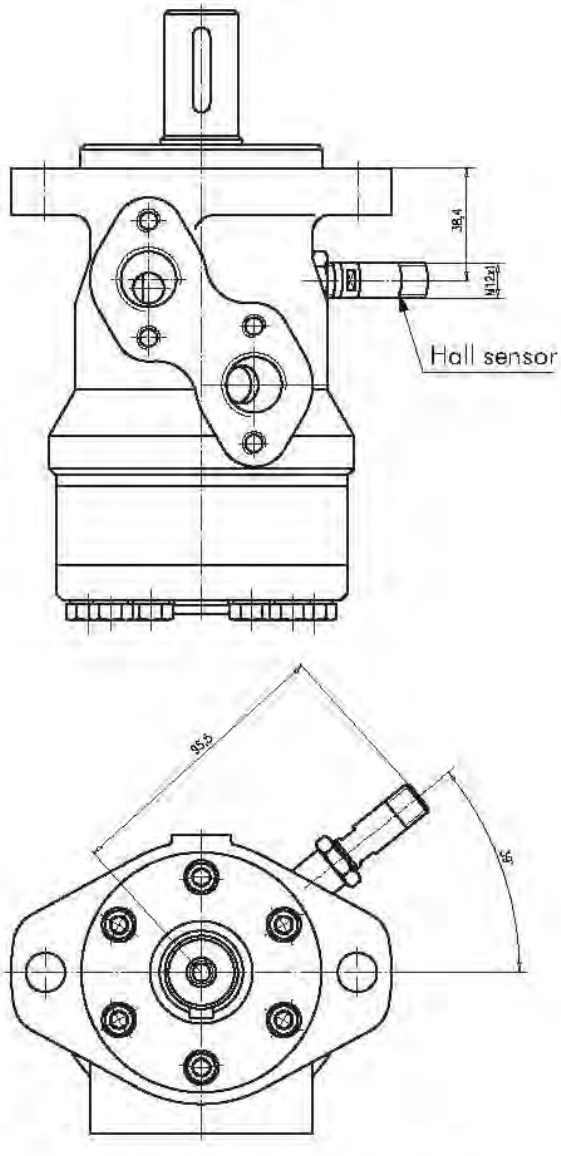


HYDRAULIC MOTORS WITH SPEED SENSOR TYPE

Fer Hydraulic is introducing hydraulic motor with a new generation of speed sensor. The electric output signal is a standard voltage signal that can be used for regulating the speed of a motor.

The speed is measured by a sensor in accordance with the Hall principle. Signal processing and amplification are performed in the sensor housing. A connection is provided in the housing by a Plug connector M12 Series.

OR...RS



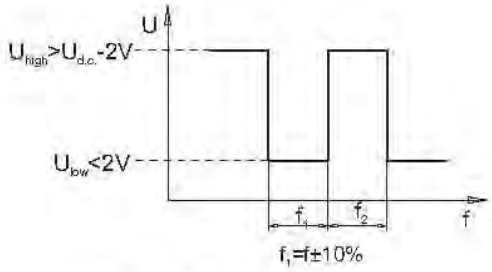
This performance is applicable for all motors of OR series. The main technical features correspond to the standard motors series OR.

DIFFERENTIAL HALL SENSOR

Technical data

Frequency range	3...20 000 Hz
Output	PNP
Power supply	10...36 VDC
Current input	20 mA (@24 VDC)
Current load	500 mA (@24 VDC;24°C)
Ambient Temperature	minus 40... plus 125°C
Protection	IP 67
Plug connector	M12-Series
Mounting principle	ISO 6149

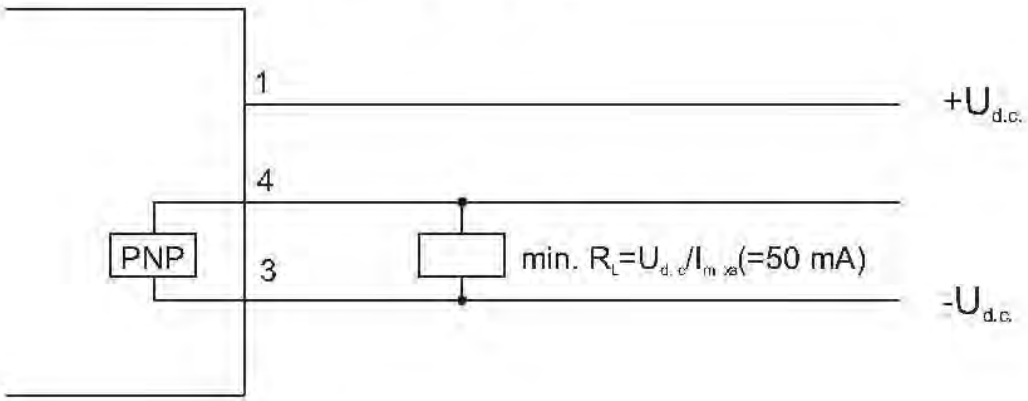
Output signal



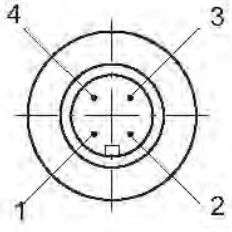
Load max.:I_{high}=I_{low}<50mA

No load current, max: 20 mA

Wiring diagram



Stik type



Terminal No.	Connection
1	$U_{d.c.}$ (+supply)
2	No connection
3	$U_{d.c.}$ (-supply)
4	Output signal

ORDER CODE

	1	2	3	4	5	6	7	8	9	10	11	12
O R												

Pos.1 - Shaft Seal Version (see page OR-10)

- omit - Low pressure seal or Seal for "...B " shaft
- **D** - High pressure seal not for "...B" shaft

Pos.2 - Case Drain

- omit - with drain port
- **U** - without drain port

Pos.3 - Mounting Flange

- omit - Oval mount, two holes
- **F** - Oval mount, four holes
- **Q** - Square mount, four bolts
- **W** - Wheel mount

Pos.4 - Option (needle bearings)

- omit - none
- **N*** - with needle bearings (not valid for ORW)

Pos.5 - Port type

- omit - Side ports
- **E** - Rear ports

Pos.6 - Displacement code

- **50** - 51,5 [cm ^{3}/rev]
- **80** - 80,3 [cm ^{3}/rev]
- **100** - 99,8 [cm ^{3}/rev]
- **125** - 125,7 [cm^3/rev]
- **160** - 159,6 [cm^3/rev]
- **200** - 199,8 [cm^3/rev]
- **250** - 250,1 [cm^3/rev]
- **315** - 315,7 [cm^3/rev]
- **400** - 397,0 [cm^3/rev]

Pos. 7 - Shaft Extensions** (see page OP - 13)

- **C** - ø25 straight, Parallel key A8x7x32 DIN6885
- **VC** - ø25 straight, Parallel key A8x7x32 DIN6885 with corrosion resistant bushing
- **CO** - ø1" straight, Parallel key ¼"x¼"x1¼" BS46
- **VCO** - ø1" straight, Parallel key ¼"x¼"x1¼" BS46 with corrosion resistant bushing
- **SH** - ø25,32 splined BS 2059 (SAE 6B)
- **VSH** - ø25,32 splined BS 2059 (SAE 6B) with corrosion resistant bushing
- **K** - ø28,56 tapered 1:10, Parallel key B5x5x14 DIN6885
- **SA** - ø24,5 splined B 25x22 DIN 5482
- **VSA** - ø24,5 splined B 25x22 DIN 5482 with corrosion resistant bushing
- **CB** - ø32 straight, Parallel key A10x8x45 DIN6885
- **KB** - ø35 tapered 1:10, Parallel key B6x6x20 DIN6885
- **SB** - splined A 25x22 DIN 5482
- **OB** - ø1¼" tapered1:8, Parallel key 5/16"x 5/16"x1¼" BS46
- **HB** - ø1¼" splined 14T ANSI B92.1 - 1976

Pos. 8 - **Ports**

- omit - BSPP (ISO 228)
- **M** - Metric (ISO 262)

Pos. 9 - **Special Features** (see Specification data on page OR - 05)

- omit - none
- **LL** -Low Leakage
- **LSV** - Low Speed Valve
- **FR** - Free Running

Pos.10 - **Rotation**

- omit - Standard Rotation
- **R** - Reverse Rotation

Pos.11 - **Option** (Paint)***

- omit - no Paint
- **P** - Painted
- **PC** - Corrosion Protected Paint

Pos.12 - **Speed Monitoring**

- omit - none
- **RS-P** - with speed sensor (PNP pull-down resistor)
- **RS-N** - with speed sensor (NPN pull-up resistor)

NOTES:

* Only with **"D"** Shaft Seal Versions!

** 1) The permissible output torque for shafts must be not exceeded!

2) The following combinations are not allowed - **Q, N** options with **"...B"** shafts

3) ORW is available only with **CB, KB** and **OB** shafts

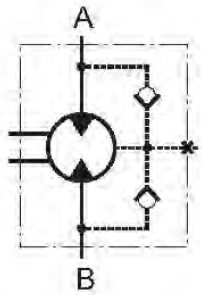
***Color at customer's request.

The hydraulic motors are mangano-phosphatized as standard.

LOW SPEED HIGH TORQUE MOTORS OK

INTRODUCTION

OK Series have a spool valve: the distribution valve is integrated in the output shaft. The cardan shaft thus rotates the distribution valve and transfers mechanical energy from the gerotor set to the output shaft.

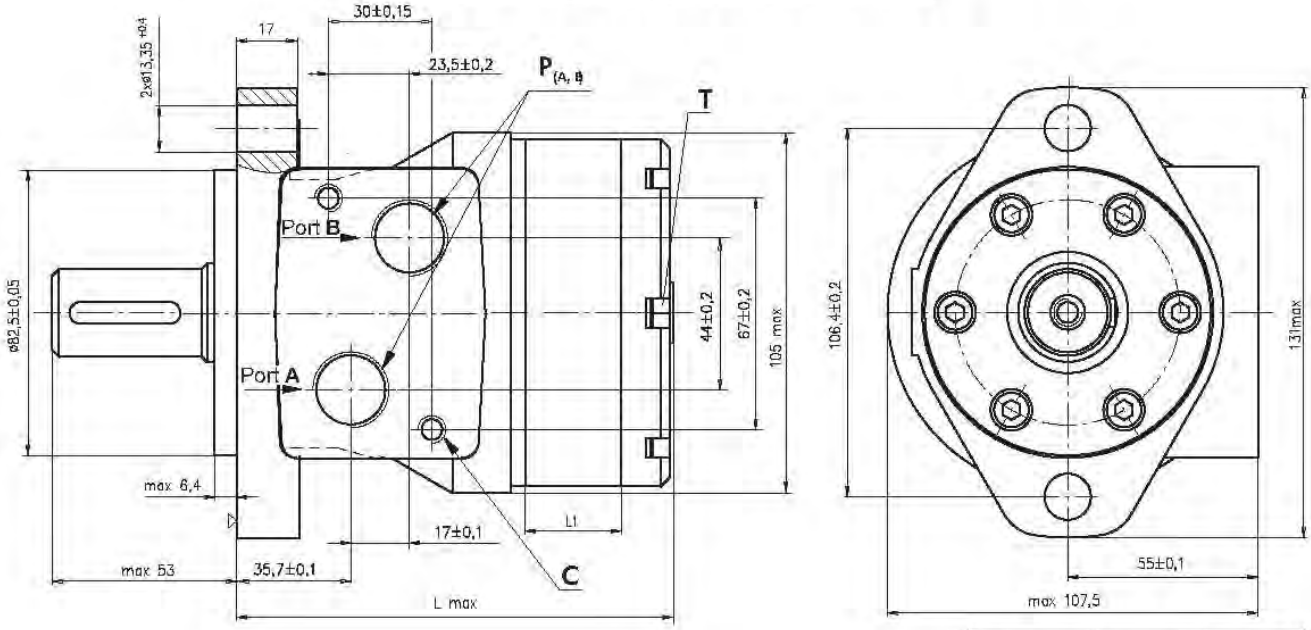


SPECIFICATION DATA

Code	Displa-cement [cm³/rev]	Max. Speed [RPM]	Max. Torque [daNm]		Max. Output [kW]		Max. Pressure Drop [bar]		Max. Oil Flow [lpm]
		cont.	cont.	int*	cont.	int*	cont.	int*	cont.
OK 50	51,5	775	10	13	9	10,4	140	175	40
OK 80	80,3	750	15,7	19,5	10,4	12,6	140	175	60
OK 100	99,8	600	19,8	24	10,8	12,8	140	175	60
OK 125	125,7	475	25	30	10,8	12,5	140	175	60
OK 160	159,6	375	32	39	10,4	11,5	140	175	60
OK 200	199,8	300	34	42	8,8	10,2	125	155	60
OK 250	250,1	240	40	47	8,1	9,4	110	140	60
OK 315	315,7	190	40	50	7,4	7,8	90	125	60
OK 400	397	150	40	50	6,2	7,1	75	90	60

* Intermittent operation: the permissible values may occur for max. 10% of every minute.

OUTLINE DIMENSIONS REFERENCE



Type	L, mm	L1, mm
OK 50	107,5	9,0
OK 80	112,5	14,0
OK 100	116	17,4
OK 125	120,5	21,8
OK 160	126,5	27,8
OK 200	133,5	34,8
OK 250	142	43,5
OK 300	153,5	54,8
OK 400	168	69,4

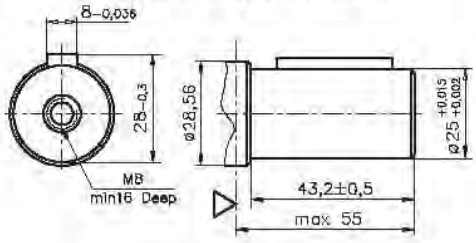
C : 2xM8 - 13mm depth
$P_{(A, B)}$: 2xG1/2 - 15mm depth
T : G1/4 - 12mm depth (plugged)

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

SHAFT EXTENSIONS

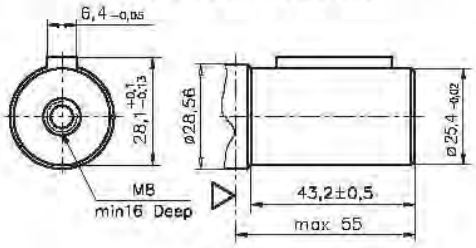
C

ø25 straight, Parallel key A8x7x32 DIN 6885
Max. Torque 44 daNm



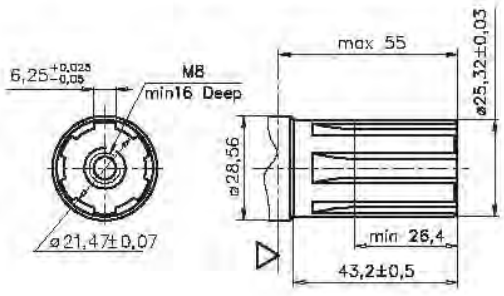
CO

ø25,4 straight, Parallel key 1/4"x1/4"x1 1/4" BS46
Max. Torque 44 daNm



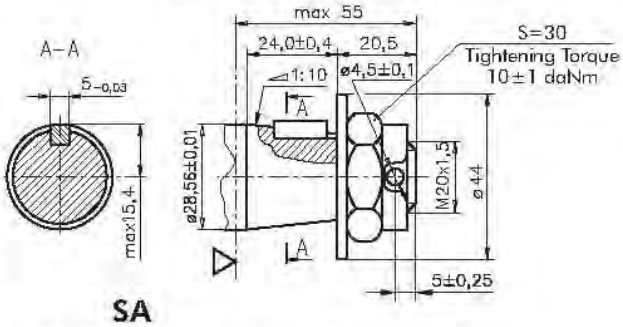
SH

ø28,56 Splined, BS 2059 (SAE 6B)
Max. Torque 44 daNm



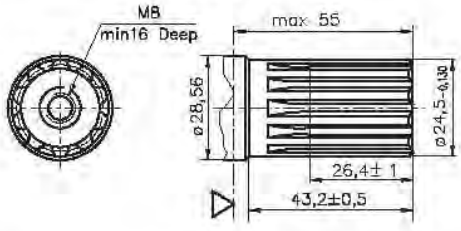
K

ø28,56; Tapered 1:10 Parallel key B5x5x14 DIN 6885
Max. Torque 44 daNm



SA

ø28,56 Splined, B25x22h9 DIN 5482
Max. Torque 44 daNm



▽- Motor Mounting Surface

ORDER CODE

	1	2	3	4	5	6	7
OK							

Pos. 1 - Displacement code

50	- 51,5 [cm³/rev]
80	- 80,3 [cm³/rev]
100	- 99,8 [cm³/rev]
125	- 125,7 [cm³/rev]
160	- 159,6 [cm³/rev]
200	- 199,8 [cm³/rev]
250	- 250,1 [cm³/rev]
315	- 315,7 [cm³/rev]
400	- 397,0 [cm³/rev]

Pos.2 - Shaft Extensions*

C	- ø25 straight, Parallel key A8x7x32 DIN6885
CO	- ø25 straight, Parallel key ¼"x¼"x1¼" BS46
SH	- ø28,56 splined BS 2059 (SAE 6B)
K	- ø28,56 tapered 1:10, Parallel key, B5x5x14 DIN6885
SA	- ø28,56 splined B25x22h9 DIN 5482

Pos. 3 - Ports

omit - BSPP (ISO 228)

Pos. 4 - Rotation

omit - Standard Rotation

R	- Reverse Rotation

Pos. 5 - Option (Paint)**

omit - no Paint

P	- Painted Low Gloss Color
PC	- Corrosion Protected Paint

Pos. 6 - Special Features

omit - none

LL	- Low Leakage
LSV	- Low Speed Valve
FR	- Free Running

Pos. 7 - Design Series

omit - Factory specified

NOTES:

* The permissible output torque for shafts must be not exceeded!

** Color at customer's request.

HYDRAULIC MOTORS OPL

APPLICATION

» Conveyors;
» Feeding mechanism of robots and manipulators;
» Metal working machines;
» Textile machines;
» Machines for agriculture;
» Food industries;
» Mining machinery etc.

CONTENTS

Specification data OPL-02
Function diagrams .....OP-06÷09
Dimensions and mounting ... OPL-03
Shaft extensions OPL-04
Permissible shaft loads OPL-04
Order code OPL-05

OPTIONS

» Model- Spool valve, gerotor;
» Antifriction conical bearings;
» Flange mount;
» Shafts- straight, splined and tapered;
» Metric and BSPP ports;
» Other special features.

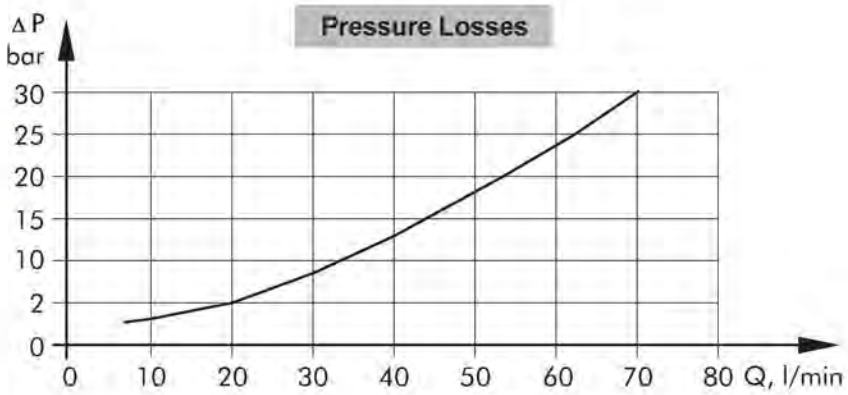
GENERAL

Displacement, [cm^3/rev.]	49,5÷396
Max. Speed, [RPM]	1210÷150
Max. Torque, [daNm]	9,4÷50
Max. Output, [kW]	9,9÷11,7
Max. Pressure Drop, [bar]	140÷95
Max. Oil Flow, [l/min]	60
Min. Speed, [RPM]	10
Permissible Shaft Loads, [daN]	P_{rad}=1500; P_a=800
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, [°C]	-30÷90
Optimal Viscosity range, [mm^2/s]	20÷75
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 micron)

Oil flow in drain line

Pressure drop (bar)	Viscosity (mm^2/s)	Oil flow in drain line (l/min)
100	20	2,5
	35	1,8
140	20	3,5
	35	2,8

Pressure Losses



SPECIFICATION DATA

Type		OPL 50	OPL 80	OPL 100	OPL 125	OPL 160	OPL 200	OPL 250	OPL 315	OPL 400
Displacement, [cm.³/rev.]		49,5	79,2	99	123,8	158,4	198	247,5	316,8	396
Max. Speed, [RPM]	Cont.	1210	755	605	485	378	303	242	190	150
	Int.*	1515	945	755	605	472	378	303	236	189
Max. Torque [daNm]	Cont.	9,4	15,1	19,3	23,7	31,3	36,6	47,0	48,6	50,0
	Int.*	11,9	19,5	23,7	29,8	37,8	45,6	58,3	56,0	59,0
	Peak**	14,0	22,0	27,0	36,5	42	53,0	67,0	85,0	85,4
Max. Output [kW]	Cont.	9,9	9,9	9,9	9,9	11,7	10,3	9,8	7,6	6,6
	Int.*	12,5	12,5	12,5	12,5	12,5	15,5	17,5	8,2	9,2
Max. Pressure Drop [bar]	Cont.	140	140	140	140	140	140	140	120	95
	Int.*	175	175	175	175	175	175	175	140	115
	Peak**	225	225	225	225	225	225	225	225	180
Max. Oil Flow [l/min]	Cont.	60	60	60	60	60	60	60	60	60
	Int.*	75	75	75	75	75	75	75	75	75
Max. Inlet Pressure [bar]	Cont.	175	175	175	175	175	175	175	175	175
	Int.*	200	200	200	200	200	200	200	200	200
	Peak**	225	225	225	225	225	225	225	225	225
Max. Return Pressure without Drain Line or Max. Pressure in Drain Line, [bar]	Cont. 0-100 RPM	100	100	100	100	100	100	100	100	100
	Cont. 100-300 RPM	50	50	50	50	50	50	50	50	50
	Cont. 300-600 RPM	25	25	25	25	25	25	25	25	25
	Cont. >600 RPM	15	15	15	15	15	15	15	15	15
	Int.* 0-max. RPM	100	100	100	100	100	100	100	100	100
Max. Return Pressure with Drain Line [bar]	Cont.	175	175	175	175	175	175	175	175	175
	Int.*	200	200	200	200	200	200	200	200	200
	Peak**	225	225	225	225	225	225	225	225	225
Max. Starting Pressure with Unloaded Shaft, [bar]		10	10	10	9	8	7	6	5	5
Min. Starting Torque [daNm]		7,7	14,0	16,8	21,0	28,0	34,6	44,0	46,0	50,0
Min. Speed***, [RPM]		10	10	10	10	10	10	10	10	10
Weight, [kg]		8,4	8,5	8,8	8,9	9,1	9,5	10,0	10,7	11,4

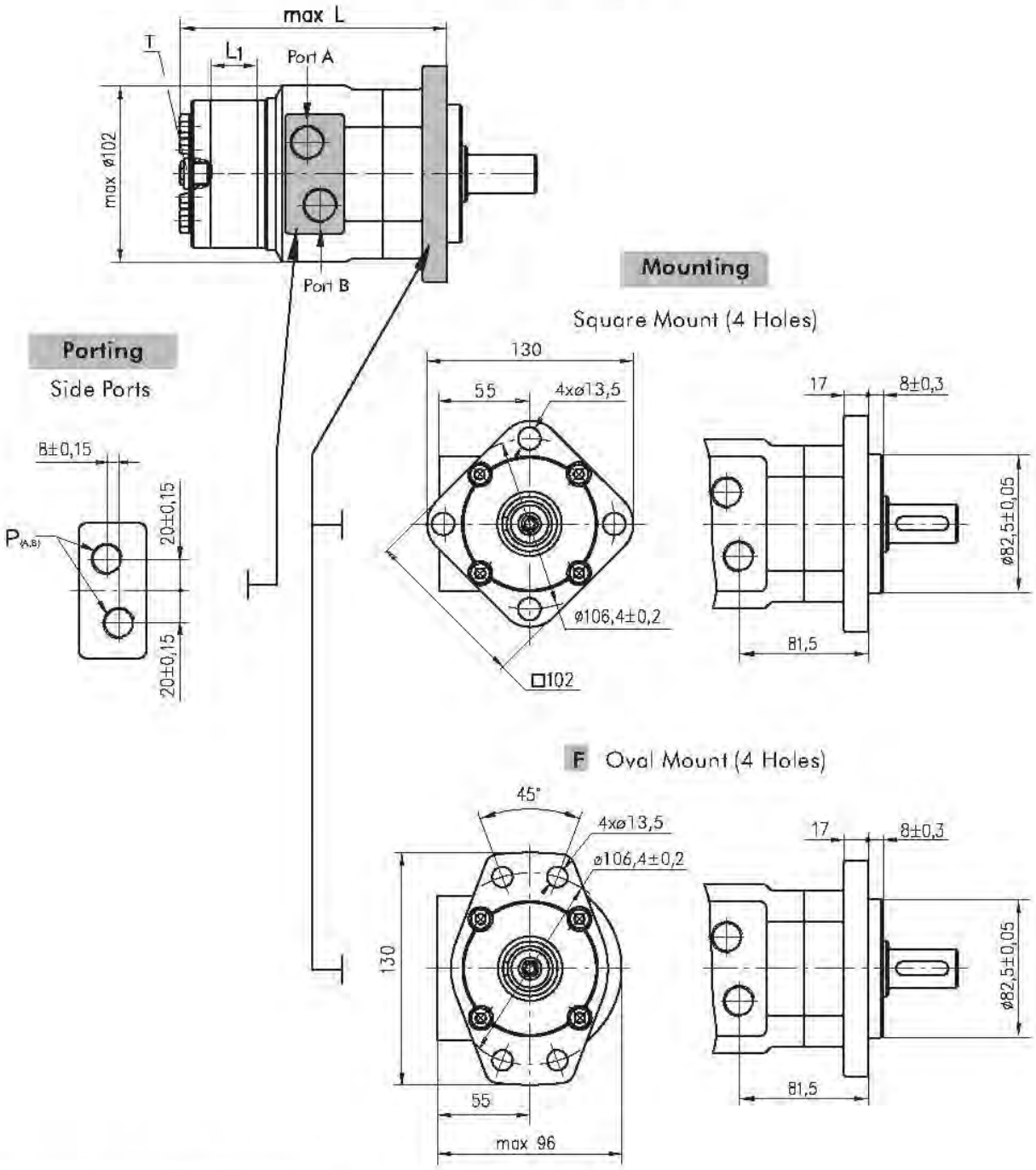
* Intermittent operation: the permissible values may occur for max. 10% of every minute.

** Peak load: the permissible values may occur for max. 1% of every minute.

*** For speeds of 10 RPM or lower, consult factory or your regional manager.

1. Intermittent speed and intermittent pressure drop must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommended using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm²/s at operating temperatures.
5. Recommended maximum system operating temperature is 82°C.
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

DIMENSIONS AND MOUNTING DATA



Type	L, mm	L1, mm
OPL 50	148	6,67
OPL 80	152	10,67
OPL 100	155	13,33
OPL 125	158	16,67
OPL 160	163	21,33
OPL 200	168	26,67
OPL 250	175	33,33
OPL 315	184	42,67
OPL 400	195	53,33

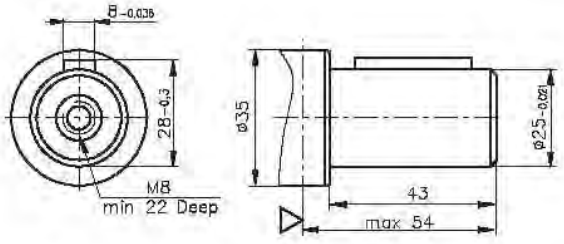
$P_{(A, B)}$: 2xG1/2 or 2xM22x1,5 - 15 mm depth
T : G1/4 or M14x1,5 - 12 mm depth (plugged)

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

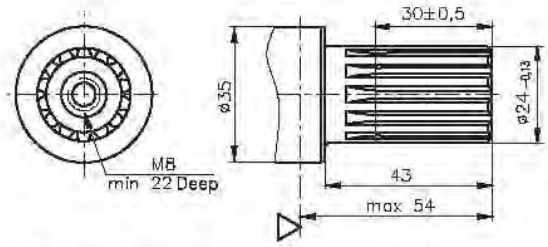
Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

SHAFT EXTENSIONS

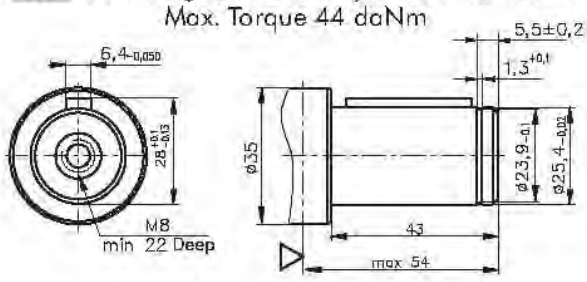
C - ø25 straight, Parallel key A8x7x30 DIN 6885
Max. Torque 44 daNm



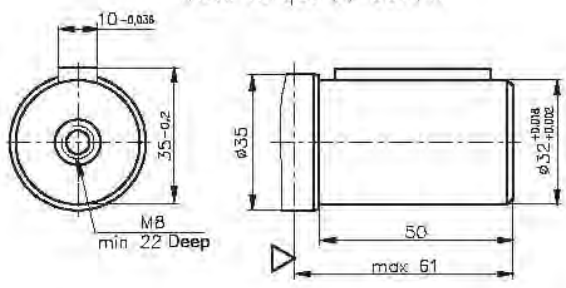
SA - splined B25x22 DIN 5482
Max. Torque 40 daNm



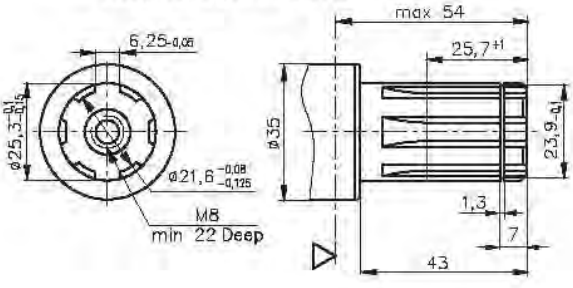
CO - ø1" straight, Parallel key ¼"x¼"x1¼" BS46
Max. Torque 44 daNm



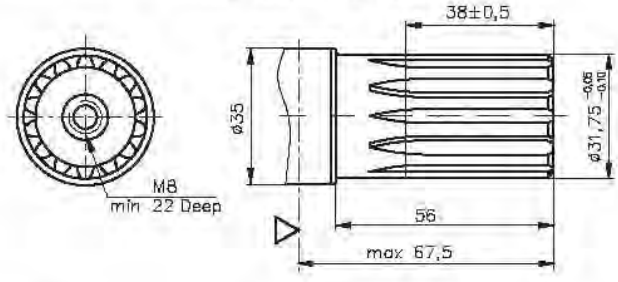
CB - ø32 straight, Parallel key A10x8x40 DIN 6885
Max. Torque 77 daNm



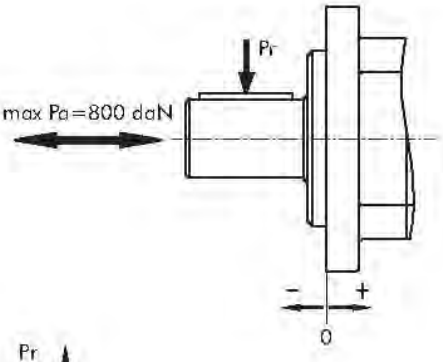
SH - splined, BS 2059 (SAE 6B)
Max. Torque 44 daNm



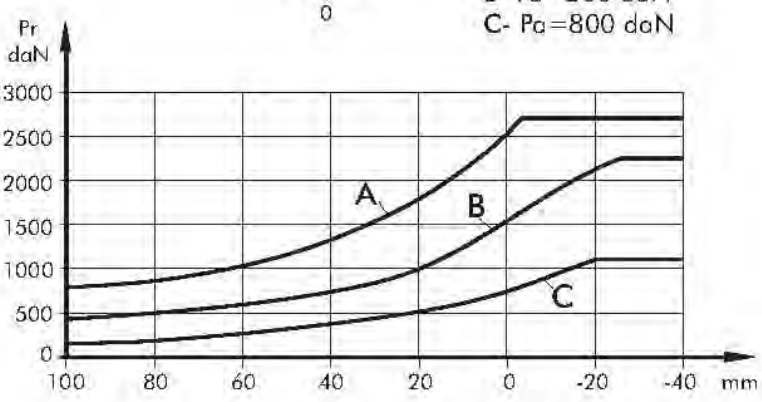
HB - ø1¼" splined 14T, DP12/24 ANSI B92.1-1976
Max. Torque 77 daNm



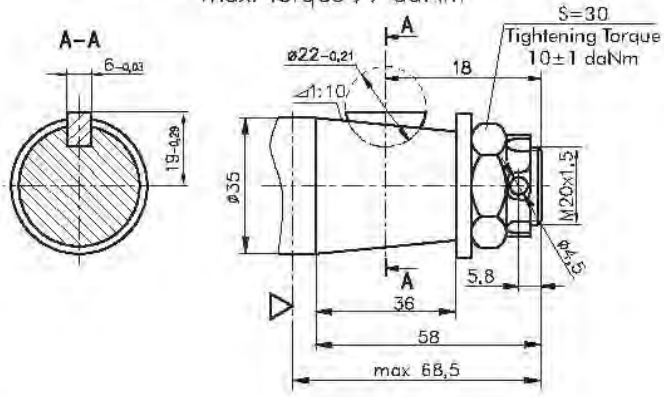
Permissible Shaft Loads EPML



A- Static load
B- Pa=200 daN
C- Pa=800 daN



KB - tapered 1:10, Woodruff key 6x9 DIN6888
Max. Torque 77 daNm



▽ - Motor Mounting Surface

ORDER CODE

	1	2	3	4	5	6	7	8
OPL								

Pos.1 - Mounting Flange

omit - Square mount four holes

F -Oval mount, four holes

Pos.2 - Displacement code*

50	- 49,5 [cm ^{3}/rev]
80	- 79,2 [cm ^{3}/rev]
100	- 99,0 [cm ^{3}/rev]
125	- 123,8 [cm ^{3}/rev]
160	- 158,4 [cm ^{3}/rev]
200	- 198,0 [cm ^{3}/rev]
250	- 247,5 [cm ^{3}/rev]
315	- 316,8 [cm ^{3}/rev]
400	- 396,0 [cm ^{3}/rev]

Pos.3 - Shaft extensions**

C	- ø25 straight, Parallel key A8x7x30 DIN6885
CO	- ø1" straight, Parallel key ¼"x¼"x1¼" BS46
SH	- ø25,3 splined BS 2059 (SAE 6B)
SA	- ø24 splined B 25x22 DIN 5482
CB	- ø32 straight, Parallel key A10x8x40 DIN6885
HB	- ø1¼" splined 14T ANSI B92.1 - 1976
KB	- ø35 tapered 1:10, Woodruff key 6x9 DIN6888

Pos. 4 - Ports

omit - BSPP (ISO 228)

M - Metric (ISO 262)

Pos. 5 - Special Features

omit - none

LL	-Low Leakage
LSV	- Low Speed Valve
FR	- Free Running

Pos. 6 - Rotation

omit - Standard Rotation

R - Reverse Rotation

Pos. 7 - Option (Paint)***

omit - no Paint

P	- Painted
PC	- Corrosion Protected Paint

Pos. 8 - Design Series

omit - Factory specified

NOTES:

* See Function diagrams from page OP-06 to page OP-09.

** The permissible output torque for shafts must be not exceeded!

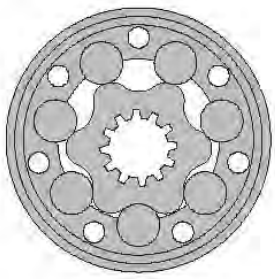
*** Color at customer's request.

The hydraulic motors are mangano-phosphatized as standard.

HYDRAULIC MOTORS ORL

APPLICATION

- » Conveyors;
- » Feeding mechanism of robots and manipulators;
- » Metal working machines;
- » Textile machines;
- » Machines for agriculture;
- » Food industries;
- » Mining machinery etc.



CONTENTS

Specification data ORL-02
Function diagrams ..... OR-06÷10
Dimensions and mounting ... ORL-03
Shaft extensions ORL-04
Permissible shaft loads ORL-04
Order code ORL-05

OPTIONS

- » Model- Spool valve, roll-gerotor;
- » Antifriction conical bearings;
- » Flange mount;
- » Shafts- straight, splined and tapered;
- » Metric and BSPP ports;
- » Other special features.

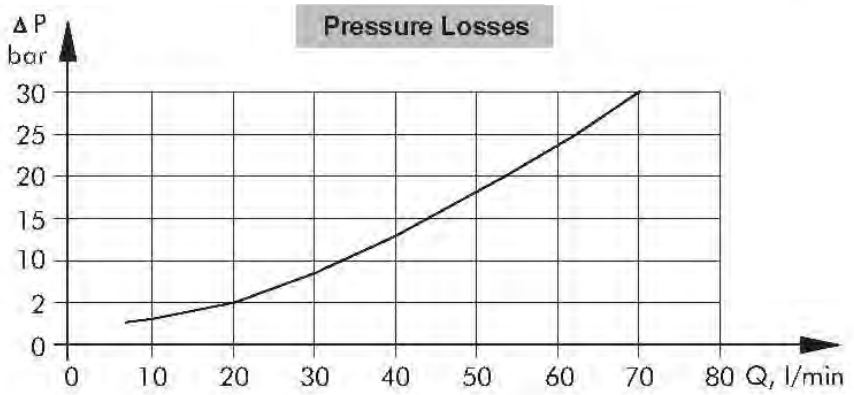
GENERAL

Displacement, [cm^3/rev.]	51,5÷396
Max. Speed, [RPM]	775÷150
Max. Torque, [daNm]	10,1÷61
Max. Output, [kW]	7÷13
Max. Pressure Drop, [bar]	115÷175
Max. Oil Flow, [l/min]	60
Min. Speed, [RPM]	10
Permissible Shaft Loads, [daN]	P_{rad}=1500; P_a=800
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, [°C]	-30÷90
Optimal Viscosity range, [mm^2/s]	20÷75
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 micron)

Oil flow in drain line

Pressure drop (bar)	Viscosity (mm^2/s)	Oil flow in drain line (l/min)
100	20	2,5
	35	1,8
140	20	3,5
	35	2,8

Pressure Losses



SPECIFICATION DATA

Type		ORL 50	ORL 80	ORL 100	ORL 125	ORL 160	ORL 200	ORL 250	ORL 315	ORL 400
Displacement, [cm³/rev.]		51,5	80,3	99,8	125,7	159,6	199,8	250,1	315,7	397
Max. Speed,	Cont.	775	750	600	475	375	300	240	190	150
[RPM]	Cont. for "LSV" motors	200	200	200	200	200	200	200	190	150
	Int.*	970	940	750	600	470	375	300	240	190
	Int. for "LSV" motors*	250	250	250	250	250	250	250	240	190
Max. Torque	Cont.	10,1	20,0	24,0	30,0	39,0	45,0	54,0	55,0	61,0
[daNm]	Int.*	13,0	22,0	28,0	34,0	43,0	50,0	61,0	63,0	69,0
	Peak**	17,0	27,0	32,0	37,0	46,0	56,0	71,0	83,0	87,0
Max. Output	Cont.	7	12,5	13,0	12,5	11,5	11,0	10,0	9,0	7,8
[kW]	Cont. for "LSV" motors	3,6	4,0	5,0	6,2	7,8	8,9	10,5	9,8	7,7
	Int.*	8,5	15,0	15,0	16,0	14,0	13,0	12,0	11,0	10,6
	Int. for "LSV" motors*	4,7	5,7	7,3	7,9	10,7	12,0	13,9	13,8	11,8
Max. Pressure Drop	Cont.	140	175	175	175	175	175	175	135	115
[bar]	Int.*	175	200	200	200	200	200	200	160	140
	Peak**	225	225	225	225	225	225	225	210	175
Max. Oil Flow	Cont.	40	60	60	60	60	60	60	60	60
[l/min]	Cont. for "LSV" motors	10	16	20	25	32	40	50	60	60
	Int.*	50	75	75	75	75	75	75	75	75
	Int. for "LSV" motors*	12,5	20	25	32	40	50	62,5	75	75
Max. Inlet Pressure	Cont.	175	175	175	175	175	175	175	175	175
[bar]	Int.*	200	200	200	200	200	200	200	200	200
	Peak**	225	225	225	225	225	225	225	225	225
Max. Return Pres-	Cont. 0-100 RPM	100	100	100	100	100	100	100	100	100
sure without Drain	Cont. 100-300 RPM	50	50	50	50	50	50	50	50	50
Line or Max. Pres-	Cont. 300-600 RPM	25	25	25	25	25	25	25	25	25
sure in Drain Line,	Cont. >600 RPM	15	15	15	15	15	15	15	15	15
[bar]	Int.* 0-max. RPM	100	100	100	100	100	100	100	100	100
Max. Return Pres-	Cont.	140	175	175	175	175	175	175	175	175
sure with Drain Line	Int.*	175	200	200	200	200	200	200	200	200
[bar]	Peak**	225	225	225	225	225	225	225	225	225
Max. Starting Pressure		10	10	10	9	7	5	4	3	3
with Unloaded Shaft, [bar]	for "LSV" motors	20	20	20	20	15	15	15	12	12
Min. Starting Torque [daNm]		8	15	20	25	32	37	45	45	49
Min. Speed*, [RPM]**		10	10	10	10	10	10	10	10	10
Weight, [kg]		8,5	8,6	8,9	9,0	9,2	9,6	10,1	10,8	11,5

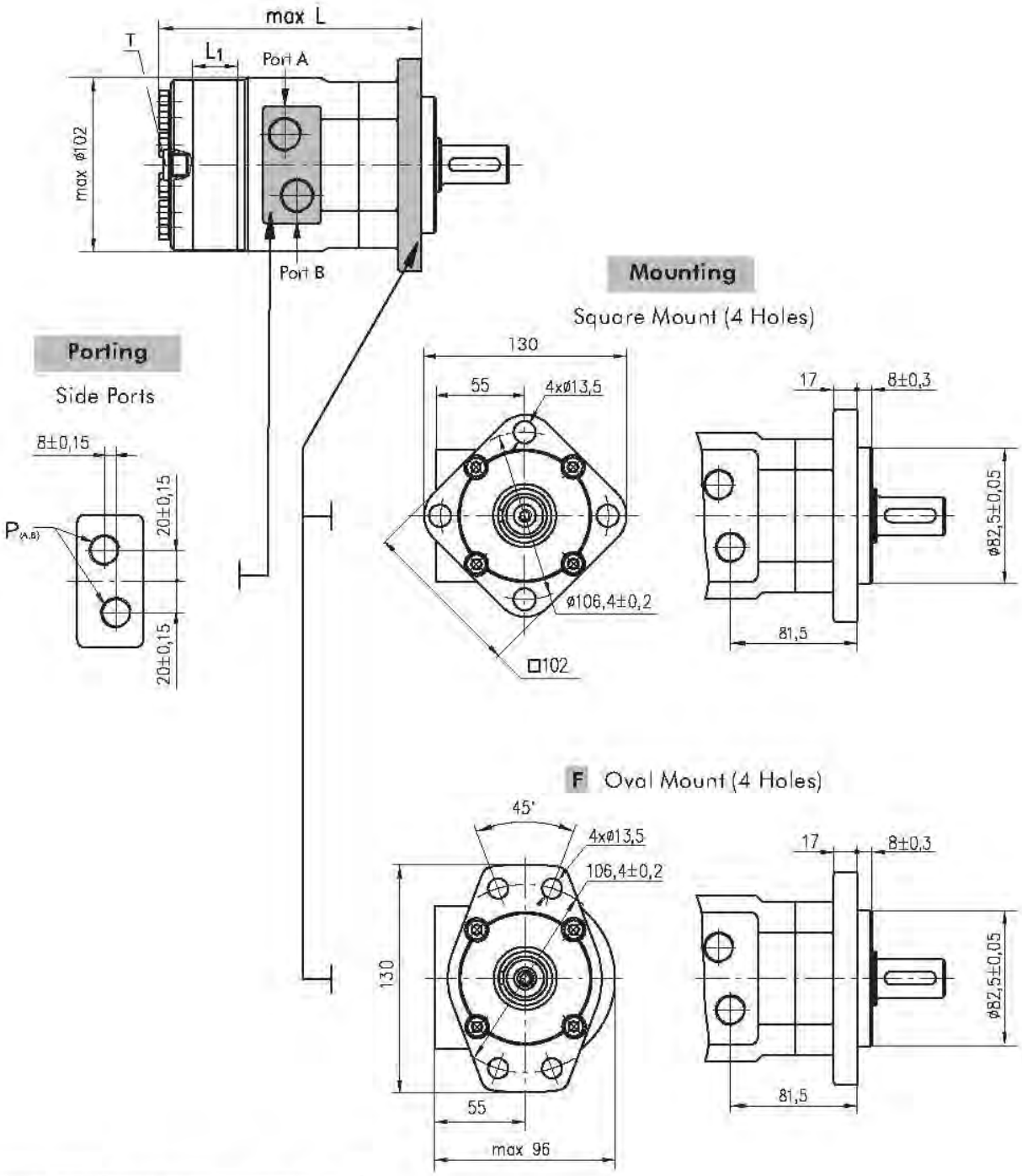
* Intermittent operation: the permissible values may occur for max. 10% of every minute.

** Peak load: the permissible values may occur for max. 1% of every minute.

*** For speeds of 10 RPM or lower, consult factory or your regional manager.

1. Intermittent speed and intermittent pressure drop must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommended using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm²/s at operating temperatures.
5. Recommended maximum system operating temperature is 82°C.
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

DIMENSIONS AND MOUNTING DATA



Type	L, mm	L, mm
ORL 50	152	9,0
ORL 80	157	14,0
ORL 100	160	17,4
ORL 125	165	21,8
ORL 160	171	27,8
ORL 200	178	34,8
ORL 250	187	43,5
ORL 315	198	54,8
ORL 400	212	69,4

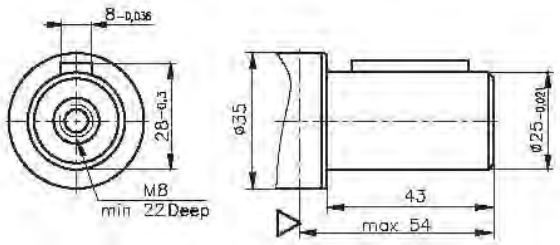
$P_{(A,B)}$: 2xG1/2 or 2xM22x1,5 - 15 mm depth
T : G1/4 or M14x1,5 - 12 mm depth (plugged)

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

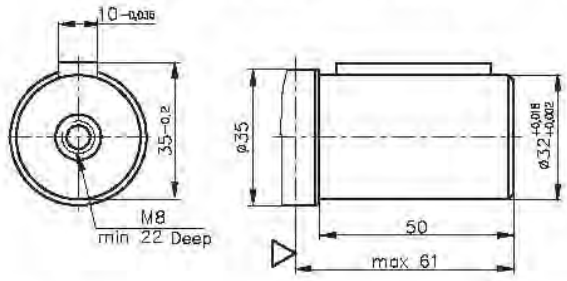
Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

SHAFT EXTENSIONS

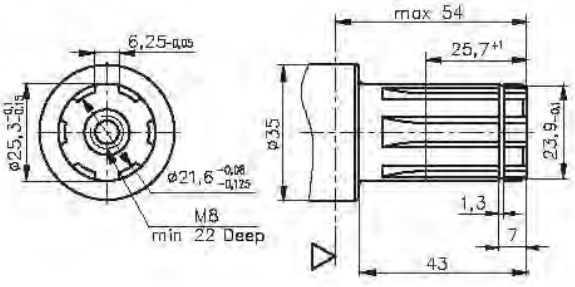
C - ø25 straight, Parallel key A8x7x30 DIN 6885
Max. Torque 44 daNm



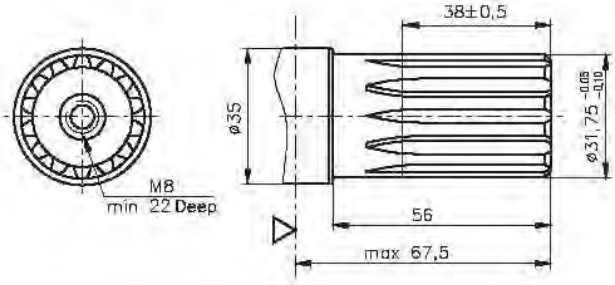
CB - ø32 straight, Parallel key A10x8x40 DIN 6885
Max. Torque 77 daNm



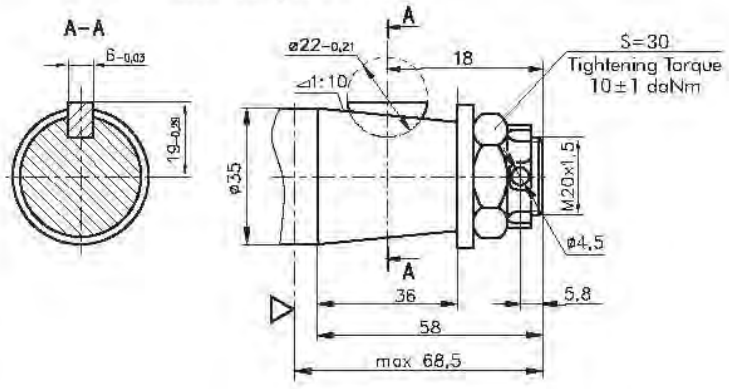
SH - splined, BS 2059 (SAE 6B)
Max. Torque 44 daNm



HB - ø1¼" splined 14T, DP12/24 ANSI B92.1-1976
Max. Torque 77 daNm

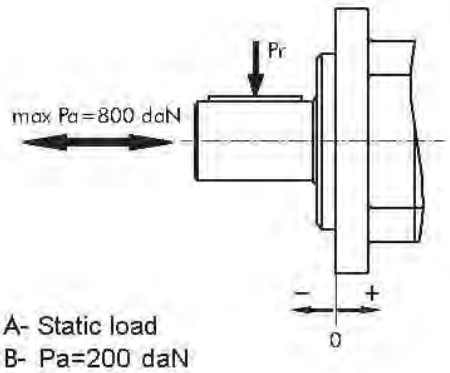


KB - tapered 1:10, woodruff key 6x9 DIN6888
Max. Torque 77 daNm

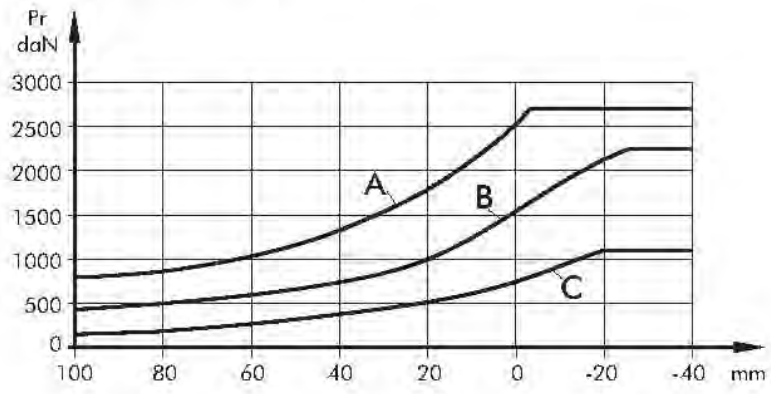


∇- Motor Mounting Surface

Permissible Shaft Loads ORL



A- Static load
B- Pa=200 daN
C- Pa=800 daN



ORDER CODE

	1	2	3	4	5	6	7	8
O R L								

Pos.1 - Mounting Flange

omit - Square mount, four holes

F - Oval mount, four holes

Pos.2 - Displacement code*

50 - 51,5 [cm ^{3}/rev]

80 - 80,3 [cm ^{3}/rev]

100 - 99,8 [cm ^{3}/rev]

125 - 125,7 [cm^3/rev]

160 - 159,6 [cm^3/rev]

200 - 199,8 [cm^3/rev]

250 - 250,1 [cm^3/rev]

315 - 315,7 [cm^3/rev]

400 - 397,0 [cm^3/rev]

Pos.3 - Shaft Extensions**

C - ø25 straight, Parallel key A8x7x30 DIN6885

CB - ø32 straight, Parallel key A10x8x40 DIN6885

SH - ø25,3 splined BS 2059 (SAE 6B)

HB - ø1¼" splined 14T ANSI B92.1 - 1976

KB - ø35 tapered 1:10, Woodruff key 6x9 DIN6888

Pos. 4 - Ports

omit - BSPP (ISO 228)

M - Metric (ISO 262)

Pos. 5 - Special Features

omit - none

LL -Low Leakage

LSV - Low Speed Valve (see Specification data)

FR - Free Running

Pos. 6 - Rotation

omit - Standard Rotation

R - Reverse Rotation

Pos. 7 - Option (Paint)***

omit - no Paint

P - Painted

PC - Corrosion Protected Paint

Pos. 8 - Design series

omit - Factory specified

NOTES:

* See Function diagrams from page OR-06 to page OR-10.

** The permissible output torque for shafts must be not exceeded!

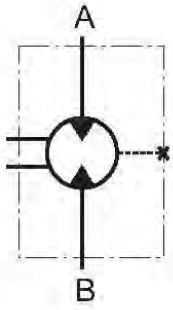
*** Color at customer's request.

The hydraulic motors are mangano-phosphatized as standard.

LOW SPEED HIGH TORQUE MOTORS ORS

INTRODUCTION

The motor type ORS has low-speed distribution and they are most efficient at a high drop pressure operating. It's recommendable to use them at low speed rotation, i.e. at low supply flow.



OPTIONS

» Model- Spool valve, orbiting roller;

» Shafts- splined;

» Shaft seal for high pressure;

» Other special features.

APPLICATION

» Conveyors;

» Feeding mechanism of robots and manipulators;

» Metal working machines;

» Textile machines;

» Machines for agriculture and foresty;

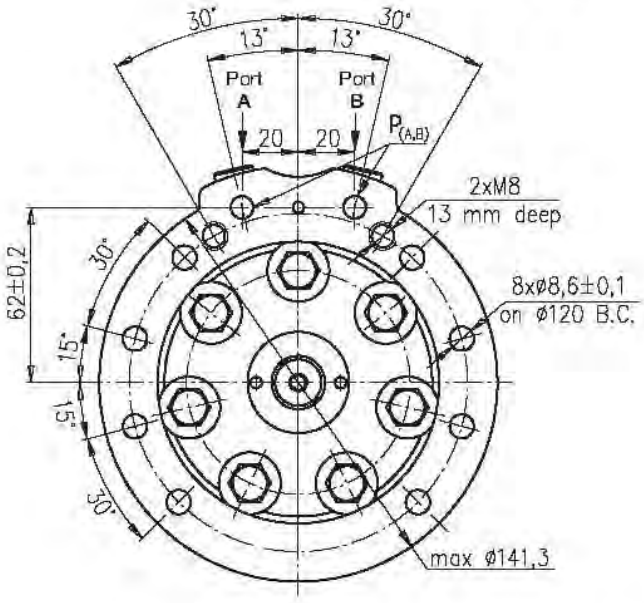
» Wood working and sawmill machinery etc.

SPECIFICATION DATA

Code	Displa-cement [cm³/rev]	Max. Speed [RPM]	Max. Torque [daNm]		Max. Output [kW]		Max. Pressure Drop [bar]		Max. Oil Flow [lpm]
		cont.	cont.	int*	cont.	int*	cont.	int*	cont.
ORS 50	51,5	775	10,0	13,0	8,2	9,7	140	175	40
ORS 80	80,3	750	15,7	19,5	8,2	9,7	140	175	60
ORS 100	99,8	600	19,8	24,0	8,2	9,7	140	175	60
ORS 125	125,7	475	25,0	30,0	8,2	9,7	140	175	60
ORS 160	159,6	375	32,0	39,0	8,2	9,7	140	175	60
ORS 200	199,8	300	34,4	47,0	8,2	12,7	125	175	60
ORS 250	229,0	240	34,5	46,5	7,9	12,0	110	150	60
ORS 300	277,0	190	34,5	45,7	6,8	9,3	90	125	60
ORS 400	369,0	150	39,0	50,2	5,4	7,8	80	105	60

* Intermittent operation: the permissible values may occur for max. 10% of every minute.

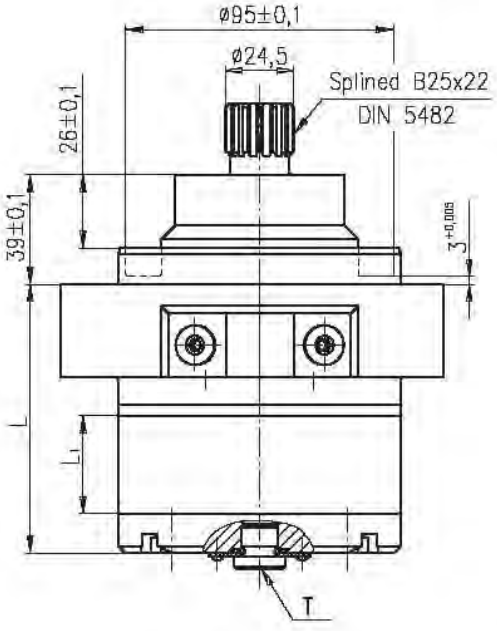
OUTLINE DIMENSIONS REFERENCE

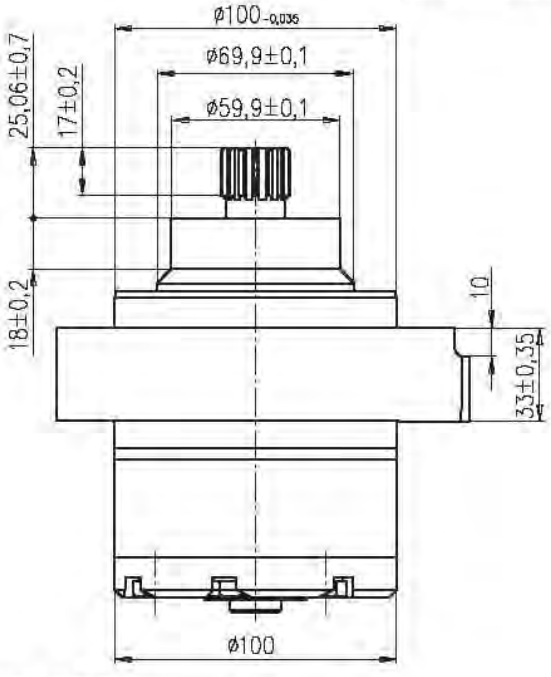


Type	L±0,5,in. [mm]	L_1,in.[mm]
ORS 50	70,0	9,0
ORS 80	75,0	14,0
ORS 100	78,4	17,4
ORS 125	82,8	21,8
ORS 160	88,8	27,8
ORS 200	95,8	34,8
ORS 250	93,5	32,5
ORS 300	100,3	39,3
ORS 400	113,4	52,4

$P_{(A,B)}$:2xø8
T : G1/4-A (plugged)

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**





ORDER CODE

	1	2	3	4
ORS				

Pos. 1 - Displacement code

50	- 51,5 [cm³/rev]
80	- 80,3 [cm³/rev]
100	- 99,8 [cm³/rev]
125	- 125,7 [cm³/rev]
160	- 159,6 [cm³/rev]
200	- 199,8 [cm³/rev]
250	- 229,0 [cm³/rev]
300	- 277,0 [cm³/rev]
400	- 369,0 [cm³/rev]

Pos. 2 - Rotation

omit - Standard Rotation
R - Reverse Rotation

Pos. 3 - Option (Paint)**

omit - no Paint
P - Painted
PC - Corrosion Protected Paint

Pos. 4 - Design Series

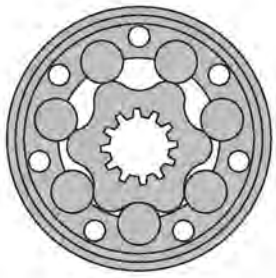
omit - Factory specified

NOTES:
* Color at customer's request.
The hydraulic motors are mangano phosphatized as standard.

HYDRAULIC MOTORS OH

APPLICATION

» Conveyors;
» Feeding mechanism of robots and manipulators;
» Metal working machines;
» Textile machines;
» Machines for agriculture;
» Food industries;
» Mining machinery etc.



CONTENTS

Specification data OH-02
Function diagrams ..... OH-03÷05
Permissible shaft loads OH-05
Dimensions and mounting ... OH-07
Shaft extensions OH-07
Order code OH-07

OPTIONS

» Model- Spool valve, roll-gerotor
» Flange mount;
» Shafts- straight, splined and tapered;
» Metric and BSPP ports;
» Other special features.

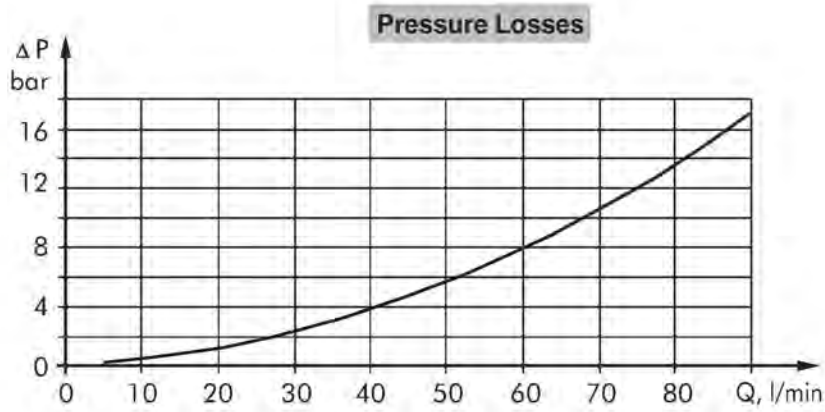
GENERAL

Displacement, [cm^3/rev.]	201,3÷502,4
Max. Speed, [RPM]	370÷150
Max. Torque, [daNm]	51÷85
Max. Output, [kW]	16÷11
Max. Pressure Drop, [bar]	175÷125
Max. Oil Flow, [l/min]	75
Min. Speed, [RPM]	10÷5
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, [°C]	-30÷90
Optimal Viscosity range, [mm^2/s]	20÷75
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 micron)

Oil flow in drain line

Pressure drop (bar)	Viscosity (mm^2/s)	Oil flow in drain line (l/min)
100	20	2,5
	35	1,8
140	20	3,5
	35	2,8

Pressure Losses



SPECIFICATION DATA

Type		OH 200	OH 250	OH 315	OH 400	OH 500
Displacement [cm3/rev.]		201,3	252	314,9	396,8	502,4
Max. Speed, [RPM]	cont.	370	295	235	185	150
	Int.*	445	350	285	225	180
Max. Torque [daNm]	cont.	51	61	74	84	85
	Int.*	58	70	82	98	104
	peak**	64	79	98	109	117
Max. Output [kW]	cont.	16	16	14	12,5	11
	Int.*	18,5	18,5	15,5	15	14
Max. Pressure Drop [bar]	cont.	175	175	175	155	125
	Int.*	200	200	200	190	160
	peak**	225	225	225	210	180
Max. Oil Flow [l/min]	cont.	75	75	75	75	75
	Int.*	90	90	90	90	90
Max. Inlet Pressure [bar]	cont.	200	200	200	200	200
	Int.*	225	225	225	225	225
	peak**	250	250	250	250	250
Max. Return Pressure without Drain Line or Max. Pressure in Drain Line , [bar]	cont. 0-100 RPM	100	100	100	100	100
	cont. 100-200 RPM	50	50	50	50	50
	cont. 200-300 RPM	20	20	20	20	20
	Int.* 0-max. RPM	100	100	100	100	100
Max. Starting Pressure with Unloaded Shaft, [bar]		5	5	5	5	5
Min. Starting Torque [daNm]	at max. press. drop cont.	39	52	66	72	72
	at max. press. drop Int.*	45	59	73	88	88
Min. Speed*, [RPM]**		10	10	8	5	5
Weight, [kg]		10,5	11	11,5	12,3	13

* Intermittent operation: the permissible values may occur for max. 10% of every minute.

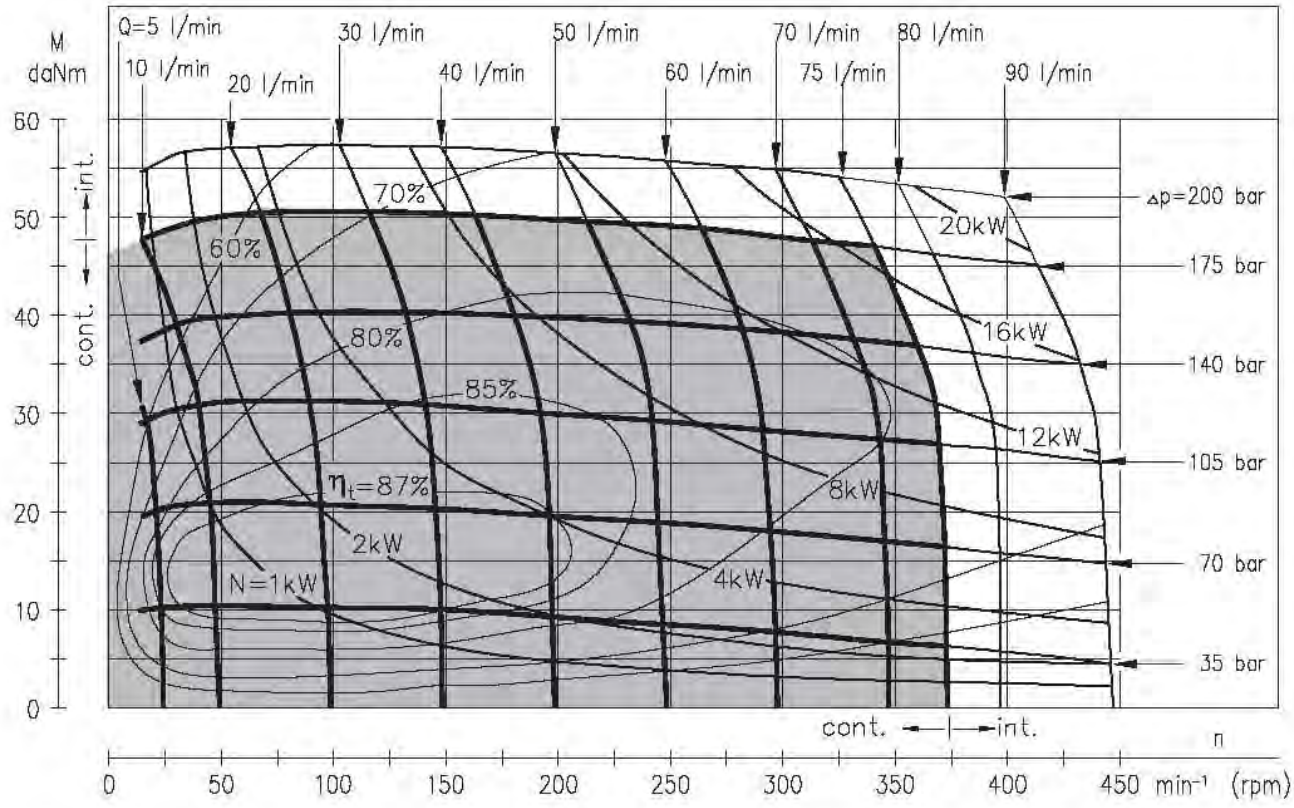
** Peak load: the permissible values may occur for max. 1% of every minute.

*** For speeds of 5 RPM lower than given, consult factory or your regional manager.

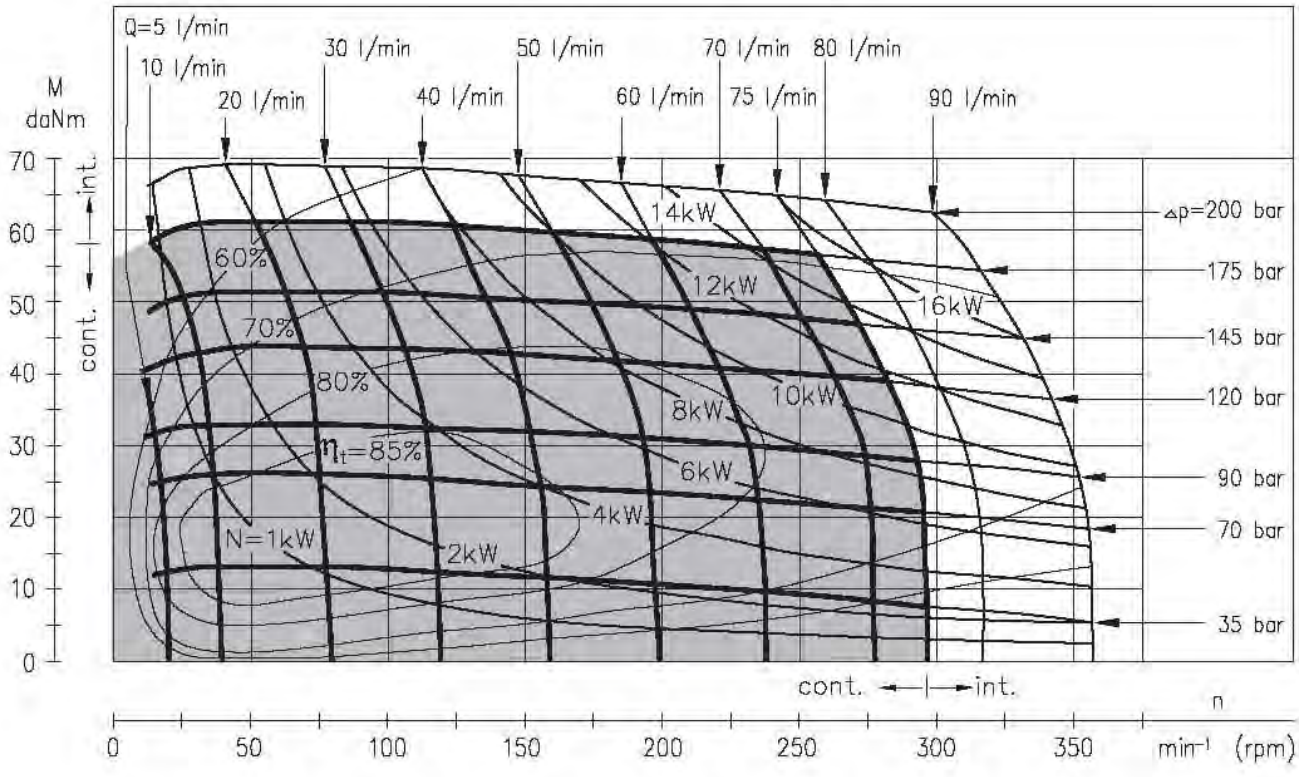
1) Intermittent speed and intermittent pressure must not occur simultaneously.
2) Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3) Recommend using a premium quality, anti-wear type mineral based hydraulic oil, HLP(DIN51524) or HM(ISO6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4) Recommended minimum oil viscosity 13 mm^2/s at 50°C.
5) Recommended maximum system operating temperature is 82°C.
6) To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

FUNCTION DIAGRAMS

OH 200



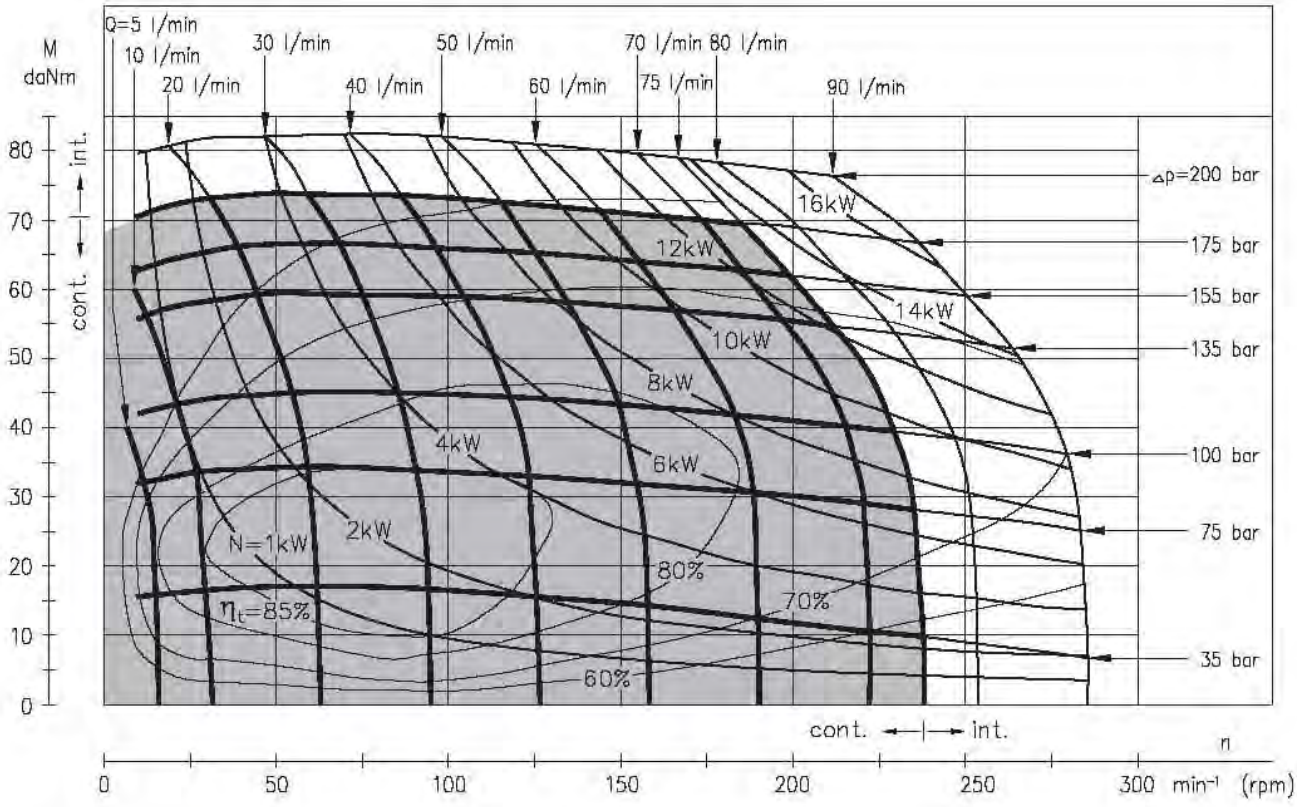
OH 250



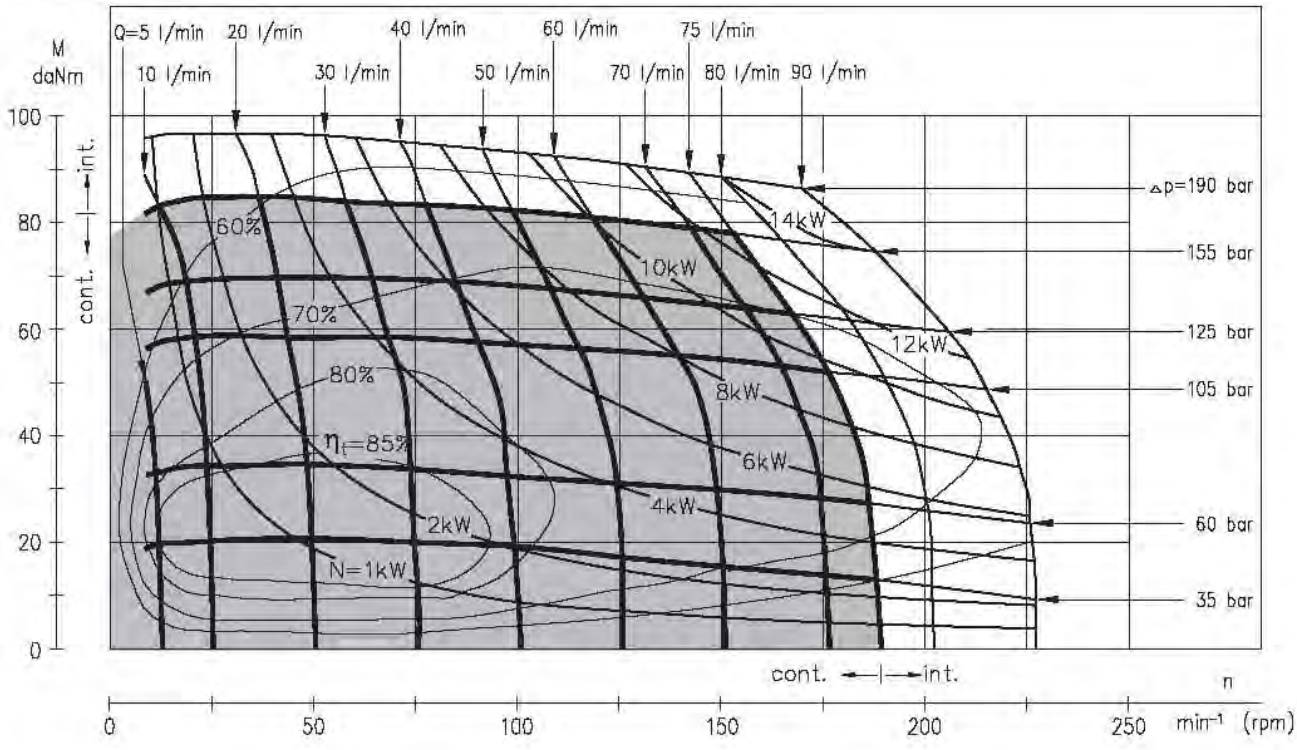
The function diagrams data was collected at back pressure 5÷10 bar
and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAMS

OH 315



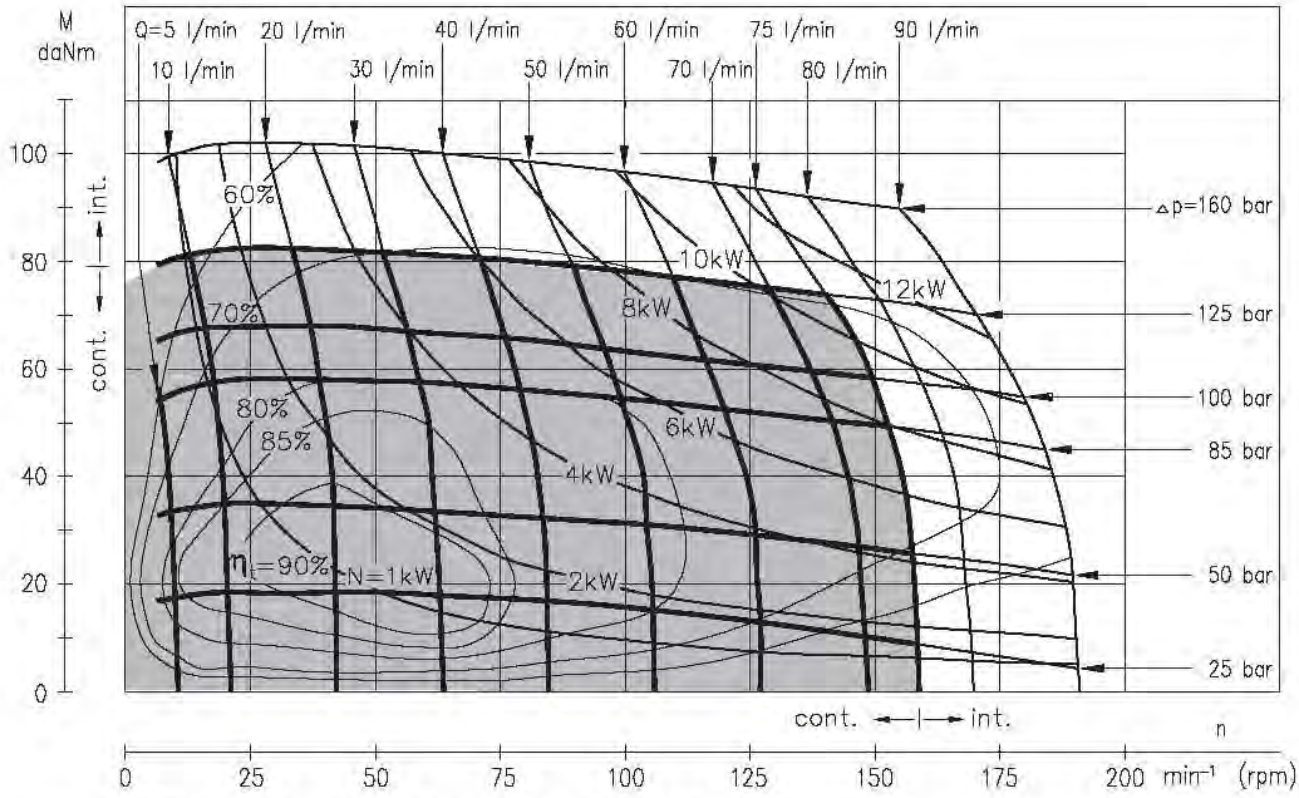
OH 400



The function diagrams data was collected at back pressure 5÷10 bar
and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAMS

OH 500



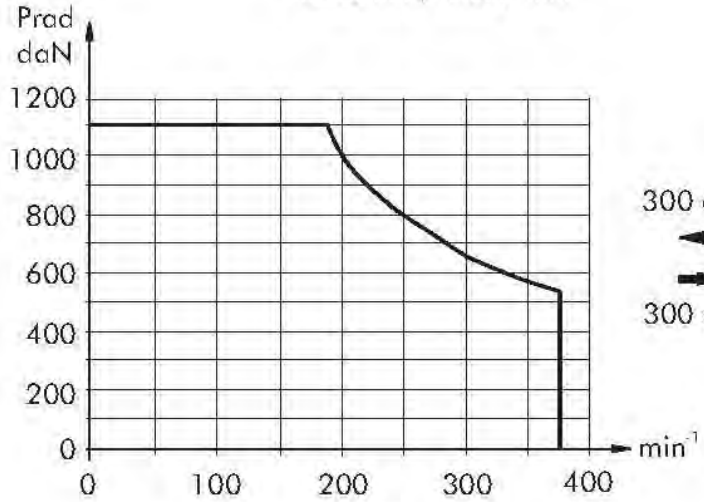
The function diagrams data was collected at back pressure 5÷10 bar and oil with viscosity of 32 mm²/s at 50° C.

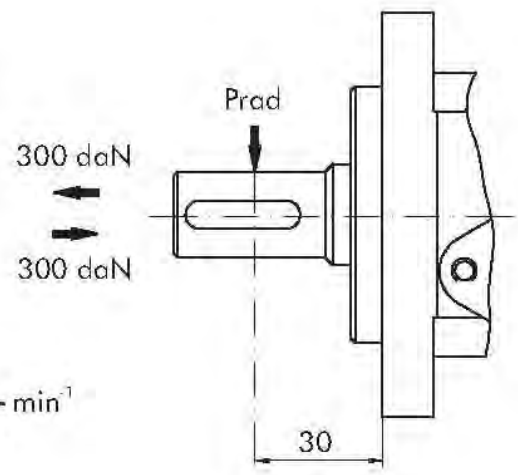
PERMISSIBLE SHAFT LOADS FOR OH MOTORS

The permissible radial shaft load P_{rad} depends on the speed (RPM) and distance (L) from the point of load to the mounting flange.

$$\text{Radial Shaft Load } P_{rad} = \frac{1100}{n} \times \frac{25000}{103{,}5+L}, \text{ daN*}$$

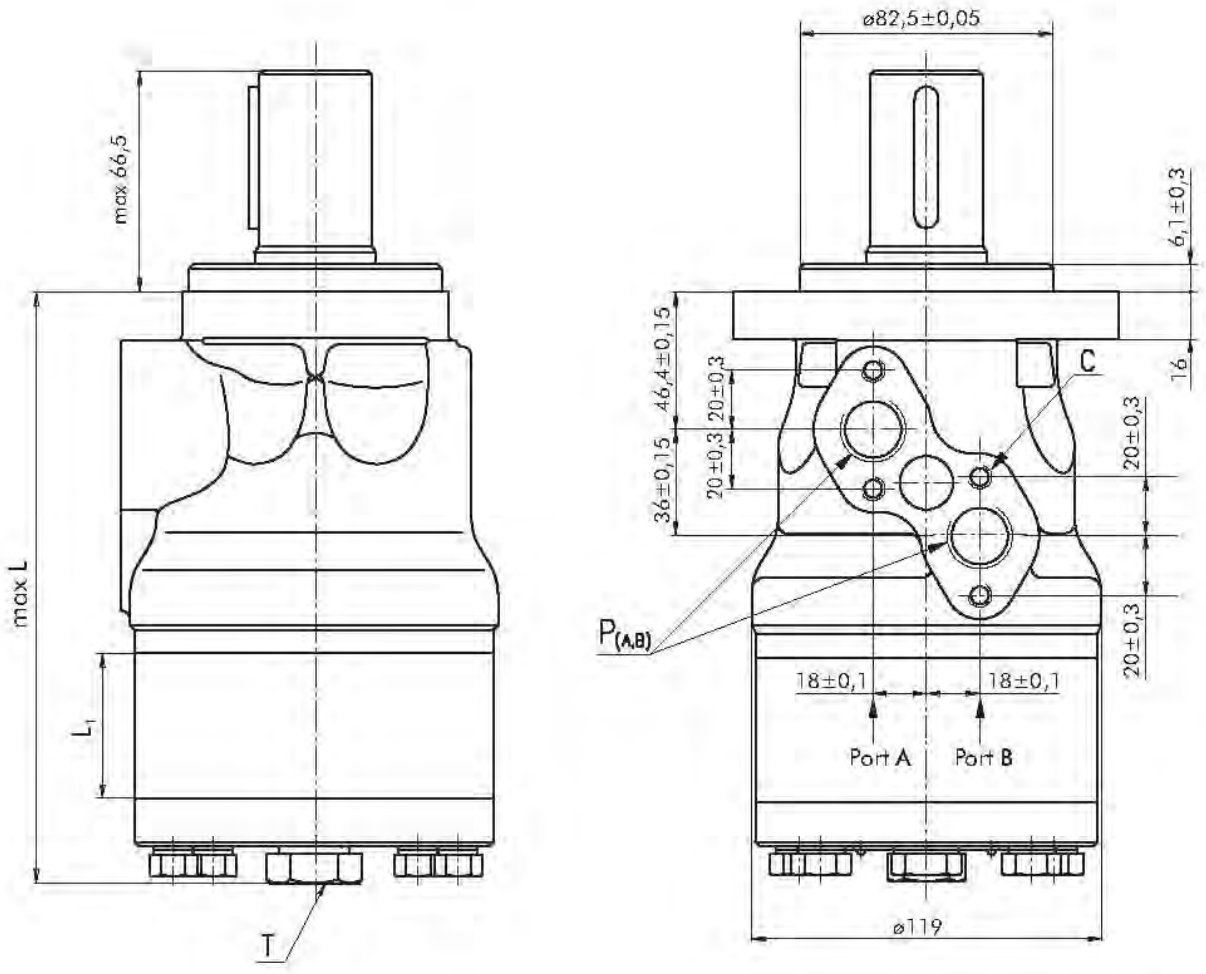
*L<60 mm; n≥200 min^{-1}

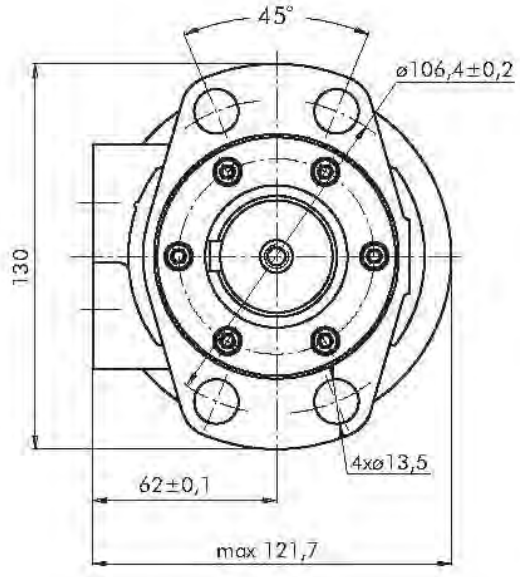




DIMENSIONS

Magneto Maunt (4 holes)





Type	L, mm	L_1, mm
OH 200	170,8	27,8
OH 250	177,8	34,8
OH 315	186,5	43,5
OH 400	197,8	54,8
OH 500	212,4	69,4

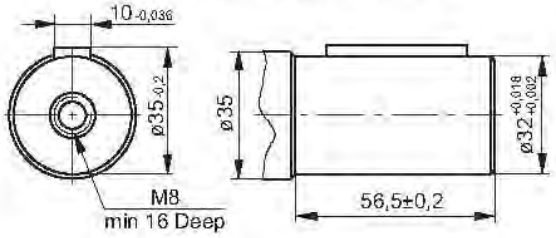
C : 4xM8-13mm depth
$P_{(A,B)}$: 2xG1/2 or 2xM22x1,5-15 mm depth
T : G1/4 or M14x1,5-12 mm depth (plugged)

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

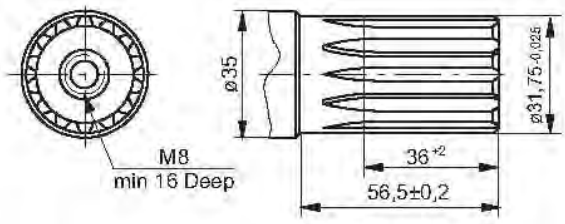
Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

SHAFT EXTENSIONS

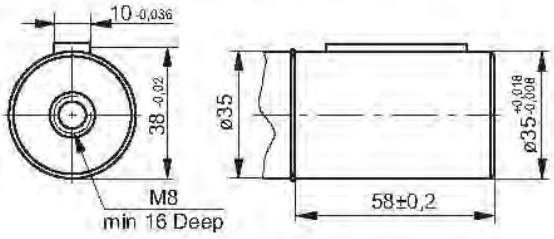
C - ø32 straight, Parallel key A10x8x45 DIN 6885
Max. Torque 77 daNm



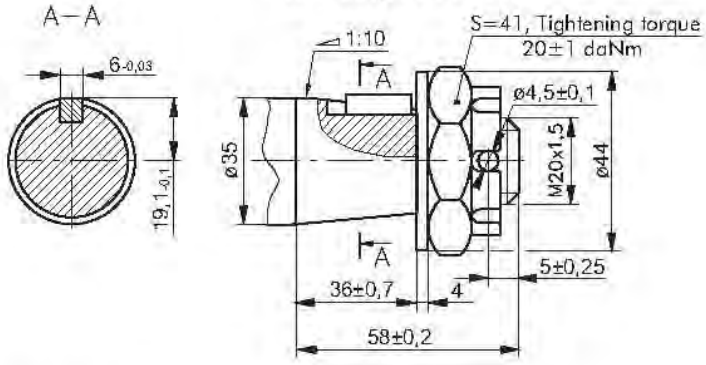
SH - ø1¼" splined 14T, DP 12/24 ANSI B92.1-1976
Max. Torque 95 daNm



CB - ø35 straight, Parallel key A10x8x45 DIN 6885
Max. Torque 95 daNm



K - tapered 1:10, Parallel key B6x6x20 DIN 6885
Max. Torque 95 daNm



ORDER CODE

	1	2	3	4	5	6	7
O H							

Pos.1 - Displacement code

200	- 201,3 [cm³/rev]
250	- 252,0 [cm³/rev]
315	- 314,9 [cm³/rev]
400	- 396,8 [cm³/rev]
500	- 502,4 [cm³/rev]

Pos.2 - Shaft Extensions *

C	- ø32 straight, Parallel key A10x8x45 DIN 6885
SH	- ø1¼" splined 14T ANSI B92.1-1970
CB	- ø35 straight, Parallel key A10x8x45 DIN 6885
K	- ø35 tapered 1:10, Parallel key B6x6x20 DIN 6885

Pos.3 - Ports

omit - BSPP (ISO 228)
M - Metric (ISO 262)

Pos. 4 - Special Features

omit - none

LL	-Low Leakage
LSV	- Low Speed Valve
FR	- Free Running

Pos. 5 - Rotation

omit - Standard Rotation
R - Reverse Rotation

Pos. 6 - Option (Paint)**

omit - no Paint

P	- Painted
PC	- Corrosion Protected Paint

Pos. 7 - Design Series

omit - Factory specified

NOTES:

* The permissible output torque for shafts must be not exceeded!

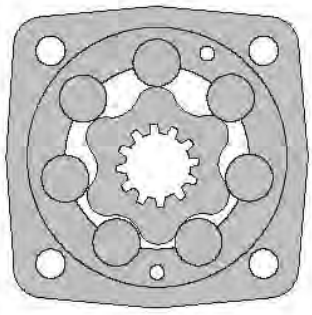
** Color at customer's request.

The hydraulic motors are mangano-phosphatized as standard.

HYDRAULIC MOTORS OS

APPLICATION

» Conveyors;
» Metal working machines;
» Machines for agriculture;
» Road building machines;
» Mining machinery;
» Food industries;
» Special vehicles etc.



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Function diagrams..... OS-05÷08
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OPTIONS

» Model- Disc valve, roll-gerotor
» Flange and wheel mount;
» Short motor;
» Motor with Drum Brake;
» Tacho and speed sensor connection;
» Side and rear ports
» Shafts- straight, splined and tapered;
» Metric and BSPP ports;
» Other special features.

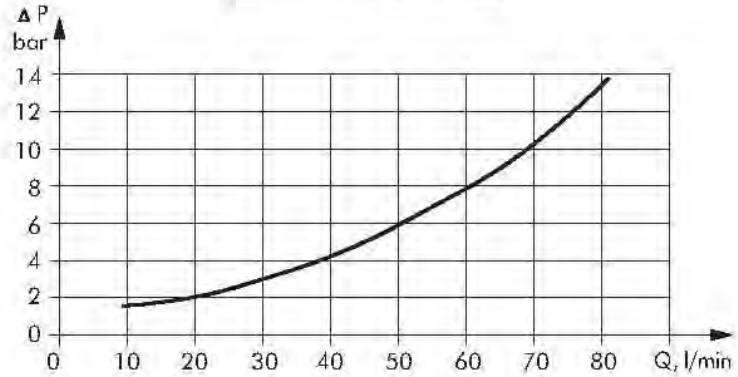
GENERAL

Displacement, [cm^3/rev.]	80,5÷711,9
Max. Speed, [RPM]	810÷105
Max. Torque, [daNm]	23,5÷58
Max. Output, [kW]	19,5÷5,4
Max. Pressure Drop, [bar]	200÷55
Max. Oil Flow, [l/min]	75
Min. Speed, [RPM]	10÷5
Permissible Shaft Loads, [daN]	P_{rad}=1500; P_a=500
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, [°C]	-30÷90
Optimal Viscosity range, [mm^2/s]	20÷75
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 micron)

Oil flow in drain line

Pressure drop (bar)	Viscosity (mm^2/s)	Oil flow in drain line (l/min)
140	20	1,5
	35	1
210	20	3
	35	2

Pressure Losses



SPECIFICATION DATA

Type		OS 80	OS 100	OS 125	OS 160	OS 200
Displacement [cm³/rev.]		80,5	100	125,7	159,7	200
Max. Speed,	cont.	810	750	600	470	375
[RPM]	Int.*	1000	900	720	560	450
Max. Torque	cont.	20	25	32	40	46
[daNm]	Int.*	24	30	38	48	60
	peak**	26	32	40	51	65
Max. Output	cont.	16	17,5	17,5	17,5	15,5
[kW]	int.*	19	21	21	21	22
Max. Pressure Drop	cont.	175	175	175	175	160
[bar]	Int.*	210	210	210	210	210
	peak**	250	250	225	225	225
Max. Oil Flow	cont.	65	75	75	75	75
[l/min]	Int.*	80	90	90	90	90
Max. Inlet Pressure	cont.	210	210	210	210	210
[bar]	Int.*	250	250	250	250	250
	peak**	300	300	300	300	300
Max. Return Pressure	cont. 0-100 RPM	100	100	100	100	100
without Drain Line or	cont. 100-300 RPM	50	50	50	50	50
Max. Pressure	cont. >300 RPM	20	20	20	20	20
inDrainLine,[bar]	Int.* 0-max. RPM	100	100	100	100	100
Max. Return Pressure	cont.	140	140	140	140	140
with Drain Line	Int.*	175	175	175	175	175
[bar]	peak**	210	210	210	210	210
Max. Starting Pressure with Unloaded Shaft, [bar]		12	10	10	8	8
Min. Starting Torque	at max. press. drop cont.	16,5	20,5	26	28	33
[daNm]	at max. press. drop Int.*	19,5	25	31	39	41
Min. Speed*, [RPM]**		10	10	8	8	6
Weight, [kg]	**OSFE**	9,8[10,2]	10[10,4]	10,3[10,7]	10,7[11,1]	11,1[11,5]
	OSWE	10,3[10,7]	10,5[10,9]	10,8[11,2]	11,2[11,6]	11,6[12]
	OSZE	7,8[8,2]	8[8,4]	8,3[8,7]	8,7[9,1]	9,1[9,5]
	OSVE	5,7[6,1]	5,9[6,3]	6,2[6,6]	6,6[7]	7[7,4]
	OSQE	10,2[10,6]	10,4[10,8]	10,7[11,1]	11,1[11,5]	11,5[11,9]
	OSBE	16,8[17,2]	17,0[17,4]	17,3[17,7]	17,7[18,1]	18,1[18,5]

* Intermittent operation: the permissible values may occur for max. 10% of every minute.

** Peak load: the permissible values may occur for max. 1% of every minute.

*** For speeds of 5 RPM lower than given, consult factory or your regional manager.

1) Intermittent speed and intermittent pressure must not occur simultaneously.
2) Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3) Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4) Recommended minimum oil viscosity 13mm²/s at operating temperatures.
5) Recommended maximum system operating temperature is 82°C.
6) To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

SPECIFICATION DATA (continued)

Type		OS 250	OS 315	OS 400	OS 475	OS 525	OS 565
Displacement [cm³/rev.]		250	314,9	397	474,6	522,7	564,9
Max. Speed,	cont.	300	240	185	160	145	130
[RPM]	Int.*	360	290	230	190	175	160
Max. Torque	cont.	50	63	67	58	58	58
[daNm]	Int.*	63	79	79	68	69	69
	peak**	69	84	85	84	85	85
Max. Output	cont.	13,5	11,0	10,5	8,4	7,6	6,9
[kW]	int.*	19	18	15	11,3	10.4	9,6
Max. Pressure Drop	cont.	140	140	120	85	80	75
[bar]	Int.*	175	175	140	100	90	85
	peak**	200	185	140	115	105	100
Max. Oil Flow	cont.	75	75	75	75	75	75
[l/min]	Int.*	90	90	90	90	90	90
Max. Inlet Pressure	cont.	210	210	210	210	210	210
[bar]	Int.*	250	250	250	250	250	250
	peak**	300	300	300	300	300	300
Max. Return Pressure	cont. 0-100 RPM	100	100	100	100	100	100
without Drain Line or	cont. 100-300 RPM	50	50	50	50	50	50
Max. Pressure	cont. >300 RPM	-	-	-	-	-	-
inDrainLine, [bar]	Int.* 0-max. RPM	100	100	100	100	100	100
Max. Return Pressure	cont.	140	140	140	140	140	140
with Drain Line	Int.*	175	175	175	175	175	175
[bar]	peak**	210	210	210	210	210	210
Max. Starting Pressure with Unloaded Shaft, [bar]		8	8	8	8	8	8
Min. Starting Torque	at max. press. drop cont.	36	44	47	47	47	47
[daNm]	at max. press. drop Int.*	44	52	55	55	55	55
Min. Speed***, [RPM]		6	5	5	5	5	5
Weight, [kg]	**OSFE**	11,6[12]	12,3[12,7]	13,2[13,6]	14[14,4]	14,9[15,3]	14,9[15,3]
	OSWE	12,1[12,5]	12,8[13,2]	13,7[14,1]	14,5[14,9]	15,4[15,8]	15,4[15,8]
	OSZE	9,6[10]	10,3[10,7]	11,2[11,6]	12[12,4]	12,9[13,3]	12,9[13,3]
	OSVE	7,5[7,9]	8,2[8,6]	9,1[9,5]	9,9[10,3]	10,8[11,2]	10,8[11,2]
	OSQE	12[12,4]	12,7[13,1]	13,6[14]	14,4[14,8]	15,3[15,7]	15,3[15,7]
	OSBE	18,6[19]	19,3[19,7]	20,2[20,6]	21[21,4]	21,9[22,3]	21,9[22,3]

* Intermittent operation: the permissible values may occur for max. 10% of every minute.

** Peak load: the permissible values may occur for max. 1% of every minute.

*** For speeds of 5 RPM lower than given, consult factory or your regional manager.

1) Intermittent speed and intermittent pressure must not occur simultaneously.
2) Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3) Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4) Recommended minimum oil viscosity 13mm²/s at operating temperatures.
5) Recommended maximum system operating temperature is 82 °C.
6) To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

SPECIFICATION DATA for OS...LSV

Low Speed Valve (LSV) "LSV" Series hydraulic motors have been designed to operate with normal pressure drop and to ensure smooth run at low speed (up to 200 min^{-1}), as the best security for operation is guaranteed at frequency of rotation 20 ÷ 50 min^{-1}. They have an increased starting pressure drop and are not recommended for using at pressure less than 40 bars.

Look at specification data for hydraulic motors standard version. The modification concerns only the following parameters : maximum speed , maximum output, maximum Oil flow and maximum starting pressure.

Type		OS 80	OS 100	OS 125	OS 160	OS 200	OR 250	OS 315	OS 400
Max. Speed,	Cont.	200	200	200	200	200	200	200	185
[RPM]	Int.*	250	250	250	250	250	250	250	225
Max. Output	Cont.	4,6	6,0	7,4	8,0	8,0	8,8	10,6	9,5
[kW]	Int.*	6,5	8,4	10,0	12,2	12,4	13,4	15,0	12,8
Max. Oil Flow	Cont.	16	20	25	32	40	50	65	75
[l/min]	Int.*	20	25	32	40	50	62,5	80	90
Max. Starting Pressure with Unloaded Shaft, [bar]		25	20	20	15	15	15	15	15

SPECIFICATION DATA for OS...LL

Low Leakage (LL) "LL" Series hydraulic motors have been designed to operate at the whole standard range of working conditions (pressure drop and frequency of rotation) , but with considerable decreased volumetric losses in the drainage ports. Their main purpose is to operate as series-connected motors in hydraulic systems.

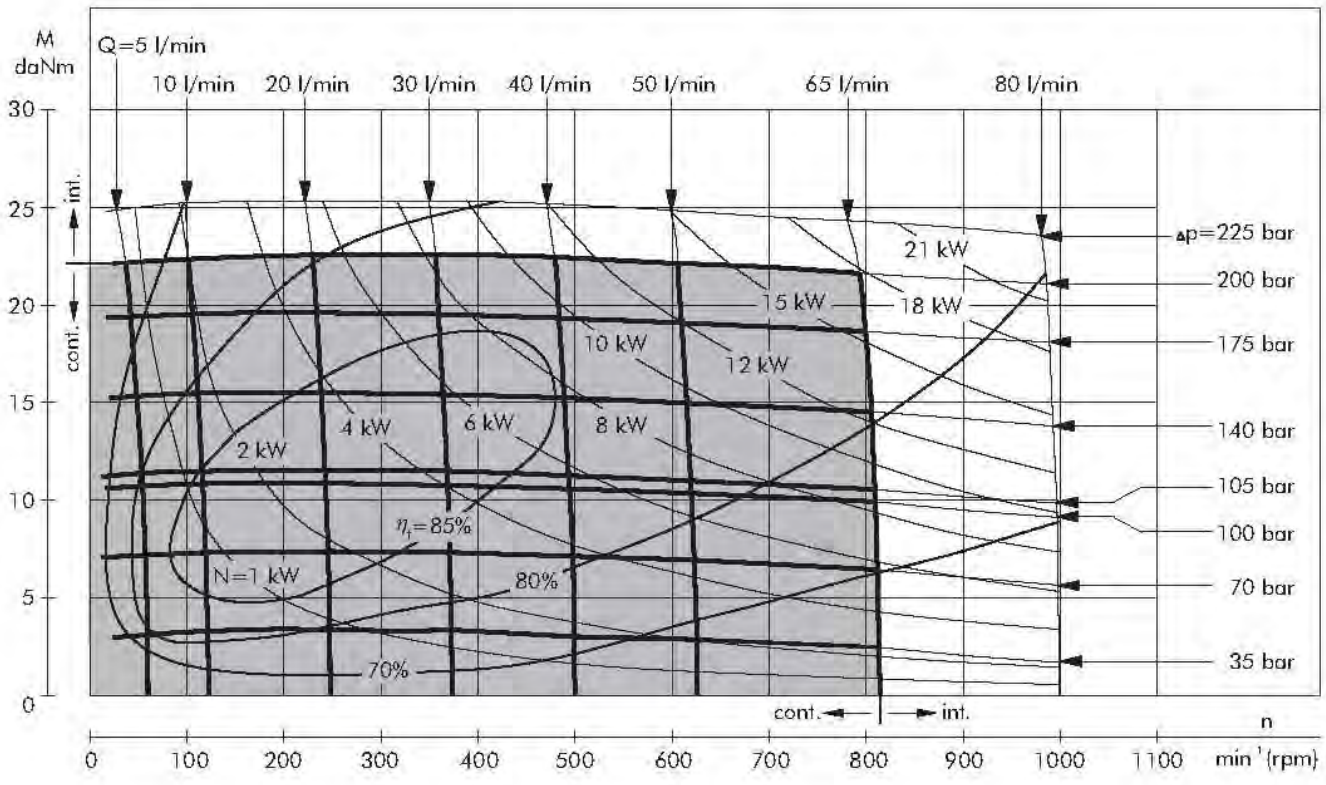
For this version is permissible decreasing of the maximal torque with up to 5% (at middle speed) and up to 10% (at high speed) in comparison to the standard versions of motors.

Look at specification data for hydraulic motors standard version. The modification concerns only the parameters: maximum torque, maximum output, minimum starting torque.

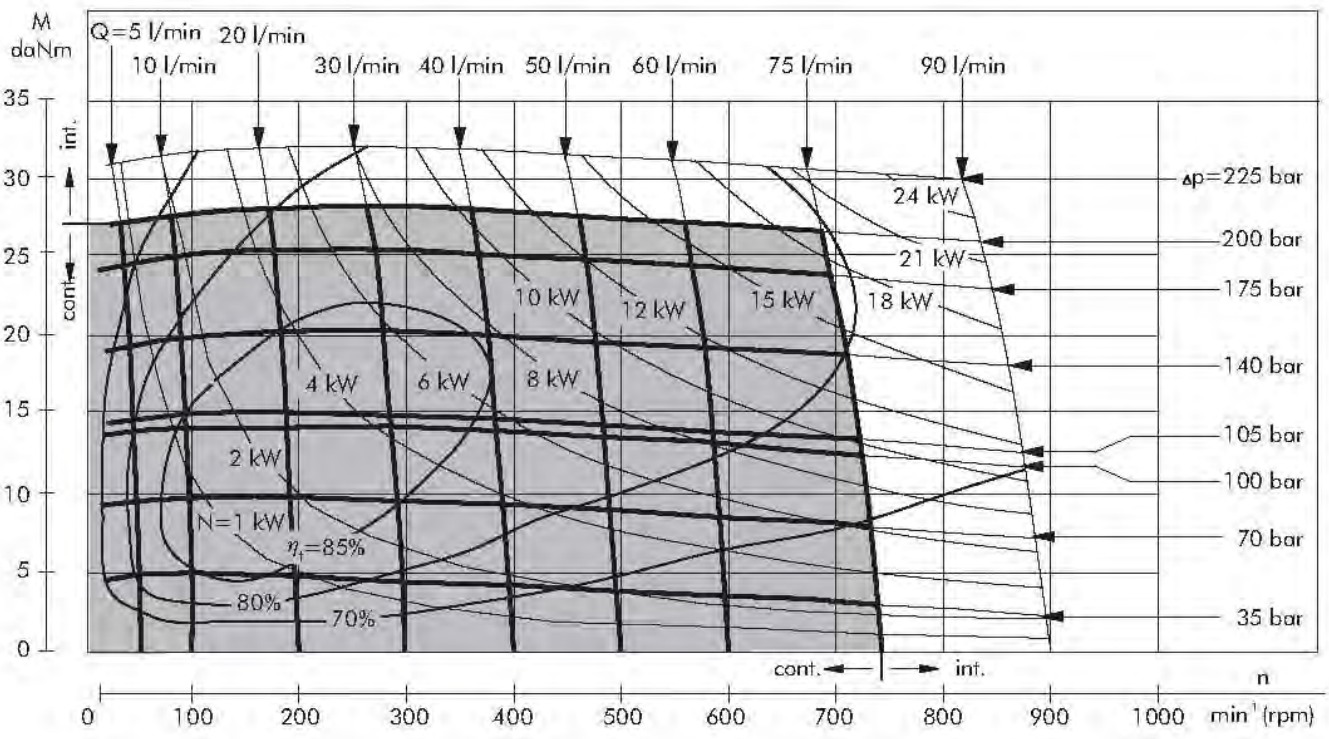
Type		OS 80	OS 100	OS 125	OS 160	OS 200	OS 250	OS 315	OS 400
Max. Torque	Cont.	22,9	28,5	36,4	33,2	39,0	43,8	52,6	56,5
[daNm]	Int.*	25,2	31,1	39,6	46,8	48,8	52,6	61,4	67,2
Max. Output	Cont.	17,8	19,3	19,3	14,8	13,3	11,8	10,9	9,5
[kW]	Int.*	19,3	21,3	21,4	20,0	16,6	14,2	12,8	12,3
Min. Starting Torque	Cont.	18,7	23,2	29,6	27,3	32,2	35,1	43,0	45,8
[daNm]	Int.*	20,3	25,9	32,3	38,0	40,0	43,0	50,7	53,6

FUNCTION DIAGRAMS

OS 80



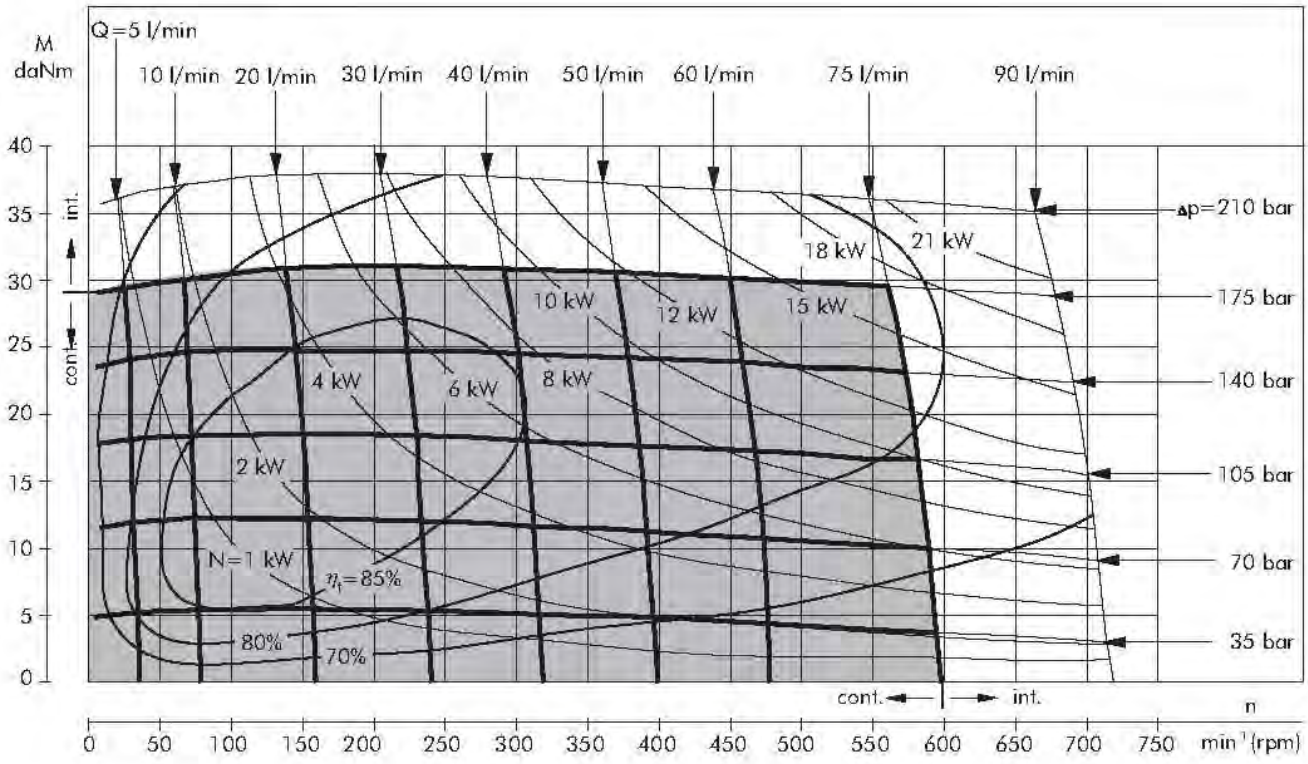
OS 100



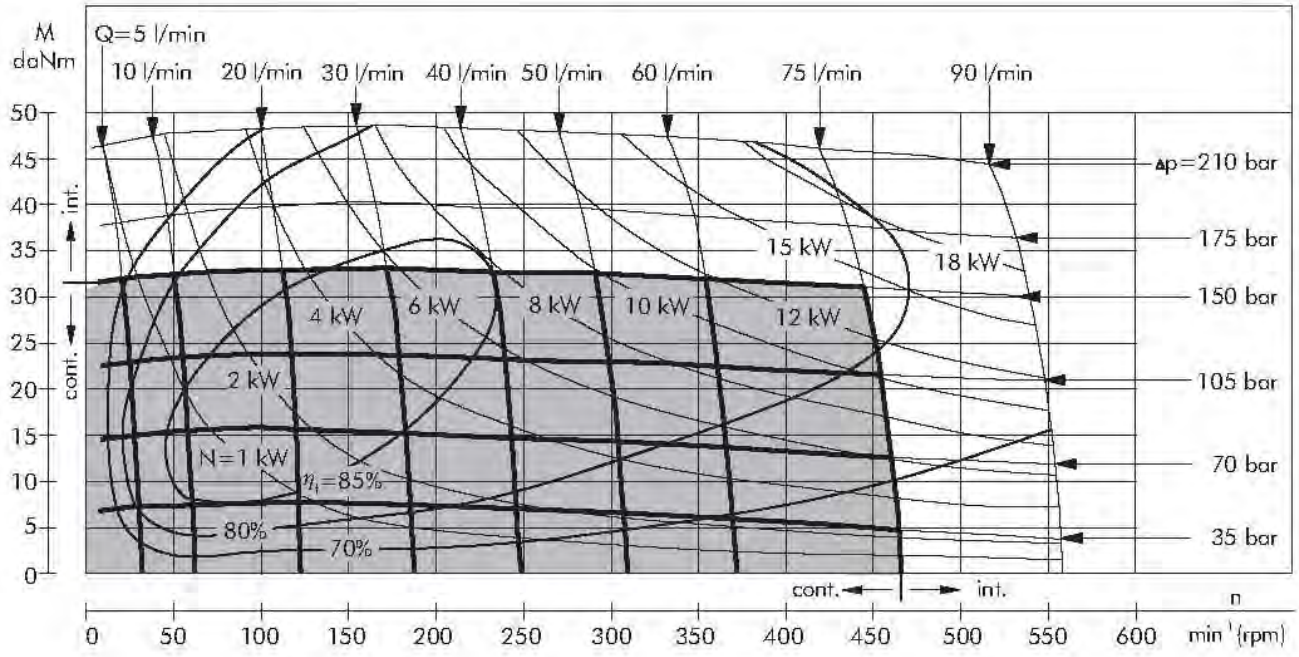
The function diagrams data was collected at back pressure 5÷10 bar and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAMS

OS 125



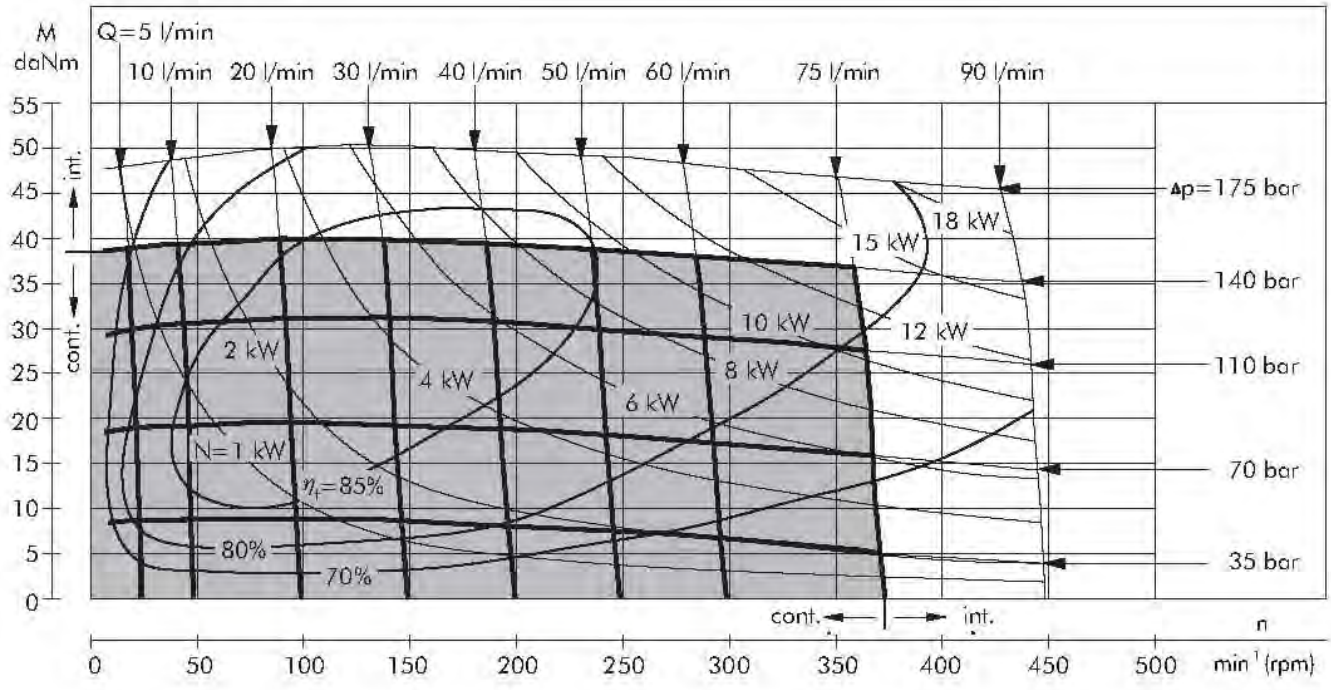
OS 160



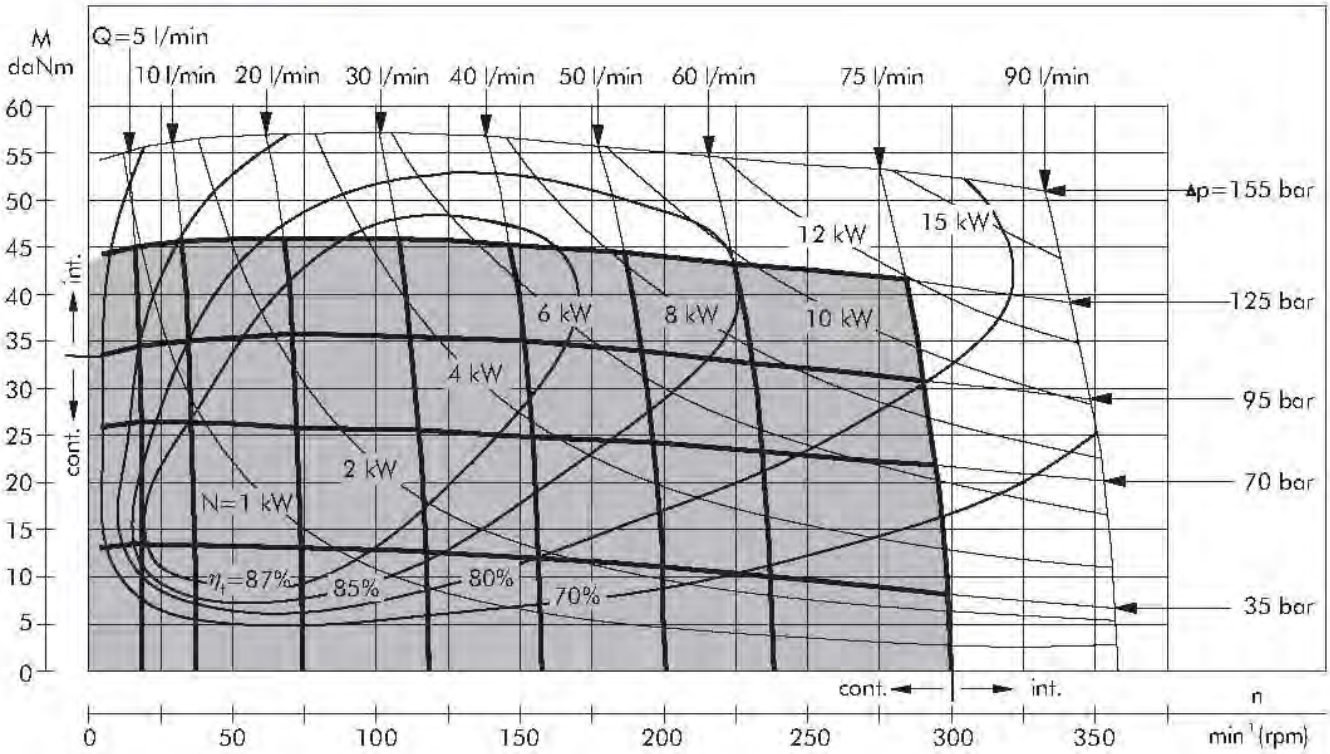
The function diagrams data was collected at back pressure 5÷10 bar
and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAMS

OS 200



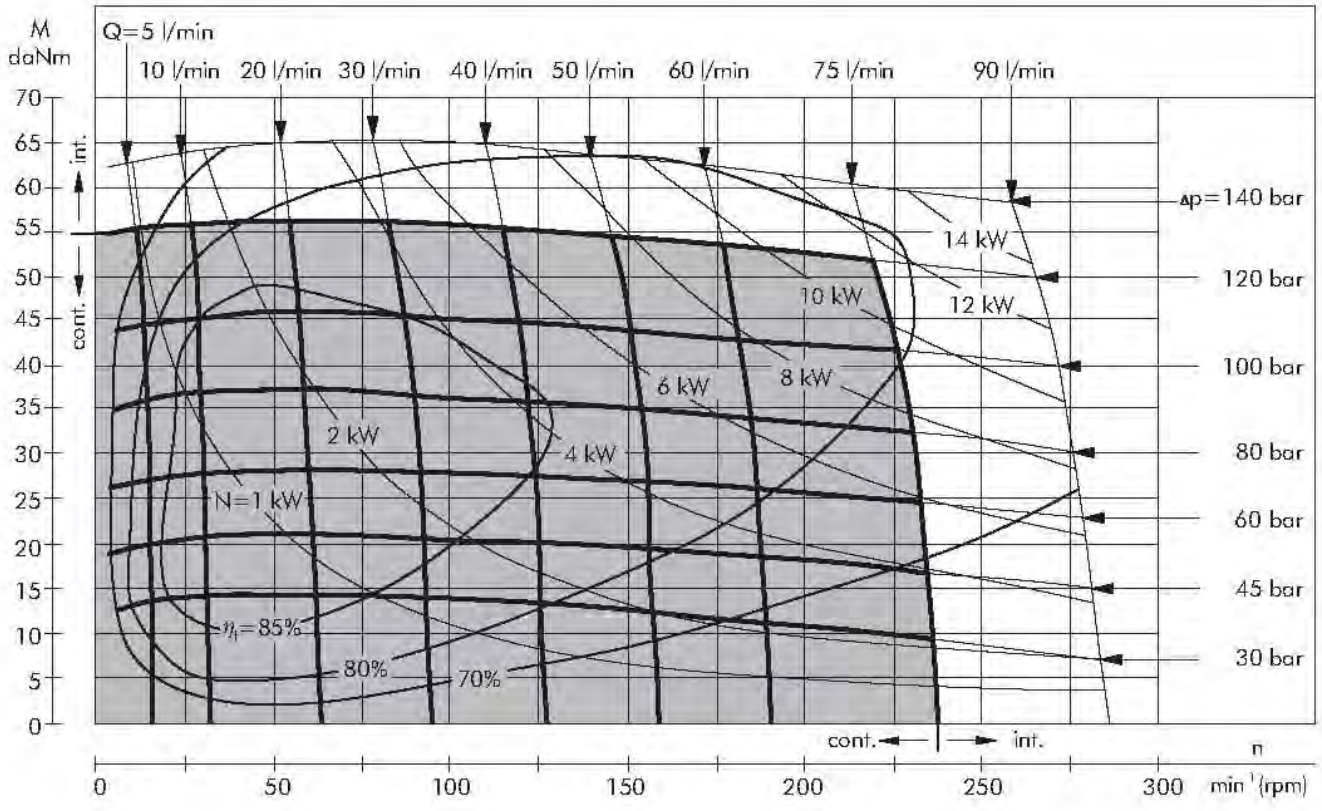
OS 250



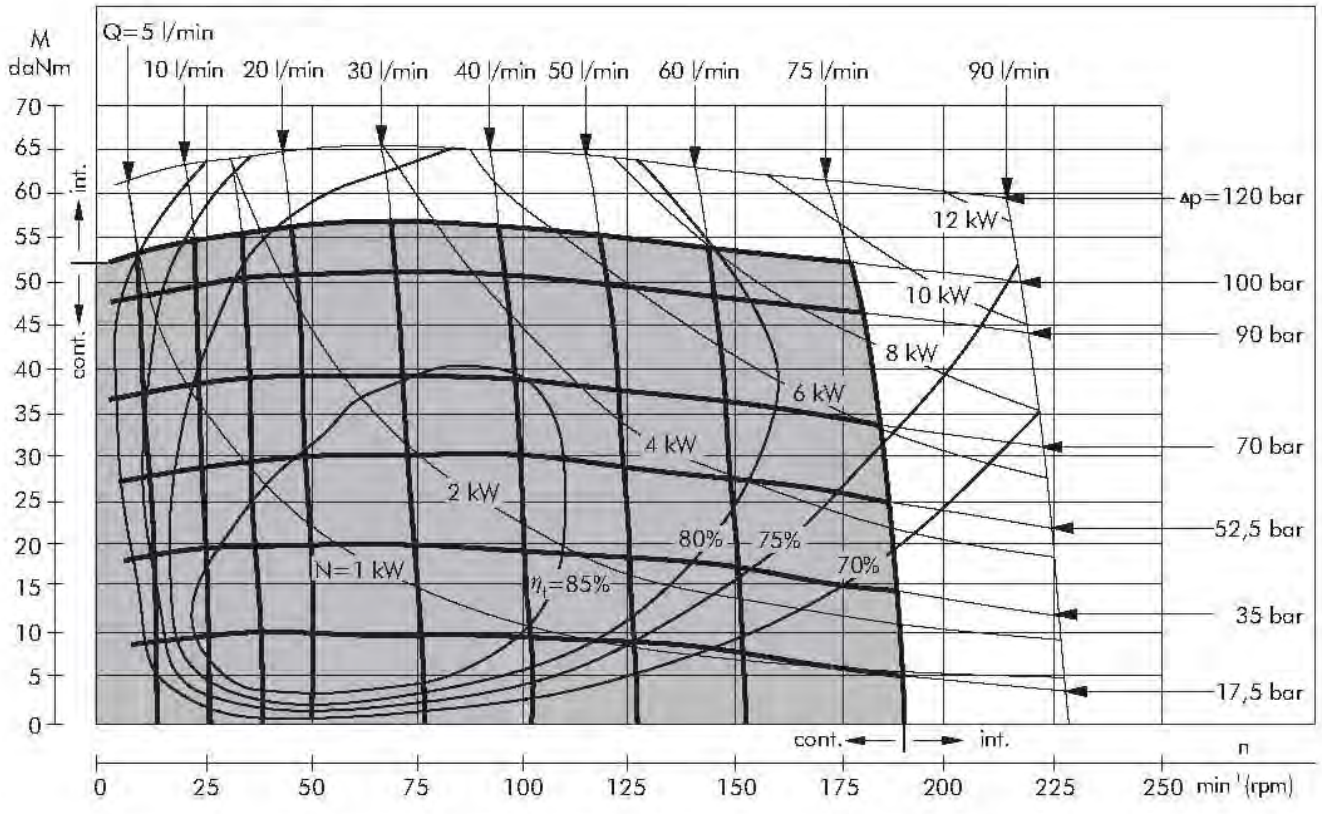
The function diagrams data was collected at back pressure 5÷10 bar
and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAMS

OS 315

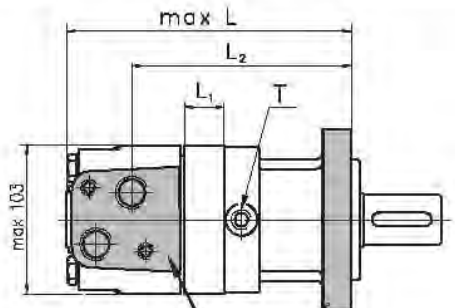


OS 400



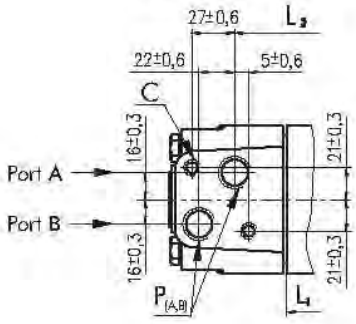
The function diagrams data was collected at back pressure 5÷10 bar and oil with viscosity of 32 mm²/s at 50° C.

DIMENSIONS AND MOUNTING DATA



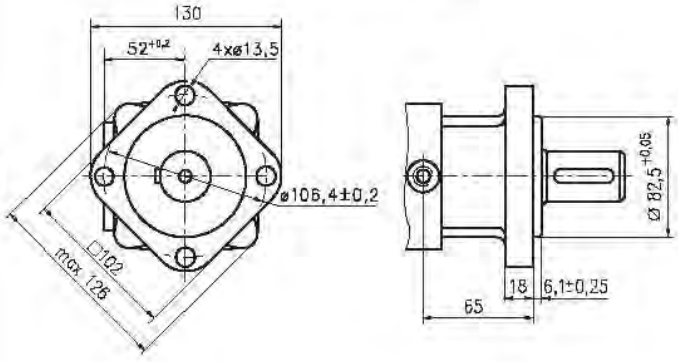
Porting

Side Ports

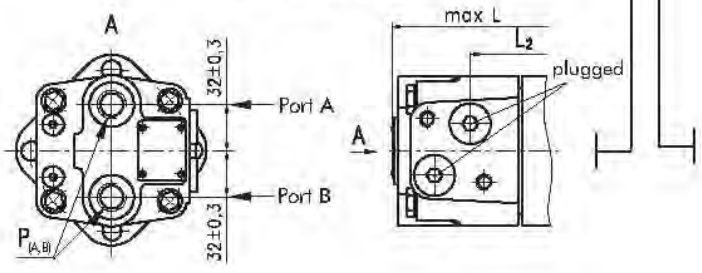


Mounting

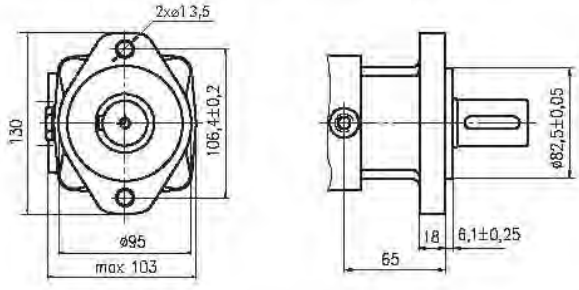
SAE A-4 Mount (4 Holes)



E Rear Ports



A SAE A-2 Mount (2 Holes)



C: 2xM10-12 mm depth
$P_{(A,B)}$: 2xG1/2 or 2xM22x1,5-15 mm depth
T: G ¼ or M14x1,5- 12 mm depth (plugged)

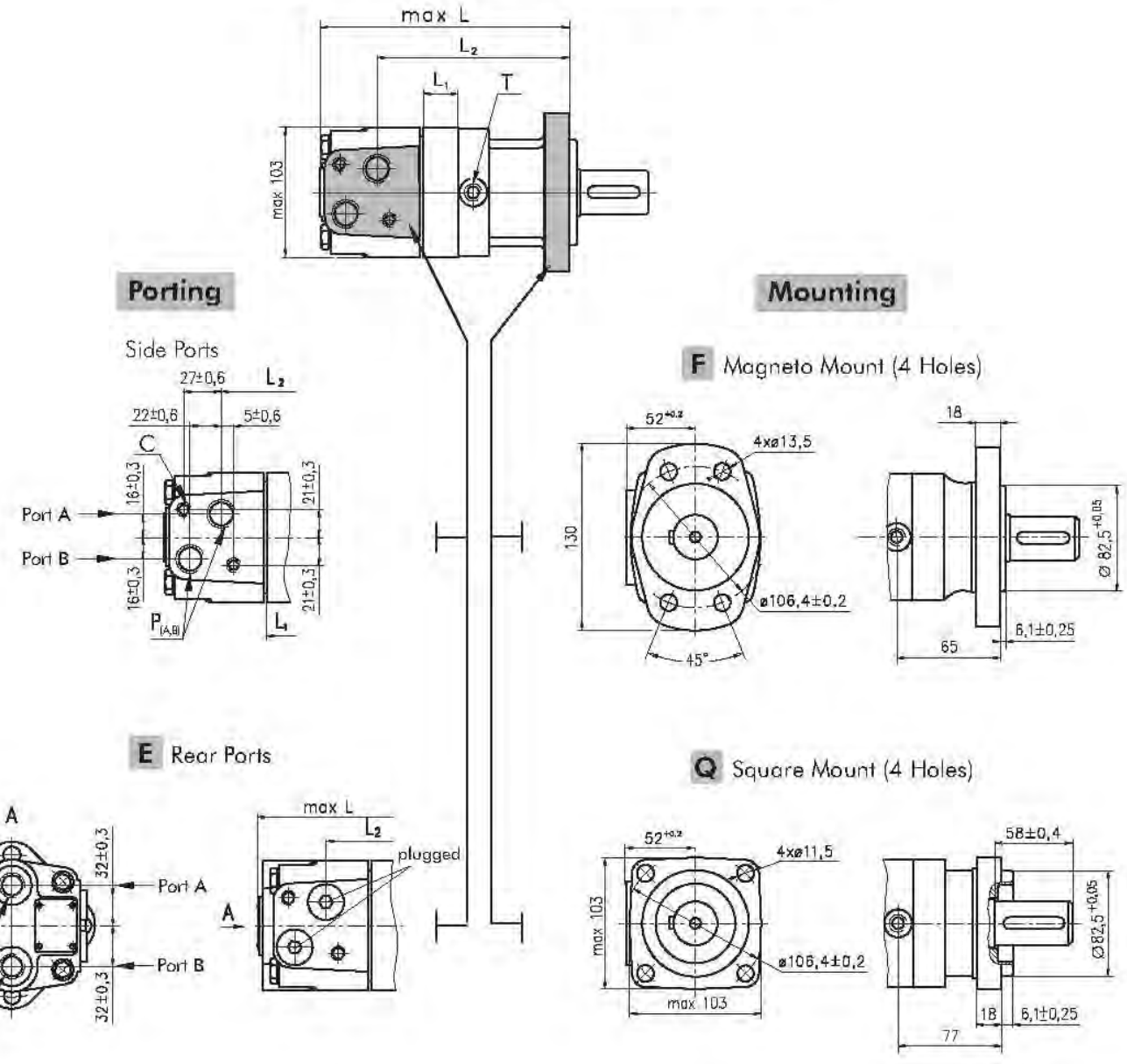
Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

Type	L, mm	L_1, mm	Type	L, mm	* L_1, mm
OS(A) 80	166	121	**OS(A)E 80**	173	11
OS(A) 100	169	125	**OS(A)E 100**	177	14,4
OS(A) 125	174	129	**OS(A)E 125**	181	18,8
OS(A) 160	180	135	**OS(A)E 160**	187	24,8
OS(A) 200	187	142	**OS(A)E 200**	194	31,8
OS(A) 250	195	151	**OS(A)E 250**	203	40,5
OS(A) 315	207	162	**OS(A)E 315**	214	51,8
OS(A) 400	221	176	**OS(A)E 400**	228	66,4
OS(A) 475	235	190	**OS(A)E 475**	242	79,6
OS(A) 565	250	206	**OS(A)E 565**	257	95,3
OS(A) 715	276	231	**OS(A)E 715**	283	121,2

* The width of the gerolor is 3 mm greater than L_1.

DIMENSIONS AND MOUNTING DATA



C: 2xM10-12 mm depth
$P_{(A,B)}$: 2xG1/2 or 2xM22x1,5-15 mm depth
T: G ¼ or M14x1,5- 12 mm depth (plugged)

Standard Rotation
Viewed from Shaft End
Port A Pressurized - CW
Port B Pressurized - CCW

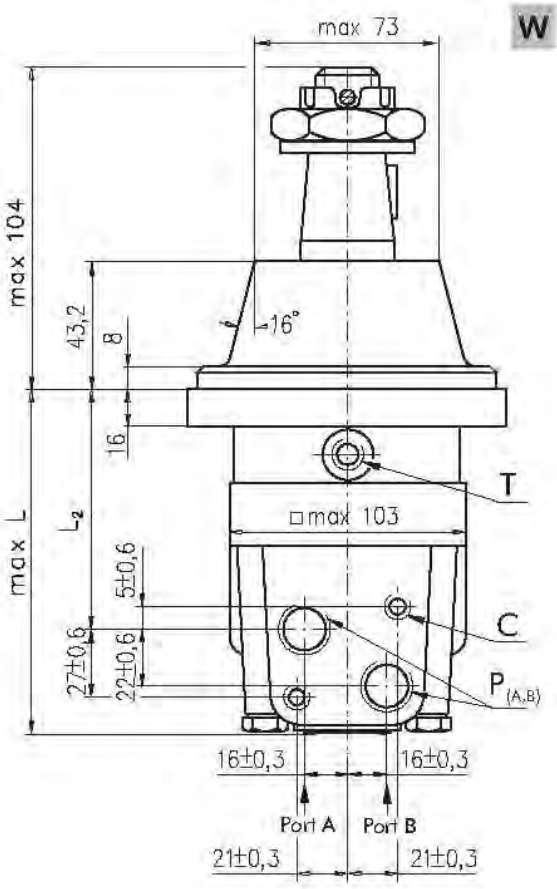
Reverse Rotation
Viewed from Shaft End
Port A Pressurized - CCW
Port B Pressurized - CW

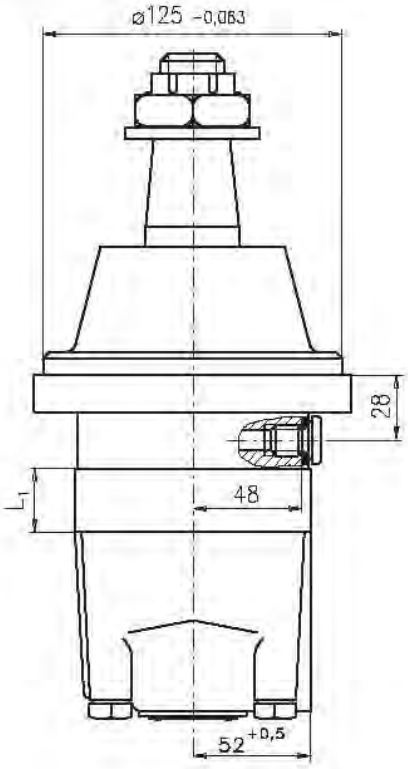
Type	L_1 mm	L_2 mm	Type	L_1 mm	L_2 mm	Type	L_1 mm	Type	L_1 mm	*L_1 mm
OSF 80	166	121	**OSQ 80**	177	133	**OSFE 80**	173	**OSQE 80**	185	11
OSF 100	169	125	**OSQ 100**	181	137	**OSFE 100**	177	**OSQE 100**	189	14,4
OSF 125	174	129	**OSQ 125**	185	141	**OSFE 125**	181	**OSQE 125**	193	18,8
OSF 160	180	135	**OSQ 160**	191	147	**OSFE 160**	187	**OSQE 160**	199	24,8
OSF 200	187	142	**OSQ 200**	198	154	**OSFE 200**	194	**OSQE 200**	206	31,8
OSF 250	195	151	**OSQ 250**	207	163	**OSFE 250**	203	**OSQE 250**	215	40,5
OSF 315	207	162	**OSQ 315**	218	174	**OSFE 315**	214	**OSQE 315**	226	51,8
OSF 400	221	176	**OSQ 400**	233	189	**OSFE 400**	228	**OSQE 400**	241	66,4
OSF 475	235	190	**OSQ 475**	245	202	**OSFE 475**	242	**OSQE 475**	254	79,6
OSF 565	250	206	**OSQ 565**	261	217	**OSFE 565**	257	**OSQE 565**	269	95,3
OSF 715	276	231	**OSQ 715**	287	243	**OSFE 715**	283	**OSQE 715**	295	121,2

* The width of the gerolor is 3 mm greater than L_1.

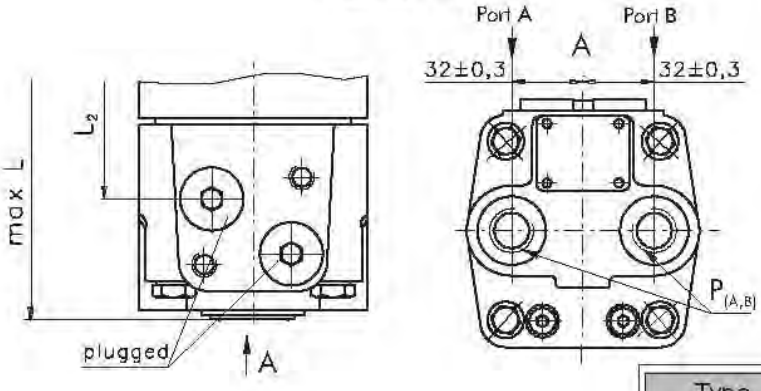
DIMENSIONS AND MOUNTING DATA - OSW

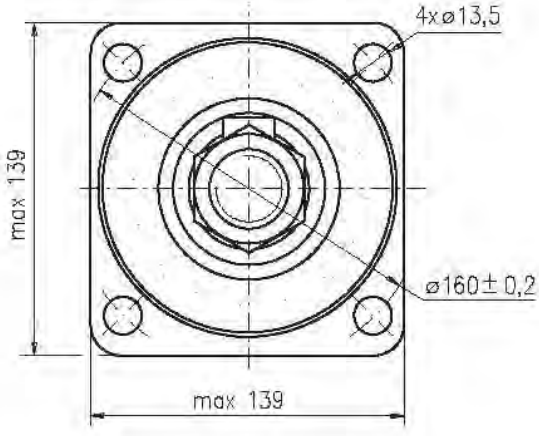
W Wheel Mount





E Rear Port





C: 2xM10-12 mm depth
$P_{(A,B)}$: 2xG1/2 or 2xM22x1,5-15 mm depth
T: G ¼ or M14x1,5 - 12 mm depth(plugged)

Type	L, mm	*L_1, mm	L_2, mm	Type	L, mm
OSW 80	127	11,0	84	**OSWE 80**	138
OSW 100	131	14,4	88	**OSWE 100**	142
OSW 125	135	18,8	92	**OSWE 125**	146
OSW 160	141	24,8	98	**OSWE 160**	152
OSW 200	148	31,8	105	**OSWE 200**	159
OSW 250	157	40,5	114	**OSWE 250**	168
OSW 315	168	51,8	125	**OSWE 315**	179
OSW 400	182	66,4	140	**OSWE 400**	194
OSW 475	196	79,6	153	**OSWE 475**	207
OSW 565	211	95,3	168	**OSWE 565**	222
OSW 715	237	121,2	194	**OSWE 715**	248

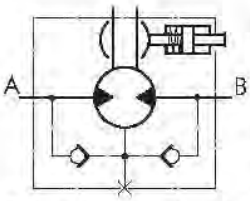
* The width of the gerolor is 3 mm greater than L_1.

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

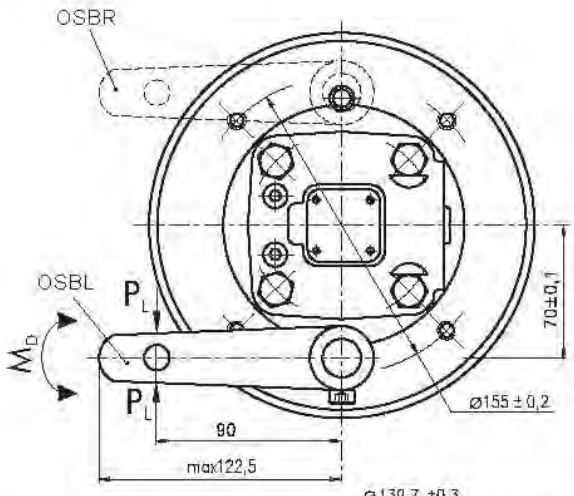
DIMENSIONS AND MOUNTING DATA - OSB

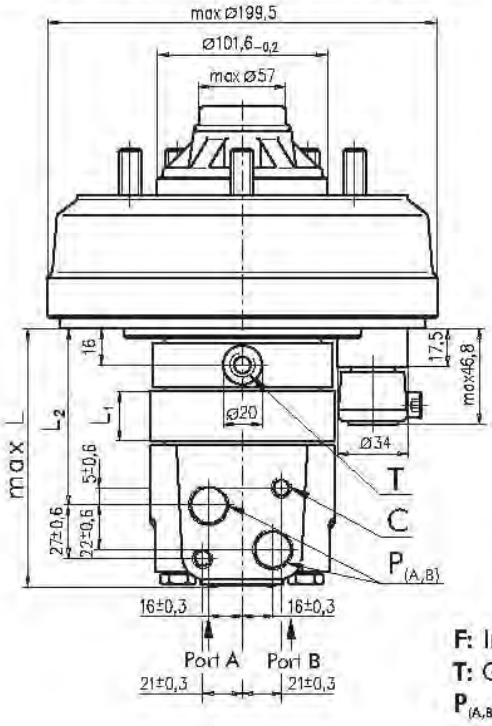
B Motor with Brum Brake

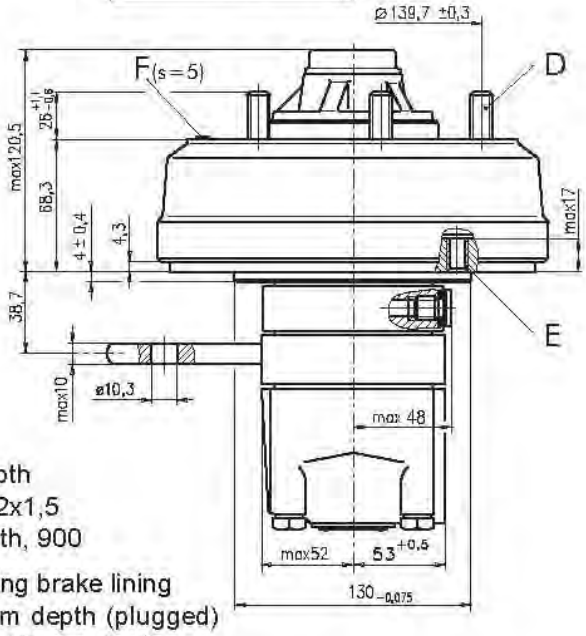


Actuating the brake level, the brake shaft is turned. The rectangular shape of the inner part of this shaft forces the brake pads to be pressed against the brake drum. This brakes the wheel or the winch drum.

Releasing the level, the springs pull it and the brake pads back to the initial position. The motor output shaft is released. Minimum angle adjustment is 10°. It can be adjusted by dismounting the level. Depending on the application You can choose the actuating direction of the brake level. The rod connection actuating the brake should be capable of moving at last 25 mm from neutral to extreme position.

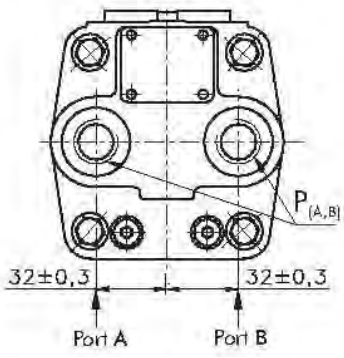


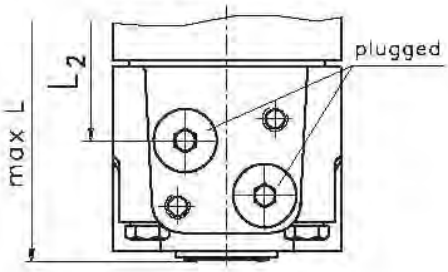




C: 2xM10-12 mm depth
D: Wheel bolts 5xM12x1,5
E: 4xM12; 17mm depth, 900
F: Inspection hole for checking brake lining
T: G 1/4 or M14x1,5 - 12 mm depth (plugged)
$P_{(A,B)}$: 2xG1/2 or 2xM22x1,5-15 mm depth

E Rear Port





Type	L_1 mm	*L_1, mm	L_2, mm	Type	L_1 mm
OSB 80	117	11,0	71	**OSBE 80**	127
OSB 100	120	14,4	74	**OSBE 100**	130
OSB 125	124	18,8	79	**OSBE 125**	134
OSB 160	130	24,8	85	**OSBE 160**	140
OSB 200	137	31,8	92	**OSBE 200**	147
OSB 250	146	40,5	107	**OSBE 250**	156
OSB 315	157	51,8	112	**OSBE 315**	167
OSB 400	172	66,4	127	**OSBE 400**	182
OSB 475	186	79,6	140	**OSBE 475**	196
OSB 565	201	95,3	155	**OSBE 565**	211
OSB 715	227	121,2	181	**OSBE 715**	237

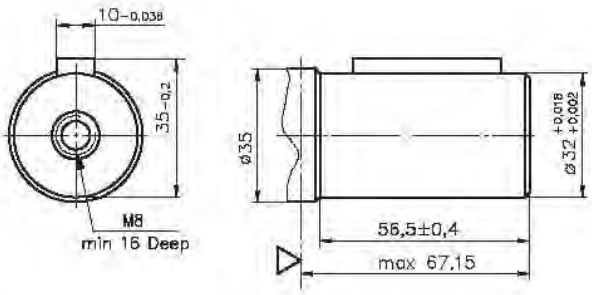
* The width of gerolor is 3 mm greater than L_1.

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

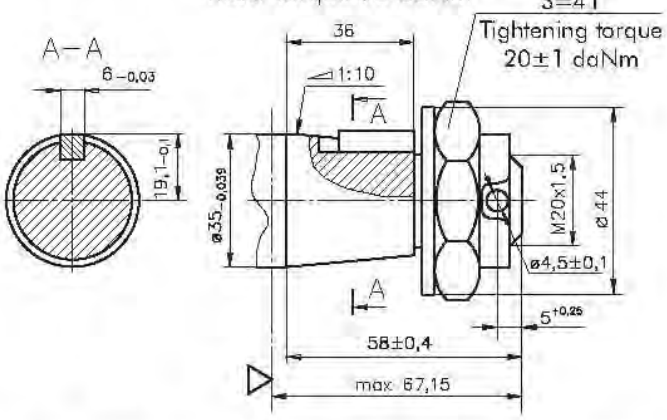
Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

SHAFT EXTENSIONS

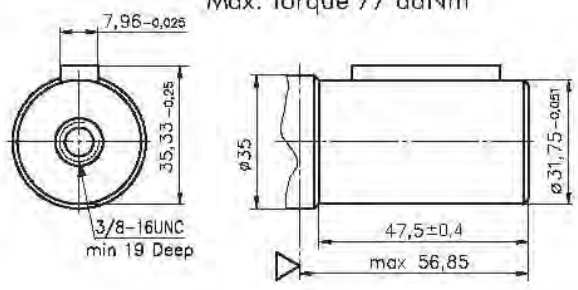
C - ø32 straight, Parallel key A10x8x45 DIN 6885
Max. Torque 77 daNm



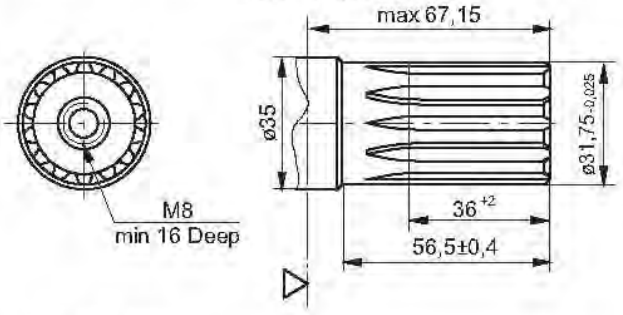
K - tapered 1:10, Parallel key B6x6x20 DIN 6885
Max. Torque 95 daNm



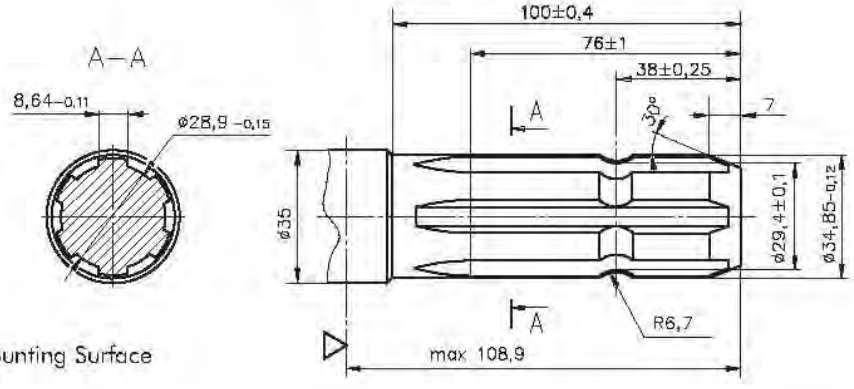
CO- ø1¼" straight, Parallel key 5/16"x 5/16"x 1¼"BS46
Max. Torque 77 daNm



SH - ø1¼" splined 14T, DP12/24 ANSI B92.1-1976
Max. Torque 95 daNm

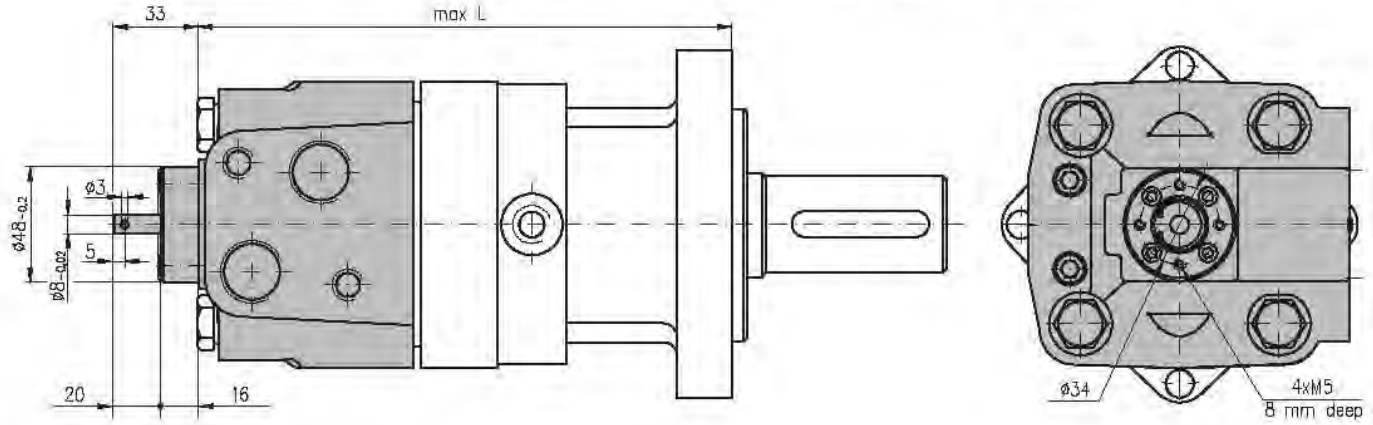


SL - ø34,85 p.t.o. DIN 9611 Form 1
Max. Torque 77 daNm



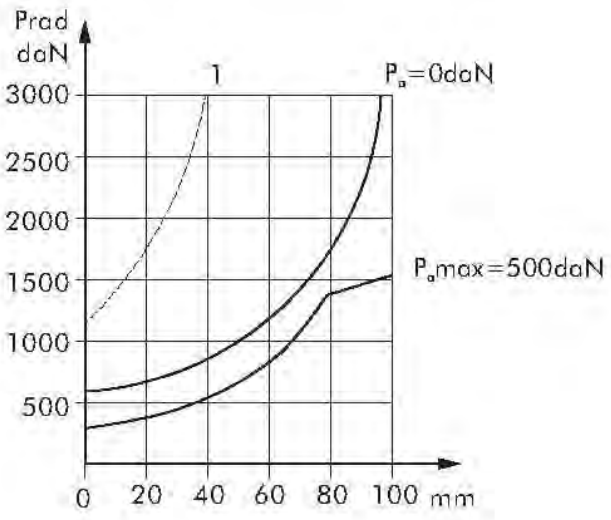
∇- Motor Mounting Surface

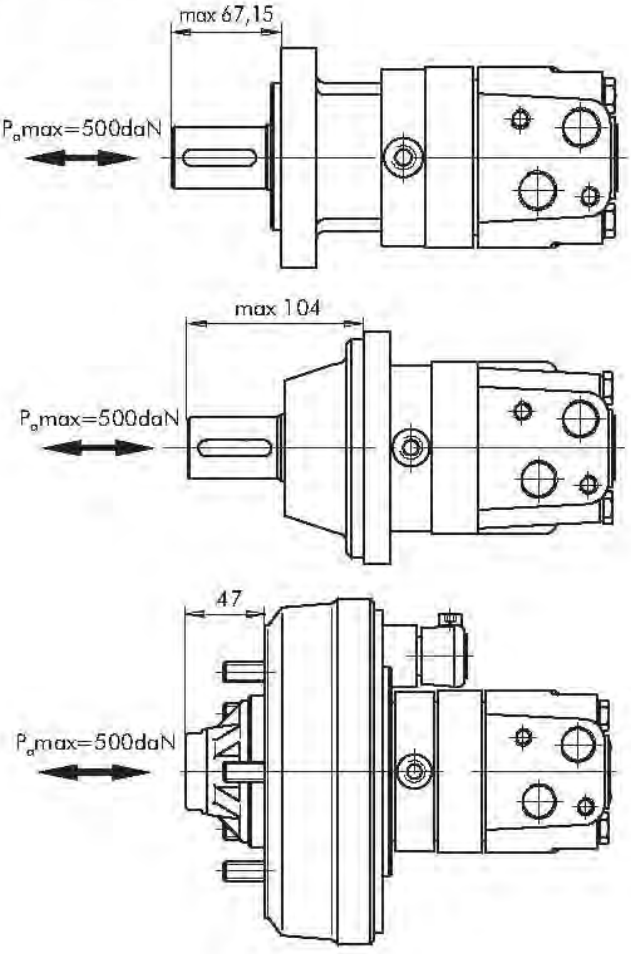
MOTORS WITH TACHO CONNECTION - Option "T"



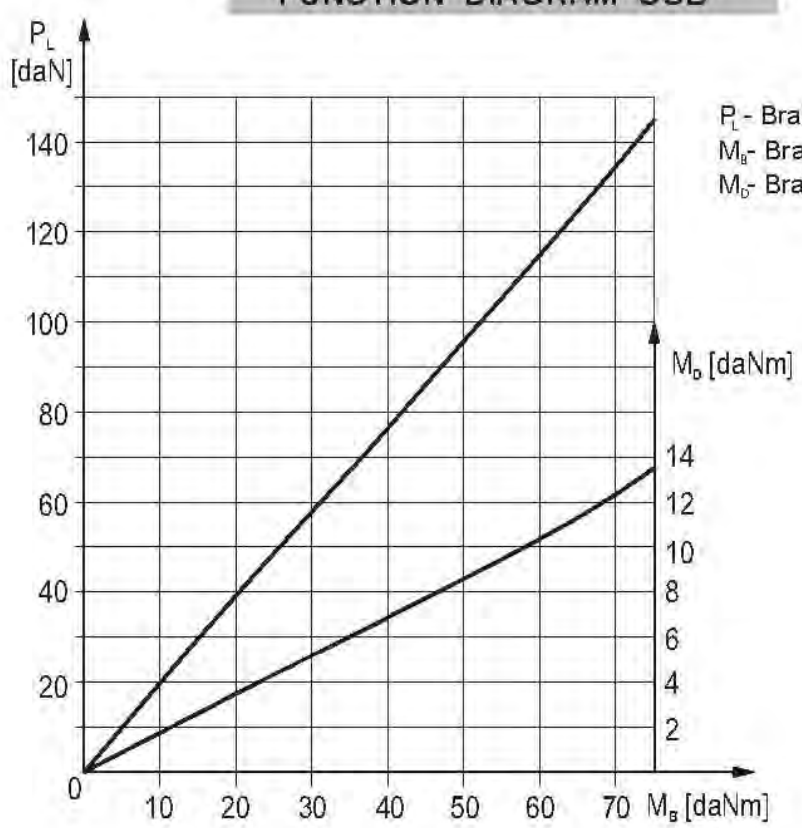
PERMISSIBLE SHAFT LOADS

The output shaft runs in tapered bearings that permit high axial and radial forces.
Curve "1" shows max. radial shaft load. Any shaft load exceeding the values quoted in the curve will seriously reduce motor life. The two other curves apply to a B10 bearing life of 3000 hours at 200 RPM.



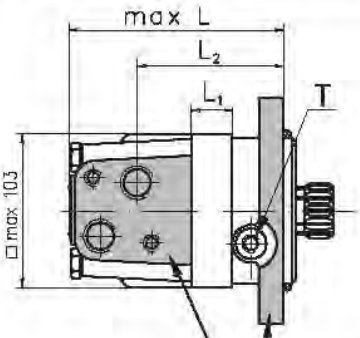


FUNCTION DIAGRAM OSB



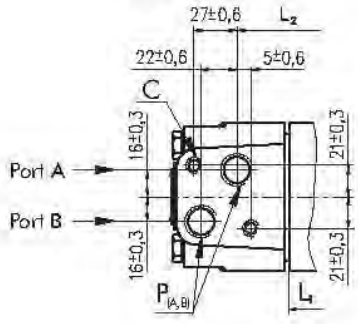
P_L - Brake Lever Load
M_B - Brake Torque
M_D - Brake Lever Torque

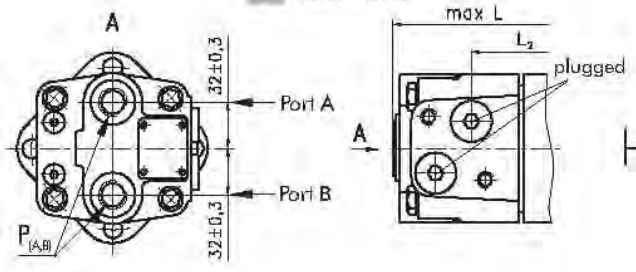
DIMENSIONS AND MOUNTING DATA - OSS, OSV and OSZ



Porting

Side Ports





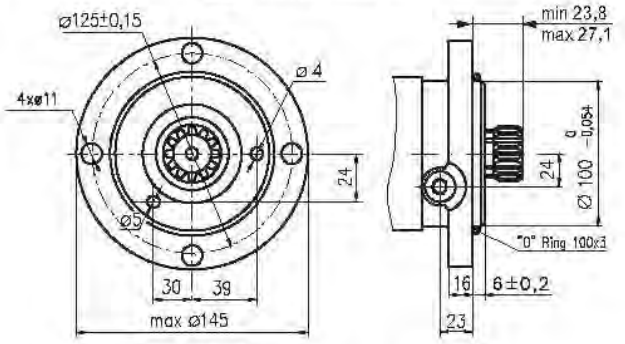
C: 2xM10-12 mm depth
$P_{(A,B)}$: 2xG1/2 or 2xM22x1,5-15 mm depth
T: G ¼ or M14x1,5- 12 mm depth (plugged)

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

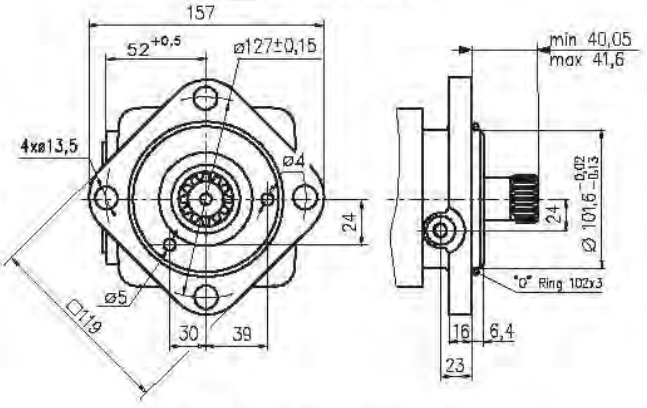
Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

Mounting

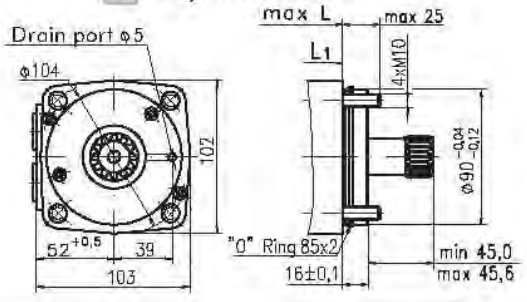
S Short Mount



Z Short Mount



V Very Short Mount

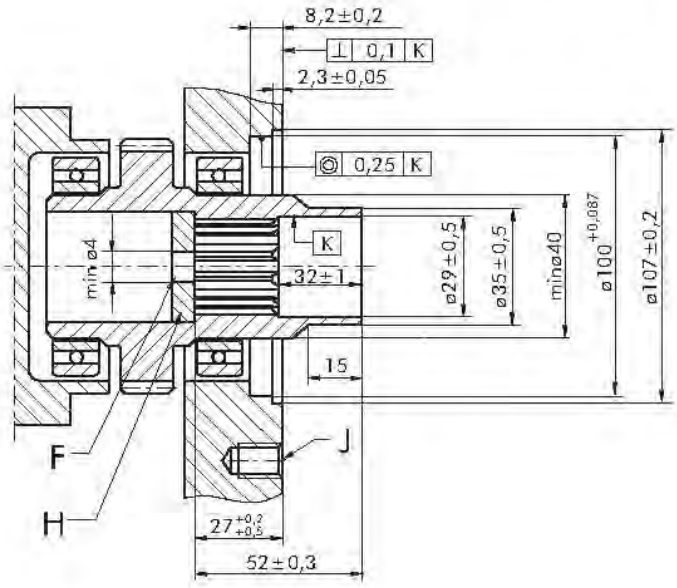


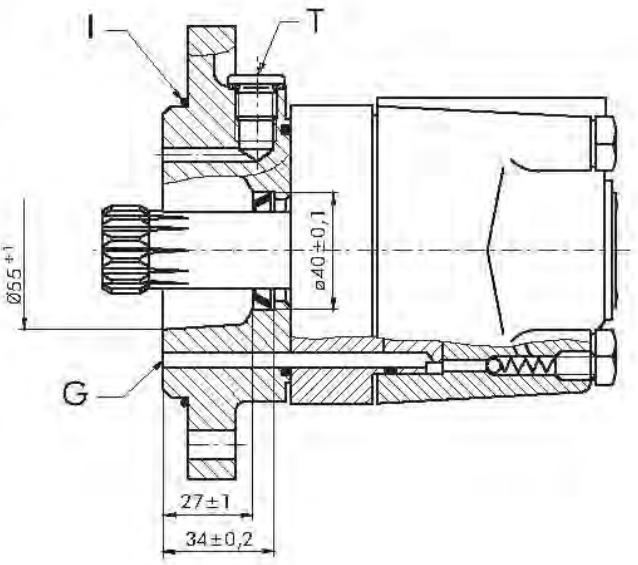
Type **	L, mm	L_2, mm	Type	L, mm	L_2, mm	Type	L, mm	Type	L, mm	*L_1, mm
OSS 80	123	80	**OSV 80**	89	49	**OSSE 80**	134	**OSVE 80**	97	11
OSS 100	127	84	**OSV 100**	92	52,5	**OSSE 100**	138	**OSVE 100**	100	14,4
OSS 125	131	87	**OSV 125**	97	57	**OSSE 125**	141	**OSVE 125**	105	18,8
OSS 160	137	93	**OSV 160**	103	63	**OSSE 160**	147	**OSVE 160**	111	24,8
OSS 200	144	100	**OSV 200**	110	70	**OSSE 200**	154	**OSVE 200**	118	31,8
OSS 250	153	109	**OSV 250**	118	78,5	**OSSE 250**	163	**OSVE 250**	126	40,5
OSS 315	164	120	**OSV 315**	130	90	**OSSE 315**	174	**OSVE 315**	138	51,8
OSS 400	179	135	**OSV 400**	144	105	**OSSE 400**	189	**OSVE 400**	153	66,4
OSS 475	192	149	**OSV 475**	158	118	**OSSE 475**	203	**OSVE 475**	166	79,6
OSS 565	207	164	**OSV 565**	173	133	**OSSE 565**	218	**OSVE 565**	181	95,3
OSS 715	233	190	**OSV 715**	199	159	**OSSE 715**	244	**OSVE 715**	207	121,2

* The width of the gerolor is 3 mm greater than L_1.
** OSZ(E) have the same dimension as type OSS(E)

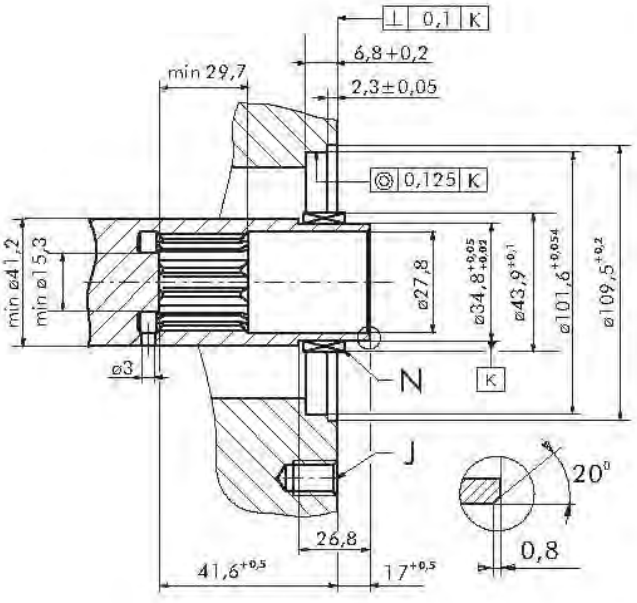
DIMENSIONS OF THE ATTACHED COMPONENT

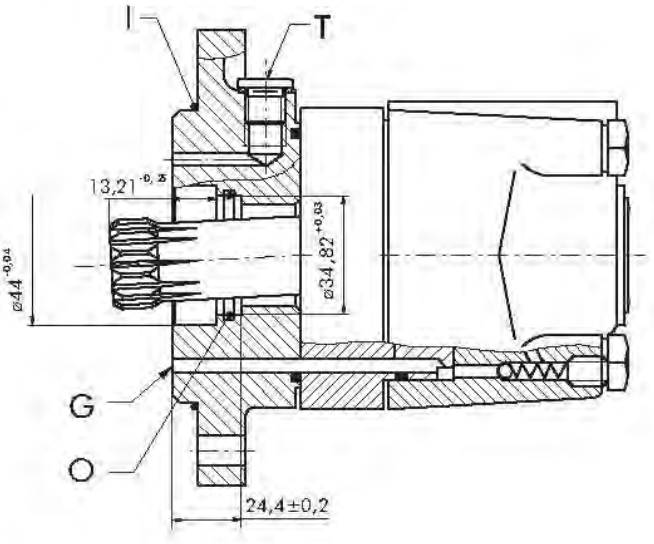
For OSS





For OSZ



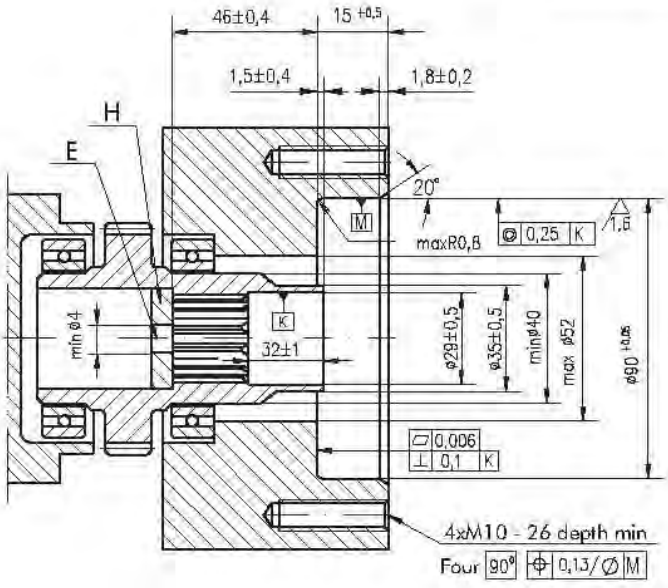


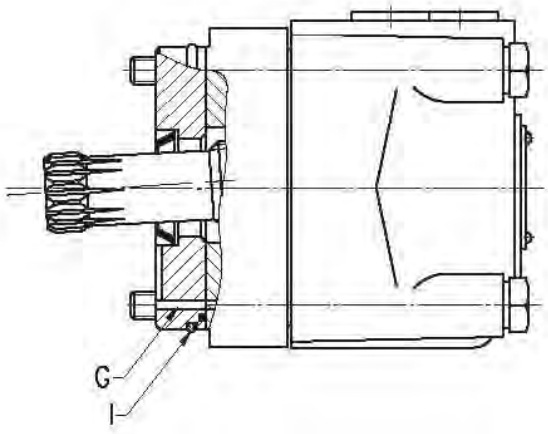
F: Oil circulation hole
G: Internal drain channel
H: Hardened stop plate
I: O- Ring 100x3mm (for OSS) or 102x3mm (for OSZ)

J: 4xM10-16 mm depth(for OSS) or 4xM12-20 mm depth (for OSZ), 90°
N: Needle bearing 1 3/8"x1 3/4"
O: O- Ring 34,5x3mm
T: Drain connection G1/4 or M14x1,5

DIMENSIONS OF THE ATTACHED COMPONENT (continued)

For OSV





E: External drain channel
G: Internal drain channel

H: Hardened stop plate
I: O- Ring 85x2mm

DRAIN CONNECTION

A drain line ought to be used when pressure in the return line can exceed the permissible pressure. It can be connected:

- For OSZ at the drain port of the motor;
- For OSV at the drain connection of the attached component. The maximum pressure in the drain line is limited by the attachedcomponent and its shaft seal.

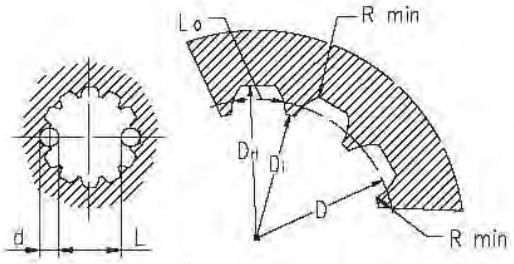
The drain line must be possible for oil to flow freely between motor and attached component and must be led to the tank. The maximum pressure in the drain line is limited by the attached component and its seal.

INTERNAL SPLINE DATA FOR THE ATTACHED COMPONENT

Standard ANSI B92.1-1976, class 5
[m=2.1166; corrected x.m=+0,8]

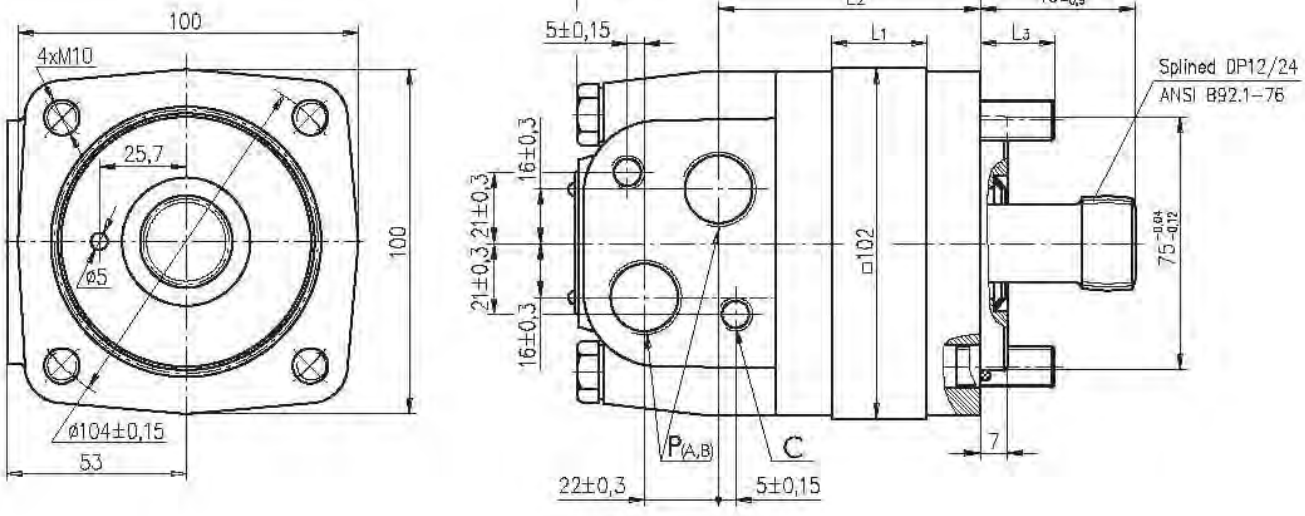
Fillet Root Side Fit		mm
Number of Teeth	z	12
Diametral Pitch	DP	12/24
Pressure Angle		30°
Pitch Dia.	D	25,4
Major Dia.	Dri	$28,0_{-0,1}$
Minor Dia.	Di	$23,0^{+0,033}$
Space Width [Circular]	Lo	4,308±0,020
Fillet Radius	Rmin	0,2
Max. Measurement between Pin	L	$17,62^{+0,15}$
Pin Dia.	d	4,835±0,001

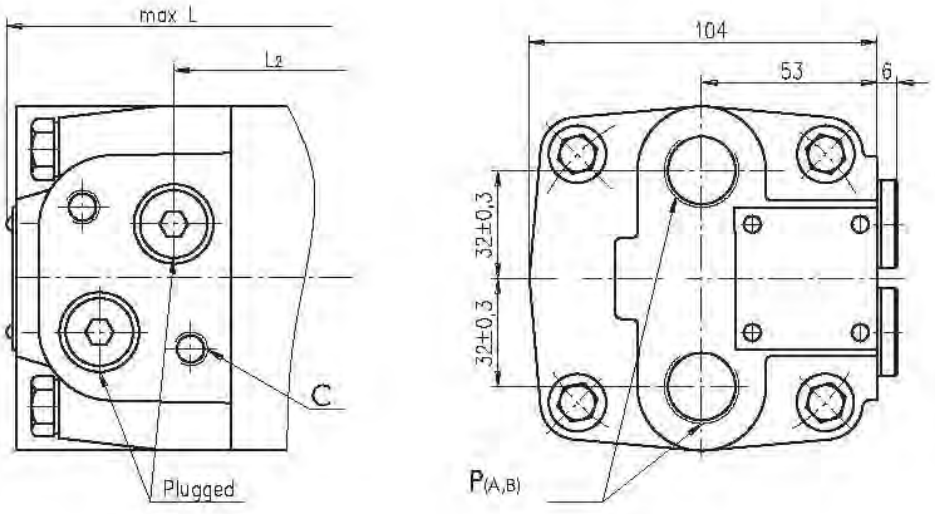
Above are when hardened



Hardering Specification:
HRC 60±2
Effective case depth (HRC 52) 0,7±0,2 mm
Materiall 20 MoCr4 DIN 17210 or better

OUTLINE DIMENSIONS REFERENCE for OSU

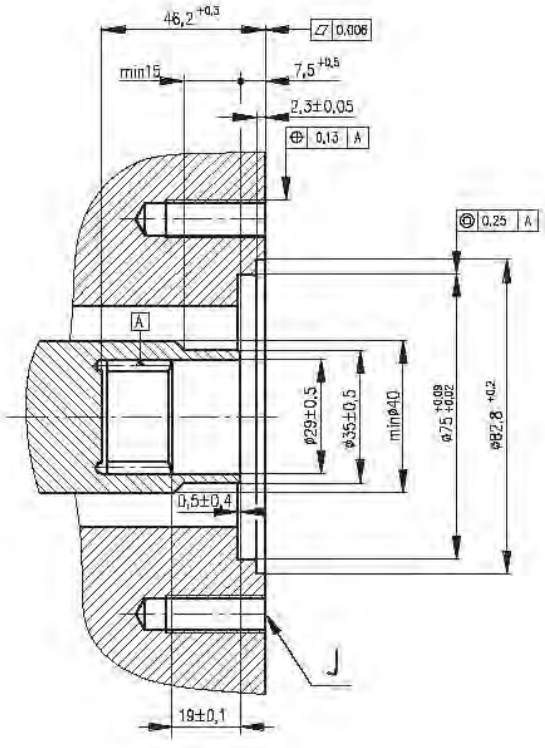


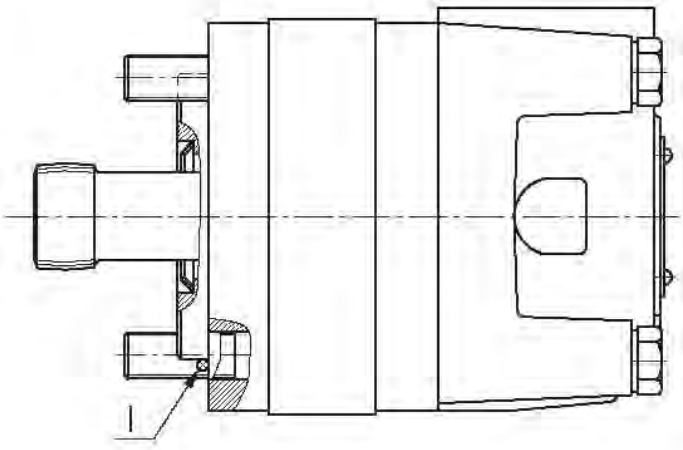


P(A,B):2xG1/2 -12 mm depth
C: 2xM10 -12 mm depth

Type	L, mm	Type	L, mm	L_1, mm	L_2, mm	L_3, mm
OSU 80	98,5	**OSUE 80**	103,5	14,0	63,0	22,0
OSU 100	102,0	**OSUE 100**	107,0	17,4	66,4	18,5
OSU 125	106,0	**OSUE 125**	113,0	21,8	70,8	19,0
OSU 160	112,0	**OSUE 160**	117,0	27,8	76,8	23,0
OSU 200	119,0	**OSUE 200**	124,0	34,8	83,8	21,0
OSU 250	128,0	**OSUE 250**	133,0	43,5	92,5	22,5
OSU 315	139,0	**OSUE 315**	144,0	54,8	103,8	21,0
OSU 400	154,0	**OSUE 400**	159,0	69,4	118,4	21,5

DIMENSIONS OF THE ATTACHED COMPONENT for OSU





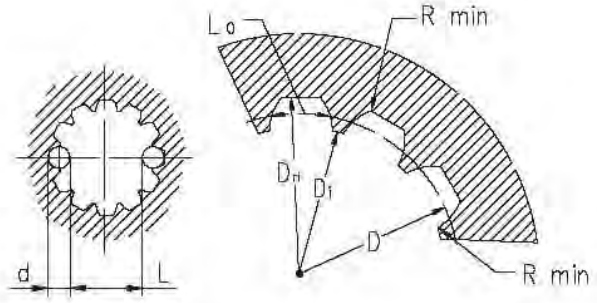
J: 4xM10-26 mm depth, 90°, ø104
I: O- Ring 75x3 mm

INTERNAL SPLINE DATA FOR THE ATTACHED COMPONENT

Standard ANSI B92.1-1976, class 5
[m=2.1166; corrected x.m=+0,8]

Fillet Root Side Fit		mm
Number of Teeth	z	12
Diametral Pitch	DP	12/24
Pressure Angle		30^{O}
Pitch Dia.	D	25,4
Major Dia.	Dri	$28,0_{-0,1}$
Minor Dia.	Di	$23,0^{+0,033}$
Space Width [Circular]	Lo	4,308±0,020
Fillet Radius	Rmin	0,2
Max. Measurement between Pin	L	$17,62^{+0,15}$
Pin Dia.	d	4,835±0,001

Above are when hardened

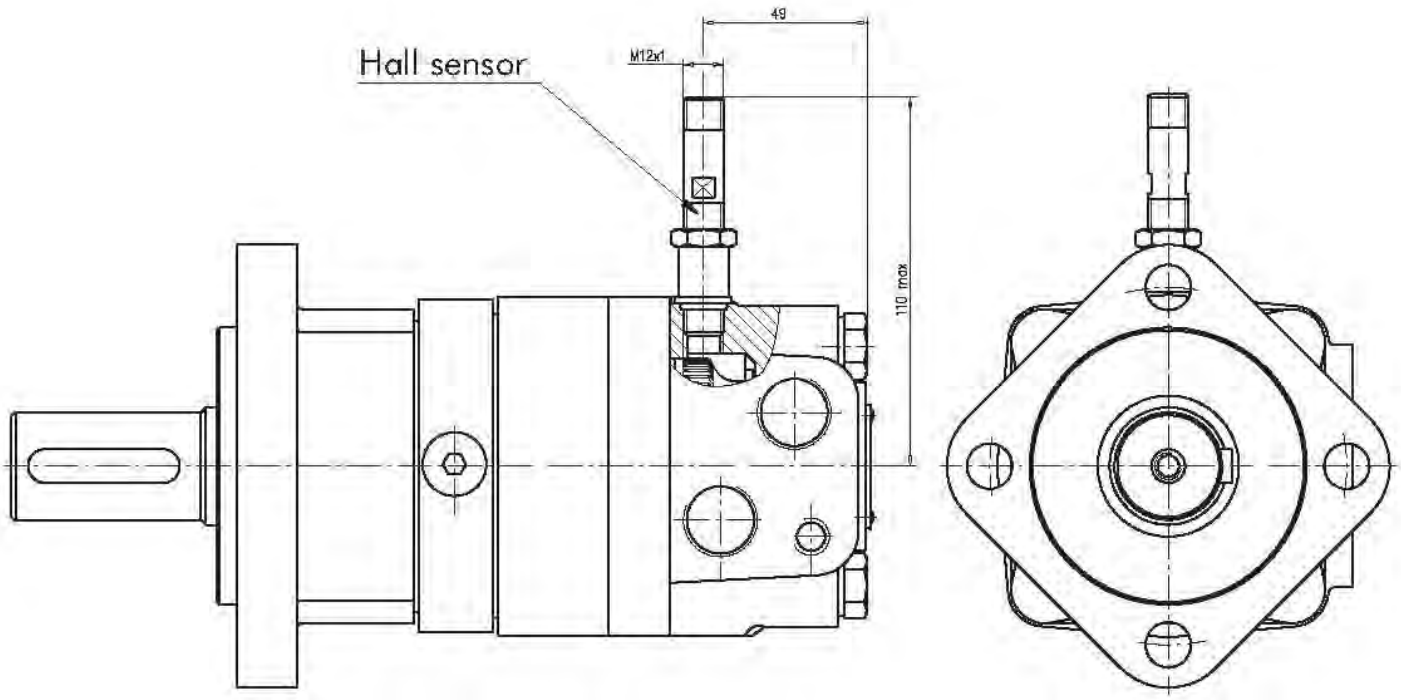


Hardering Specification:
HRC 60±2
Effective case depth (HRC 52) 0,7±0,2 mm
Materiall 20 MoCr4 DIN 17210 or better

Hydraulic motors with speed sensor type OS...RS

Fer Hydraulic is introducing hydraulic motor with a new generation of speed sensor. The electric output signal is a standard voltage signal that can be used for regulating the speed of a motor.

The speed is measured by a sensor in accordance with the Hall principle. Signal processing and amplification are performed in the sensor housing. A connection is provided in the housing by a Plug connector M12 Series.



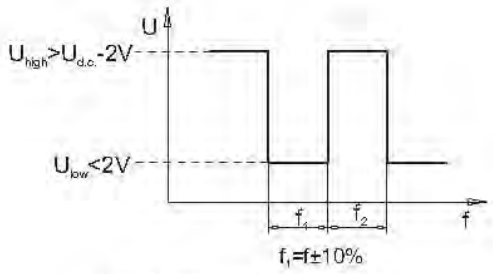
This performance is applicable for all motors of OS series. The main technical features correspond to the standard motors series OS.

DIFFERENTIAL HALL SENSOR

Technical data

Frequency range	3...20 000 Hz
Output	PNP
Power supply	10...36 VDC
Current input	20 mA (@24 VDC)
Current load	500 mA (@24 VDC;24°C)
Ambient Temperature	minus 40... plus 125°C
Protection	IP 67
Plug connector	M12-Series
Mounting principle	ISO 6149
Pulses per revolution	54

Output signal

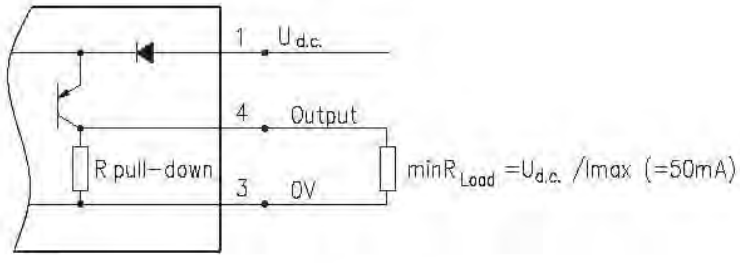


Load max.:I_{high}=I_{low}<50mA

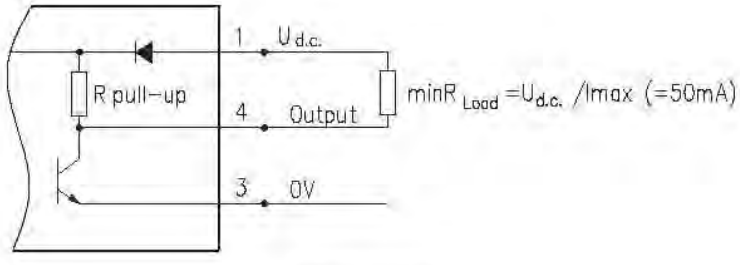
No load current, max: 20 mA

Wiring diagram

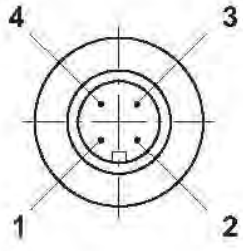
PNP



NPN



Stik type



Terminal No.	Connection
1	$U_{d.c.}$
2	No connection
3	0V
4	Output signal

ORDER CODE

	1	2	3	4	5	6	7	8	9	10	11
OS											

Pos.1 - Mounting Flange

omit - SAE A mount, four holes
A - SAE A mount, two holes
F - Magneto mount, four holes
Q - Square mount, four holes
B - Motor with drum brake
S - Short mount
V - Very short mount
W - Wheel mount
Z - Short mount, with place for needle bearing

Pos.2 - Port type

omit - Side ports
E - Rear ports

Pos.3 - Displacement code

80 - 80,5 [cm³/rev]
100 - 100,0 [cm³/rev]
125 - 125,7 [cm³/rev]
160 - 159,7 [cm³/rev]
200 - 200,0 [cm³/rev]
250 - 250,0 [cm³/rev]
315 - 314,9 [cm³/rev]
400 - 397,0 [cm³/rev]
475 - 474,6 [cm³/rev] (w/o Function diagram)
525 - 522,7 [cm³/rev] (w/o Function diagram)
565 - 564,9 [cm³/rev] (w/o Function diagram)
715 - 715,0 [cm³/rev] (w/o Function diagram)

Pos. 4- Shaft Extensions*

C - ø32 straight, Parallel key A10x8x45 DIN6885
CO - ø1¼" straight, Parallel key 5/16"x5/16"x1¼" BS46
K - ø35 tapered 1:10, Parallel key B6x6x20 DIN6885
SL - ø34,85 p.t.o. DIN 9611 Form 1
SH - ø1¼" splined 14T ANSI B92.1-1976

Pos. 5 - Ports

omit - BSPP (ISO 228)
M - Metric (ISO 262)

Pos. 6 - Actuating Direction**

R - Right
L - Left

Pos. 7 - Speed Monitoring

omit - none
T - with tacho connection (only for side ports)
RS-P - with speed sensor (PNP pull-down resistor)
RS-N - with speed sensor (NPN pull-up resistor)

Pos. 8 - Special Features (see Specification data-page OS - 04)

omit - none
LL -Low Leakage
LSV - Low Speed Valve

Pos.9 - Rotation

omit - Standard Rotation
R - Reverse Rotation

Pos.10 - Option (Paint)***

omit - no Paint
P - Painted
PC - Corrosion Protected Paint

Pos.11 - Design Series

omit - Factory specified

NOTES:
* The permissible output torque for shafts must be not exceeded!
** Only for OSB
*** Color at customer's request.

The hydraulic motors are mangano-phosphatized as standard.

HYDRAULIC MOTORS OSY

NEW

OSY is the new hydraulic motor in a family of "disc valve" series which has dimensions and mounting data the same as at hydraulic motors type OS.

This motor is described with 15÷20% hidger technical data-max. Torque and max. Pressure drop, thereby higher power. This makes it suitable for vehicles with greater loads and speed drop.

CONTENTS

Specification data ..... OSY-02÷03
Function diagrams ..... OSY-04÷06
Dimensions and mounting ..... OS-10÷11
Wheel motor OS-12
Shaft extensions OS-13
Permissible shaft loads OS-14
Dimensions and mounting - OSYS, V OSY-07
Internal Spline data OSY-08
Order code OSY-08

OPTIONS

- » Model- Disc valve, roll-gerotor
- » Flange and wheel mount;
- » Short motor;
- » Side and rear ports
- » Shafts- straight, splined and tapered;
- » Other special features.

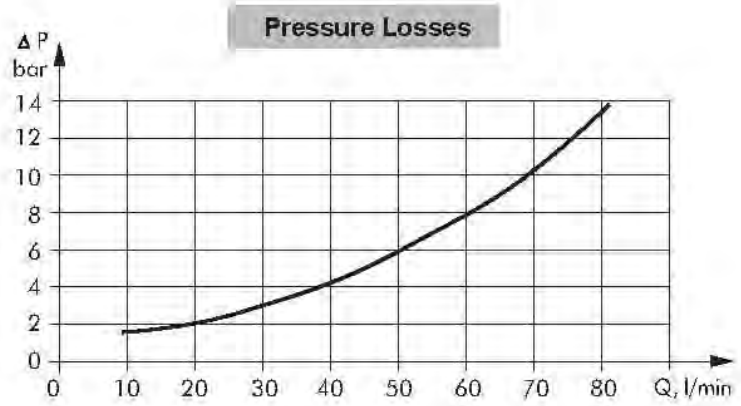
GENERAL

Displacement, [cm^3/rev.]	159,7÷397
Max. Speed, [RPM]	470÷185
Max. Torque, [daNm]	46,1÷90
Max. Output, [kW]	11÷19,5
Max. Pressure Drop, [bar]	205÷160
Max. Oil Flow, [l/min]	75
Min. Speed, [RPM]	8÷5
Permissible Shaft Loads, [daN]	P_{rad}=1500; P_a=500
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, [°C]	-30÷90
Optimal Viscosity range, [mm^2/s]	20÷75
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 micron)

Oil flow in drain line

Pressure drop (bar)	Viscosity (mm^2/s)	Oil flow in drain line (l/min)
140	20	1,5
	35	1
210	20	3
	35	2

Pressure Losses



SPECIFICATION DATA FOR OSY

Type		OSY 160	OSY 200	OSY 250	OSY 315	OSY 400
Displacement [cm³/rev.]		159,7	200	250	314,9	397
Max. Speed,	cont.	470	375	300	240	185
[RPM]	Int.*	560	450	360	285	225
Max. Torque	cont.	46,1	58,0	72,5	92,2	90,0
[daNm]	Int.*	51,5	64,5	80,6	96,0	97,0
Max. Output	cont.	19,5	19,5	18,5	16	11,0
[kW]	int.*	24,0	24,0	23	17,5	12
Max. Pressure Drop	cont.	205	205	205	205	160
[bar]	Int.*	225	225	225	220	175
Max. Oil Flow	cont.	75	75	75	75	75
[l/min]	Int.*	90	90	90	90	90
Max. Inlet Pressure	cont.	225	225	225	225	225
[bar]	Int.*	250	250	250	250	250
Max. Return Pressure	cont. 0-100 RPM	100	100	100	100	100
without Drain Line or	cont. 100-300 RPM	50	50	50	50	50
Max. Pressure	cont. >300 RPM	20	20	-	-	-
in Drain Line, [bar]	Int.* 0-max. RPM	100	100	100	100	100
Max. Return Pressure	cont.	140	140	140	140	140
with Drain Line, [bar]	Int.*	175	175	175	175	175
Max. Starting Pressure with Unloaded Shaft, [bar]		8	8	8	8	8
Min. Starting Torque	at max. press. drop cont.	36,9	46,2	58,0	73,8	72,0
[daNm]	at max. press. drop Int.*	40,5	50,7	63,6	79,2	78,7
Min. Speed, [RPM]**		8	6	6	5	5
Weight, [kg]	**OSYF**	10,8	11,2	11,7	12,4	13,3
For rear ports:	**OSYW**	11,3	11,7	12,2	12,9	13,8
+0,400 kg	**OSYQ**	11,2	11,6	12,1	12,8	13,7

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** For speeds of 5 RPM lower than given, consult factory or your regional manager.

1) Intermittent speed and intermittent pressure must not occur simultaneously.
2) Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3) Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4) Recommended minimum oil viscosity 13mm²/s at operating temperatures.
5) Recommended maximum system operating temperature is 82°C.
6) To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

SPECIFICATION DATA for OSY...LSV

Low Speed Valve (LSV) "LSV" Series hydraulic motors have been designed to operate with normal pressure drop and to ensure smooth run at low speed (up to 200 min $^{-1}$), as the best security for operation is guaranteed at frequency of rotation 20 ÷ 50 min $^{-1}$. They have an increased starting pressure drop and are not recommended for using at pressure less than 40 bars.

Look at specification data for hydraulic motors standard version. The modification concerns only the following parameters : maximum speed , maximum output, maximum Oil flow and maximum starting pressure.

Type		OSY 160	OSY 200	OSY 250	OSY 315	OSY 400
Max. Speed,	Cont.	200	200	200	200	185
[RPM]	Int.*	250	250	250	250	225
Max. Output	Cont.	8,0	8,0	8,8	10,6	9,5
[kW]	Int.*	12,2	12,4	13,4	15,0	12,8
Max. Oil Flow	Cont.	32	40	50	65	75
[l/min]	Int.*	40	50	62,5	80	90
Max. Starting Pressure with Unloaded Shaft, [bar]		15	15	15	15	15

SPECIFICATION DATA for OSY...LL

Low Leakage (LL) "LL" Series hydraulic motors have been designed to operate at the whole standard range of working conditions (pressure drop and frequency of rotation) , but with considerable decreased volumetric losses in the drainage ports. Their main purpose is to operate as series-connected motors in hydraulic systems.

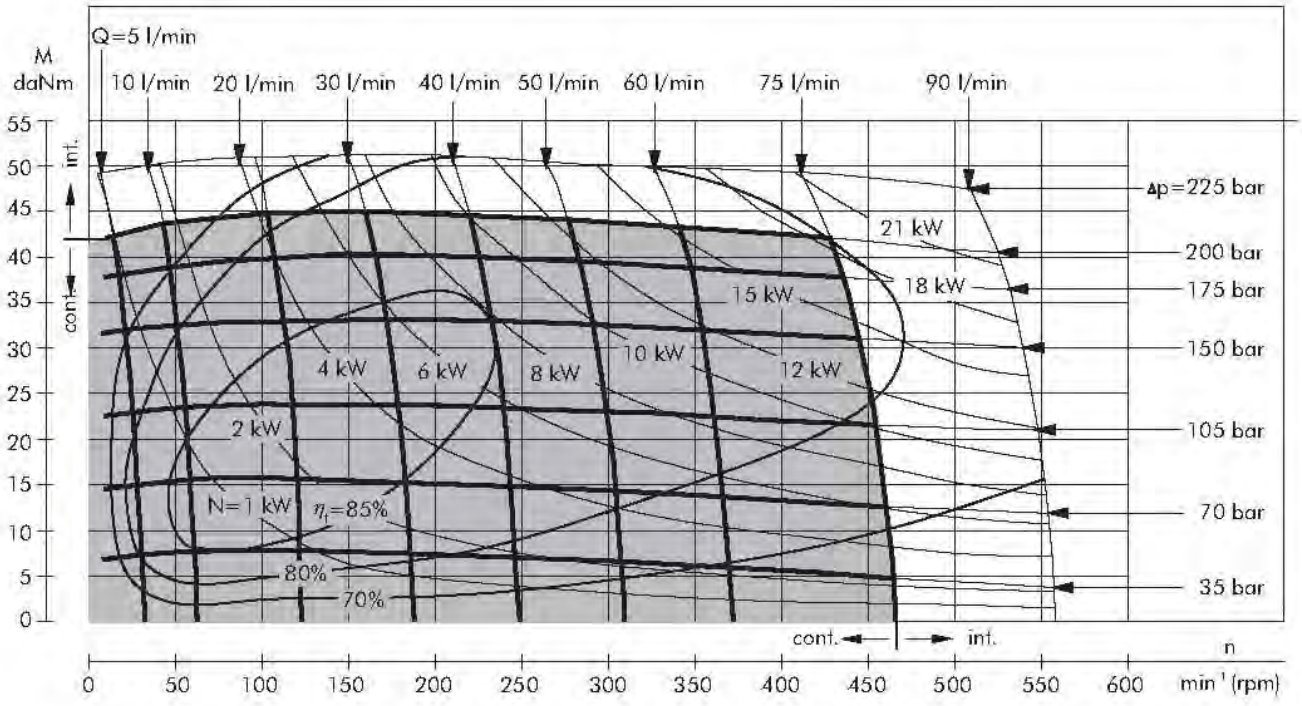
For this version is permissible decreasing of the maximal torque with up to 5% (at middle speed) and up to 10% (at high speed) in comparison to the standard versions of motors.

Look at specification data for hydraulic motors standard version. The modification concerns only the parameters: maximum torque, maximum output, minimum starting torque.

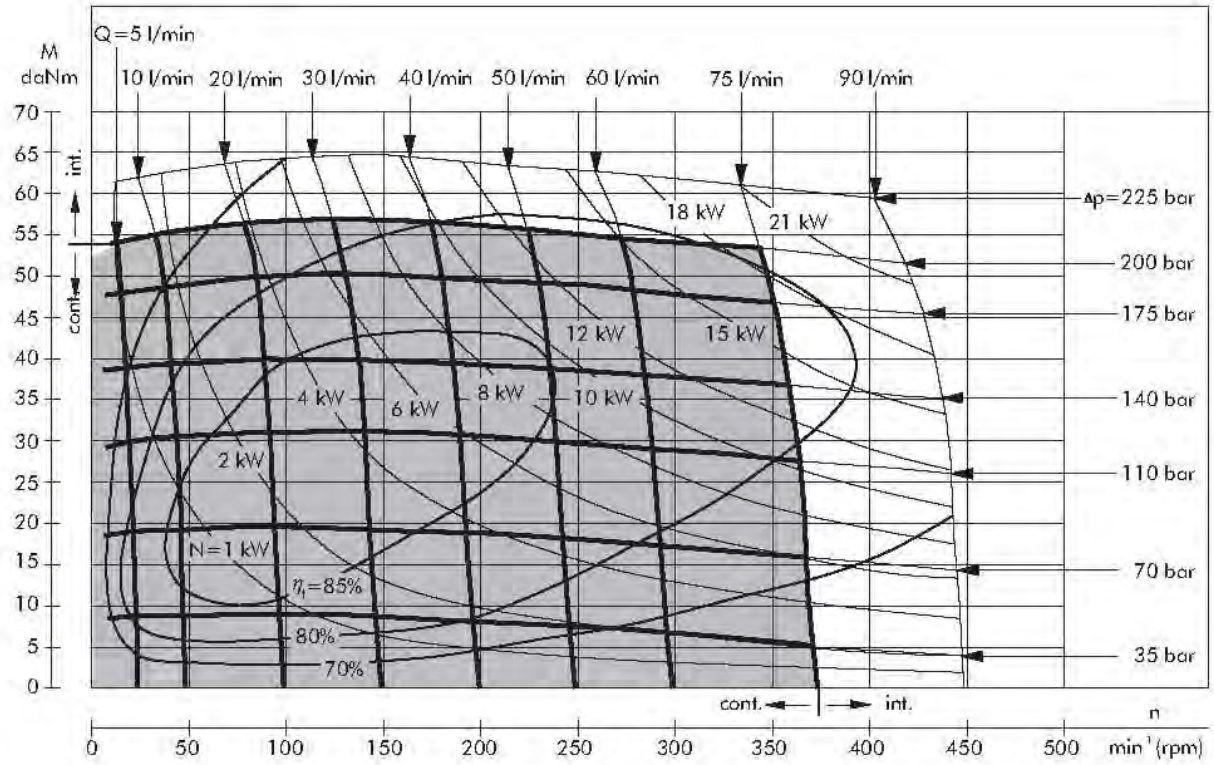
Type		OSY 160	OSY 200	OSY 250	OSY 315	OSY 400
Max. Torque	Cont.	43,8	55,1	68,8	87,6	85,5
[daNm]	Int.*	48,9	61,3	76,6	91,2	92,2
Max. Output	Cont.	17,6	17,6	16,7	14,7	10,0
[kW]	Int.*	21,8	21,8	20,7	15,8	10,9
Min. Starting Torque	Cont.	35,9	45,1	56,4	71,8	70,2
[daNm]	Int.*	39,6	49,7	62,0	73,9	74,7

FUNCTION DIAGRAMS

OSY 160



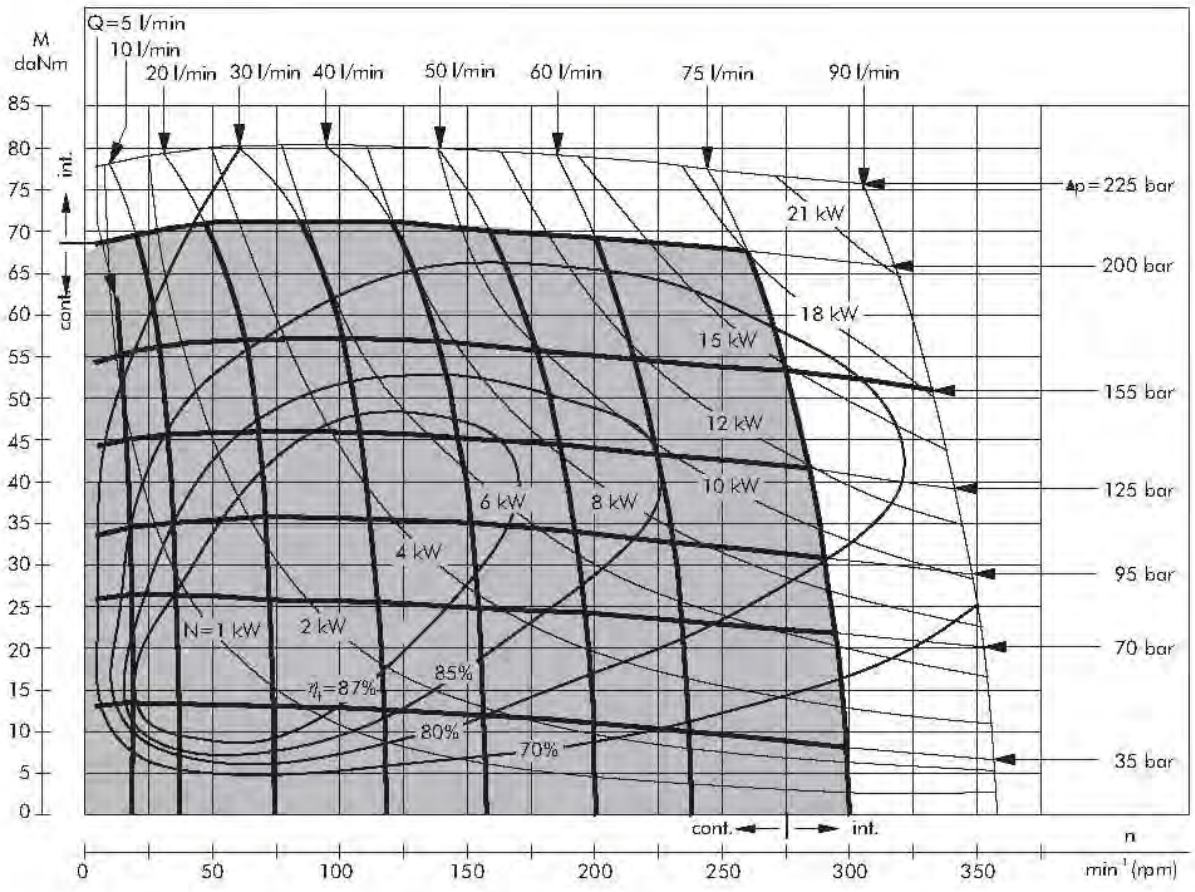
OSY 200



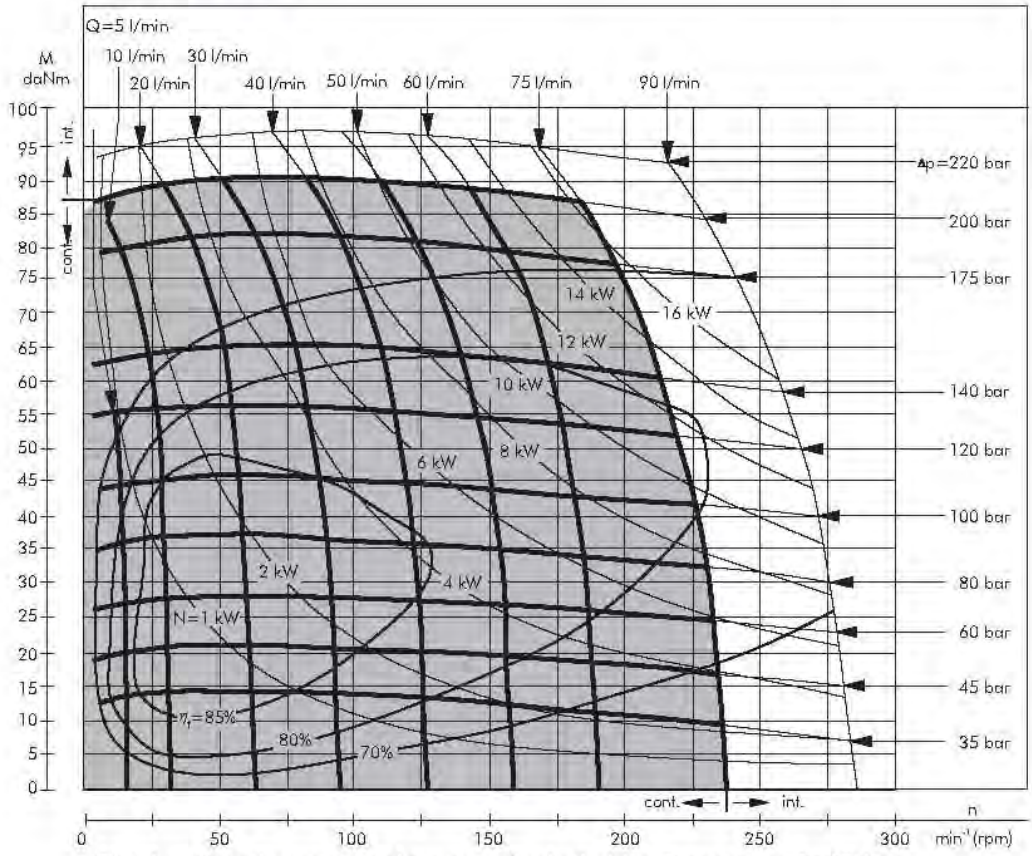
The function diagrams data was collected at back pressure 5÷10 bar
and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAMS

OSY 250



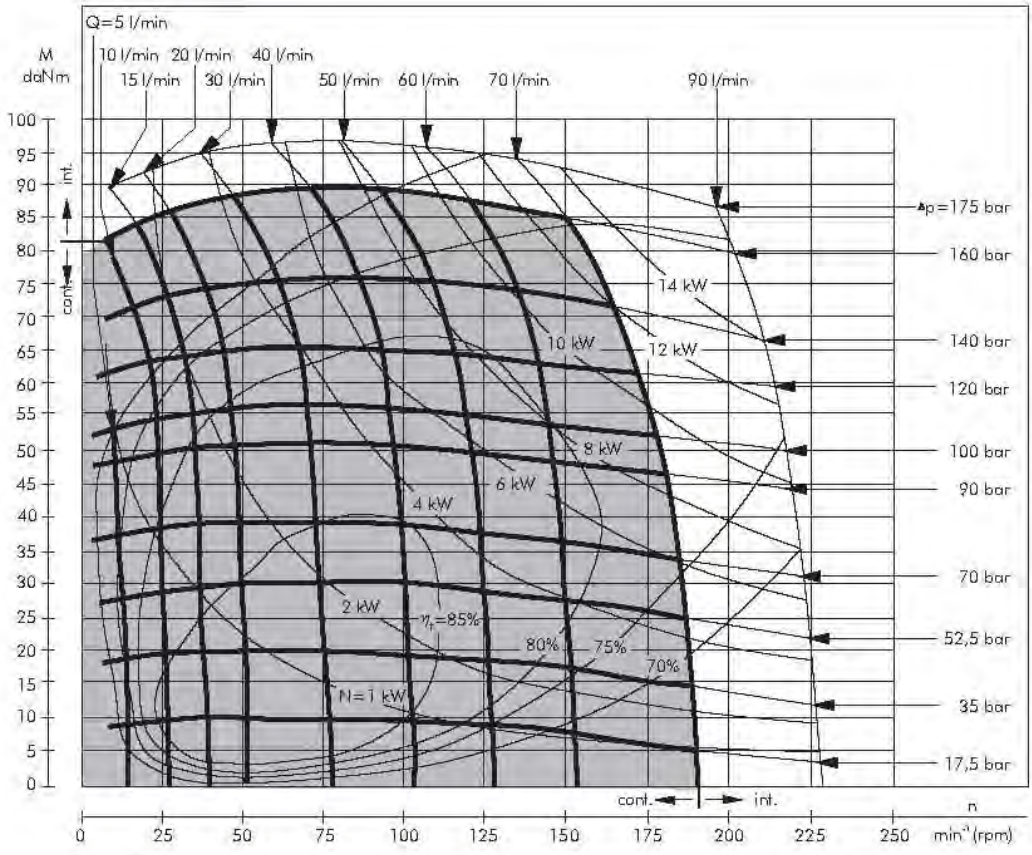
OSY 315



The function diagrams data was collected at back pressure 5÷10 bar and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAMS

OSY 400

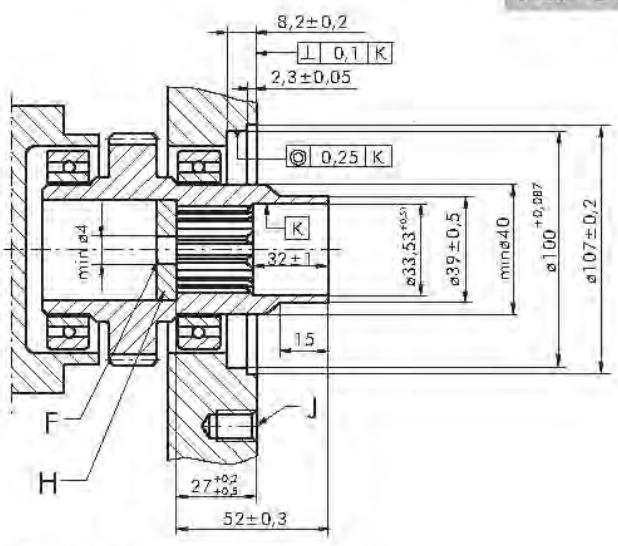


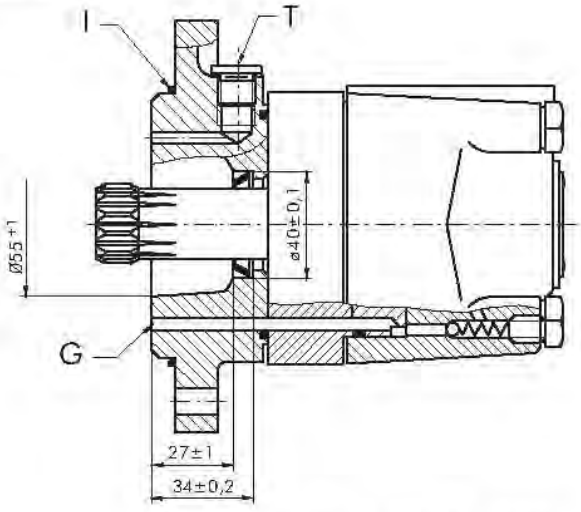
The function diagrams data was collected at back pressure 5÷10 bar and oil with viscosity of 32 mm²/s at 50° C.

The dimensions, mounting data, shaft extensions and permissible shaft loads are the same as at hydraulic motors type OS except following below.

DIMENSIONS OF THE ATTACHED COMPONENT

For OSYS

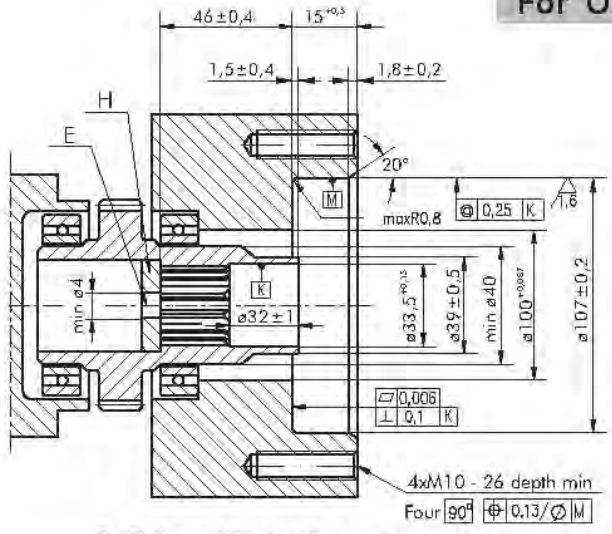


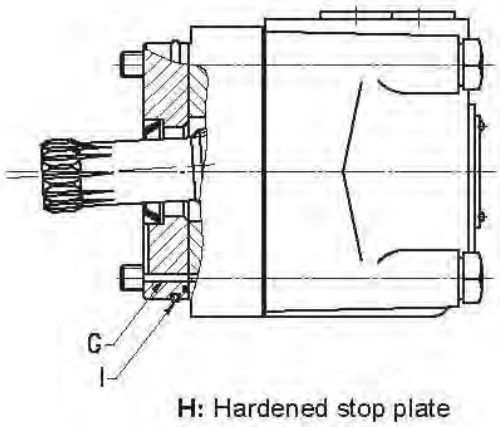


F: Oil circulation hole
G: Internal drain channel
H: Hardened stop plate
I: O- Ring 100x3mm

J: 4xM10-16 mm depth (for OSS)
N: Needle bearing 1 3/8"x1¾"
T: Drain connection G1/4 or M14x1,5

For OSYV





E: External drain channel
G: Internal drain channel

H: Hardened stop plate
I: O- Ring 85x2mm

DRAIN CONNECTION

A drain line ought to be used when pressure in the return line can exceed the permissible pressure. It can be connected:

- For OSYS at the drain port of the motor;
- For OSYV at the drain connection of the attached component. The maximum pressure in the drain line is limited by the attached component and its shaft seal.

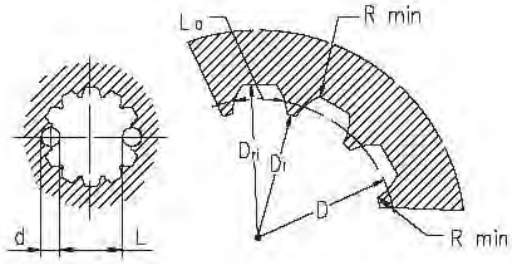
The drain line must be possible for oil to flow freely between motor and attached component and must be led to the tank. The maximum pressure in the drain line is limited by the attached component and its seal.

INTERNAL SPLINE DATA FOR THE ATTACHED COMPONENT

Standard 12 DP 10/20 ANSI B92.1-1976, class 5
[m=2.54; corrected x.m=+0,4]

Fillet Root Side Fit		mm
Number of Teeth	z	12
Diametral Pitch	DP	10/20
Pressure Angle		30^{O}
Pitch Dia.	D	30,48
Major Dia.	Dri	$33,2^{+0,4}$
Minor Dia.	Di	$27,8^{+0,1}$
Space Width [Circular]	Lo	$4,45^{+0,071}$
Fillet Radius	Rmin	0,2
Max. Measurement between Pin	L	$22,72^{+0,17}$
Pin Dia.	d	5±0,001

Above are when hardened



Hardering Specification:
HRC 60±2
Effective case depth (HRC 52) 0,7±0,2 mm
Material: 20 MoCr4 DIN 17210 or better

ORDER CODE

	1	2	3	4	5	6	7	8	9
OSY									

Pos.1 - Mounting Flange

omit - SAE A mount, four holes
A - SAE A mount, two holes
F - Magneto mount, four holes
Q - Square mount, four holes
S - Short mount
V - Very short mount
W - Wheel mount

Pos.2 - Port type

omit - Side ports
E - Rear ports

Pos.3 - Displacement code

160 - 159,7 [cm^3/rev]
200 - 200,0 [cm^3/rev]
250 - 250,0 [cm^3/rev]
315 - 314,9 [cm^3/rev]
400 - 397,0 [cm^3/rev]

Pos. 4 - Shaft Extensions*

C - ø32 straight, Parallel key A10x8x45 DIN6885
K - ø35 tapered 1:10, Parallel key B6x6x20 DIN6885
SL - ø34,85 p.t.o. DIN 9611 Form 1
SH - ø1¼" splined 14T ANSI B92.1-1976

Pos. 5 - Ports

omit - BSPP (ISO 228)
M - Metric (ISO 262)

Pos. 6 - Special Features (see Specification data page OSY - 03)

omit - none
LL -Low Leakage
LSV - Low Speed Valve

Pos. 7 - Rotation

omit - Standard Rotation
R - Reverse Rotation

Pos. 8 - Option (Paint)**

omit - no Paint
P - Painted
PC - Corrosion Protected Paint

Pos. 9 - Design Series

omit - Factory specified

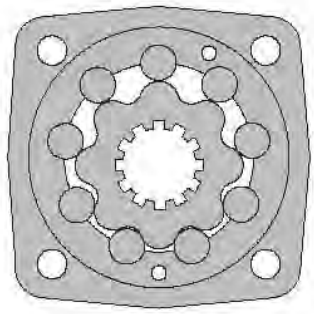
NOTES:
* The permissible output torque for shafts must be not exceeded!
** Color at customer's request.

The hydraulic motors are mangano-phosphatized as standard.

HYDRAULIC MOTORS OT

APPLICATION

- » Conveyors;
- » Metal working machines;
- » Machines for agriculture;
- » Road building machines;
- » Mining machinery;
- » Food industries;
- » Special vehicles;
- » Plastic and rubber machinery etc.



CONTENTS

Specification data OT-02
Function diagrams ..... OT-03÷05
Dimensions and mounting OT-06
Shaft extensions OT-07
Dimensions and mounting- OTS, V ..... OT-08÷09
Internal Spline data OT-10
Permissible shaft loads OT-10
Tacho connection OT-13
Order code OT-13

OPTIONS

- » Model: Disc valve, roll-gerotor
- » Flange with wheel mount;
- » Short motor;
- » Tacho and speed sensor connection;
- » Side and rear ports;
- » Shafts: straight, splined and tapered;
- » Metric and BSPP ports;
- » Other special features.

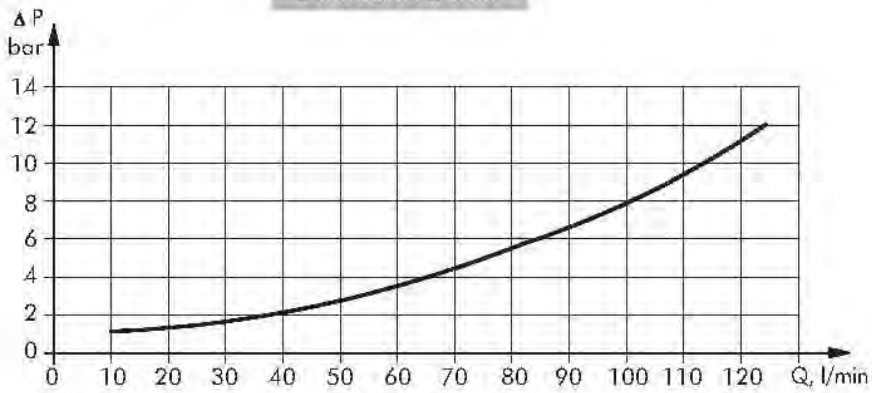
GENERAL

Displacement, [cm^3/rev.]	161,1÷725
Max. Speed, [RPM]	625÷175
Max. Torque, [daNm]	47÷125
Max. Output, [kW]	20,2÷33,5
Max. Pressure Drop, [bar]	200÷115
Max. Oil Flow, [l/min]	100÷125
Min. Speed, [RPM]	10÷5
Permissible Shaft Loads, [daN]	P_{rad}=1700; P_a=1000
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, [°C]	-30÷90
Optimal Viscosity range, [mm^2/s]	20÷75
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 micron)

Oil flow in drain line

Pressure drop (bar)	Viscosity (mm^2/s)	Oil flow in drain line (l/min)
140	20	1,5
	35	1
210	20	3
	35	2

Pressure Losses



SPECIFICATION DATA

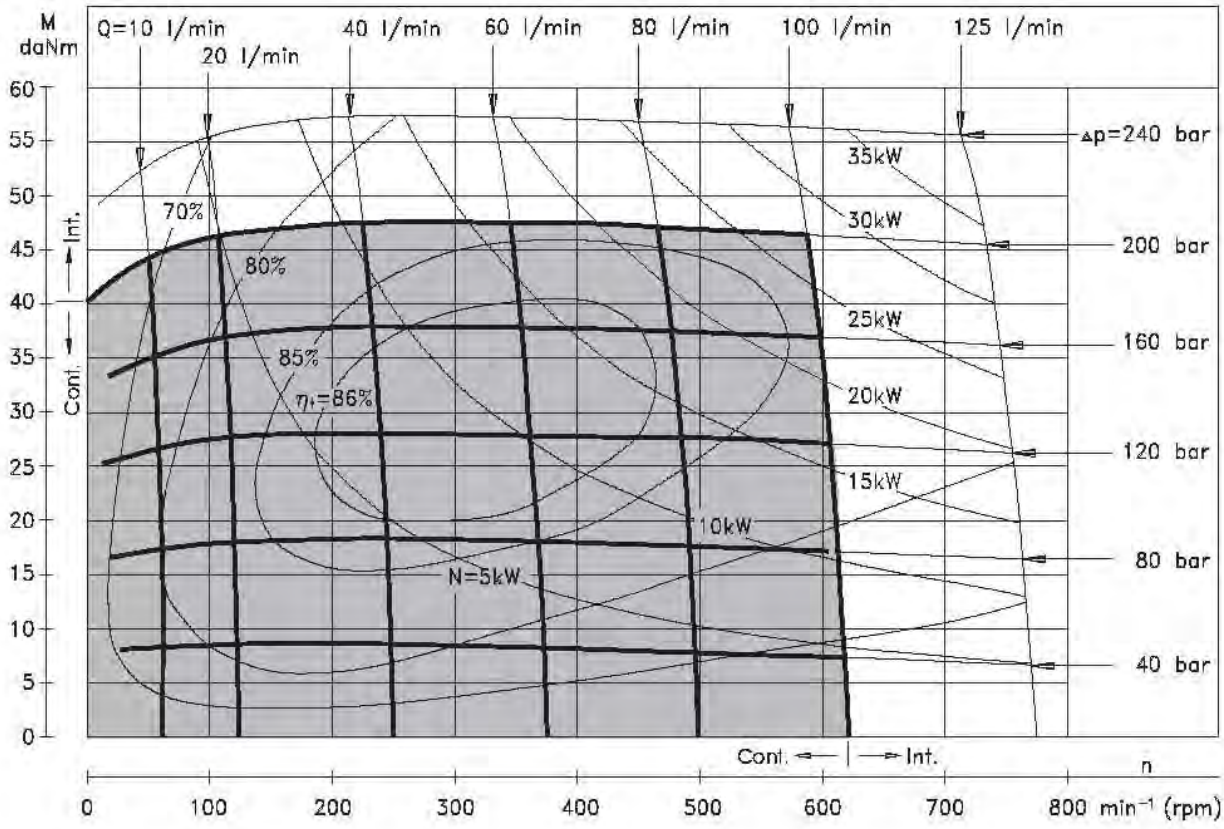
Type		OT 160	OT 200	OT 250	OT 315	OT 400	OT 500	OT 630	OT 725
Displacement [cm³/rev.]		161,1	201,4	251,8	326,3	410,9	523,6	612,3	725
Max. Speed,	cont.	625	625	500	380	305	240	206	172
[RPM]	Int.*	780	750	600	460	365	285	247	205
Max. Torque	cont.	47	59	73	95	108	122	123	125
[daNm]	Int.*	56	71	88	114	126	137	138	140
	peak**	66	82	102	133	144	160	161	165
Max. Output	cont.	26,5	33,5	33,5	33,5	30	26,5	24,3	20,2
[kW]	int.*	32	40	40	40	35	30	27,5	26,8
Max. Pressure Drop	cont.	200	200	200	200	180	160	140	115
[bar]	Int.*	240	240	240	240	210	180	160	130
	peak**	280	280	280	280	240	210	190	160
Max. Oil Flow	cont.	100	125	125	125	125	125	125	125
[l/min]	Int.*	125	150	150	150	150	150	151,4	151,4
Max. Inlet Pressure	cont.	210	210	210	210	210	210	210	210
[bar]	Int.*	250	250	250	250	250	250	250	250
	peak**	300	300	300	300	300	300	300	300
Max. Return Pressure	cont. 0-100 RPM	75	75	75	75	75	75	75	75
without Drain Line or	cont. 100-300 RPM	40	40	40	40	40	40	40	40
Max. Pressure	cont. >300 RPM	20	20	20	20	20	-	-	-
in Drain Line, [bar]	Int.* 0-max. RPM	75	75	75	75	75	75	75	75
Max. Return Pressure	cont.	140	140	140	140	140	140	140	140
with Drain Line	Int.*	175	175	175	175	175	175	175	175
[bar]	peak**	210	210	210	210	210	210	210	210
Max. Starting Pressure with Unloaded Shaft, [bar]		10	10	10	10	10	10	10	10
Min. Starting Torque	at max. press. drop cont.	34	43	53	74	84	95	95	95
[daNm]	at max. press. drop Int.*	41	52	63	89	97	106	108	110
Min. Speed*, [RPM]**		10	9	8	7	6	5	5	5
Weight, [kg]	**OT**	20	20,5	21	22	23	24	25	26
	OTW	22	22,5	23	24	25	26	27	28
	OTS	15	15,5	16	17	18	19	20	21
	OTV	11	11,5	12	13	14	15	16	17

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% of every minute.
*** For speeds of 5 RPM lower than given, consult factory or your regional manager.

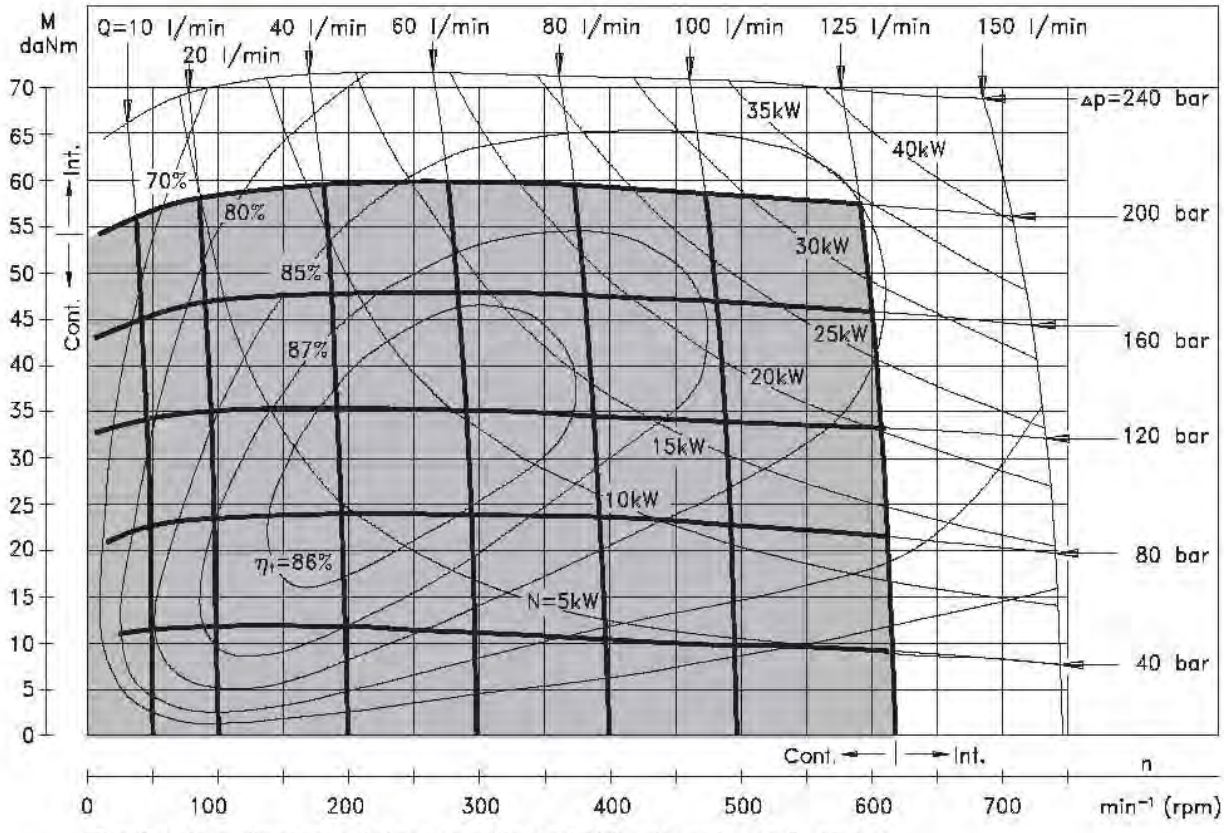
1) Intermittent speed and intermittent pressure must not occur simultaneously.
2) Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3) Recommend using a premium quality, anti-wear type mineral based hydraulic oil, HLP(DIN51524) or HM(ISO6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4) Recommended minimum oil viscosity 13 mm²/s at 50°C.
5) Recommended maximum system operating temperature is 82°C.
6) To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

FUNCTION DIAGRAMS

OT 160



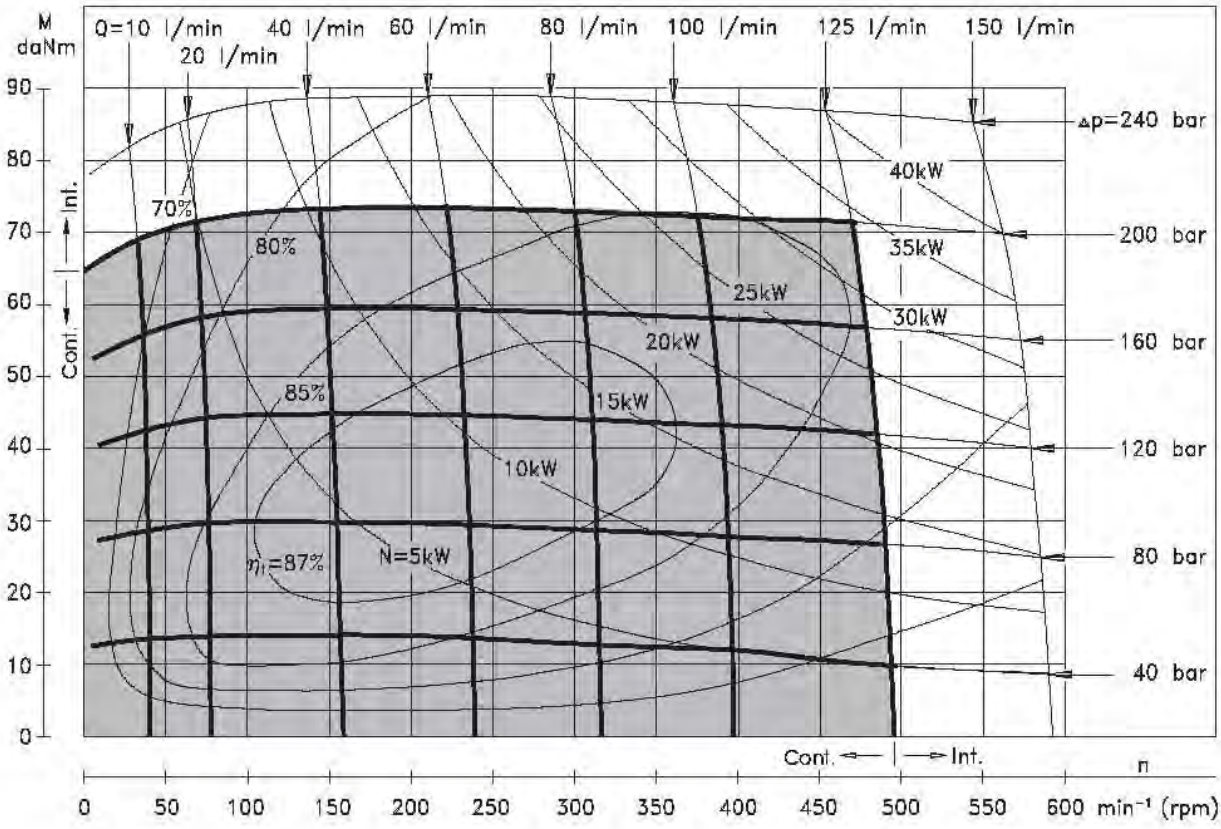
OT 200



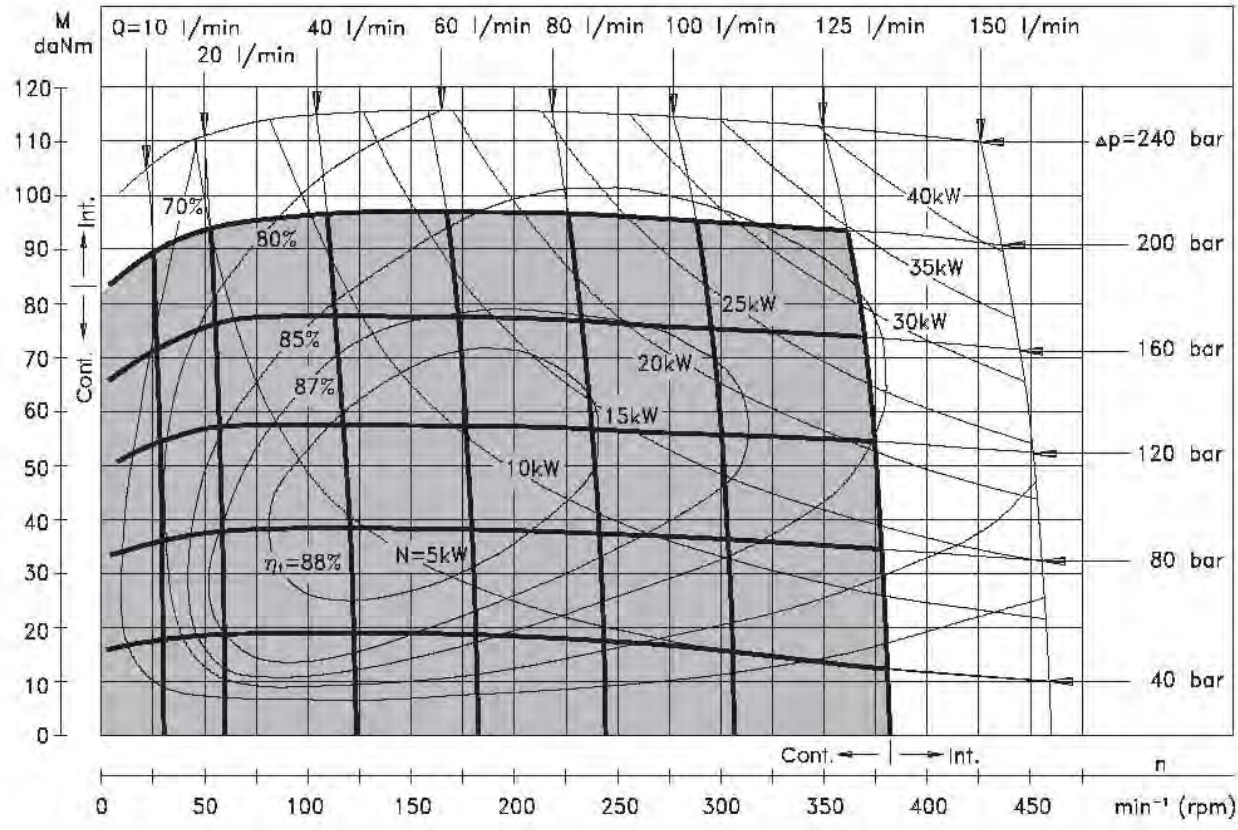
The function diagrams data was collected at back pressure 5÷10 bar and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAMS

OT 250

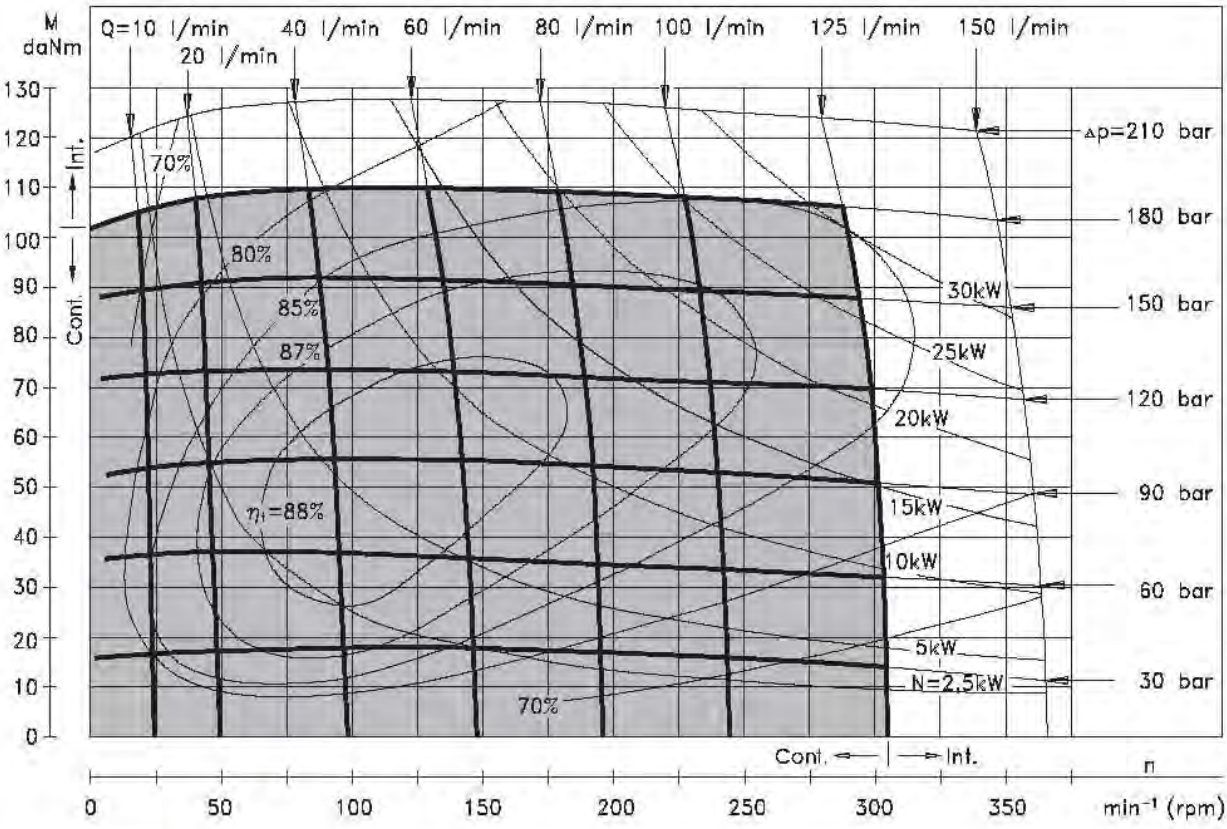


OT 315

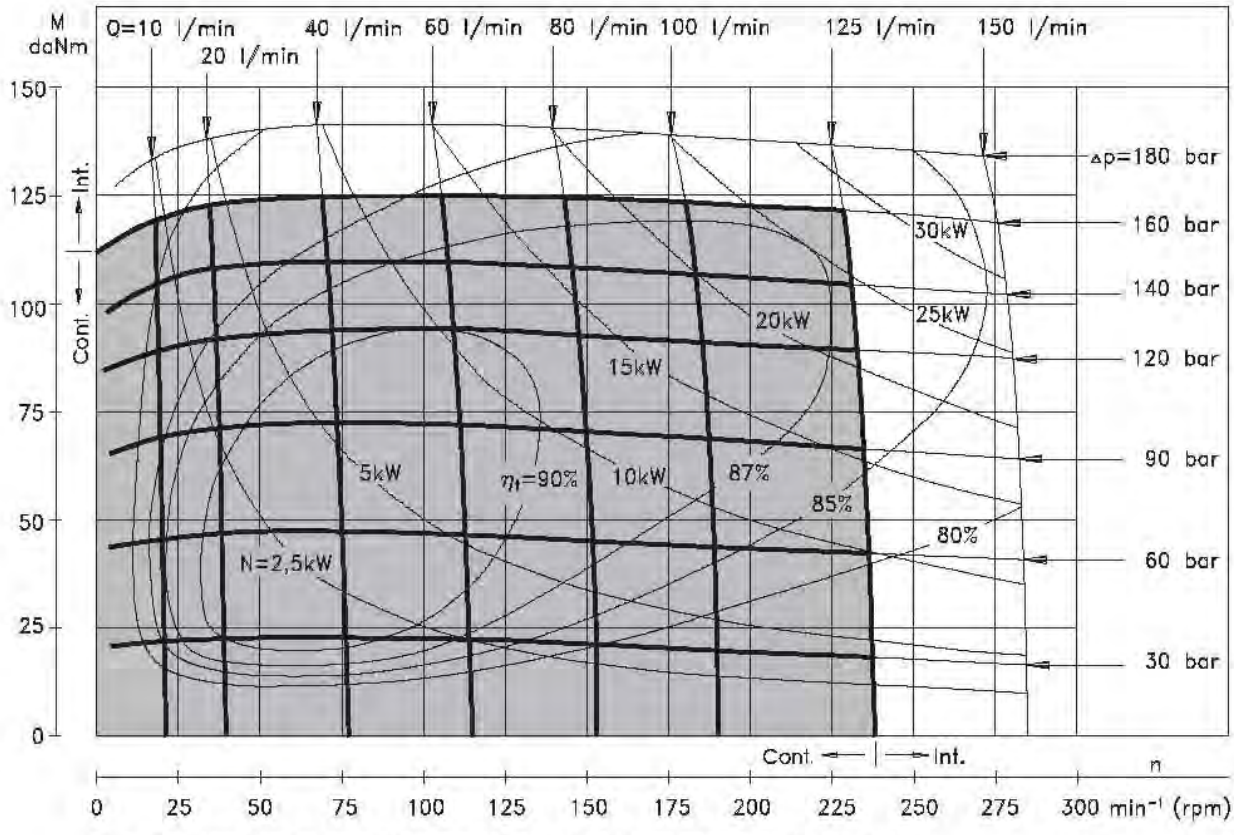


FUNCTION DIAGRAMS

OT 400

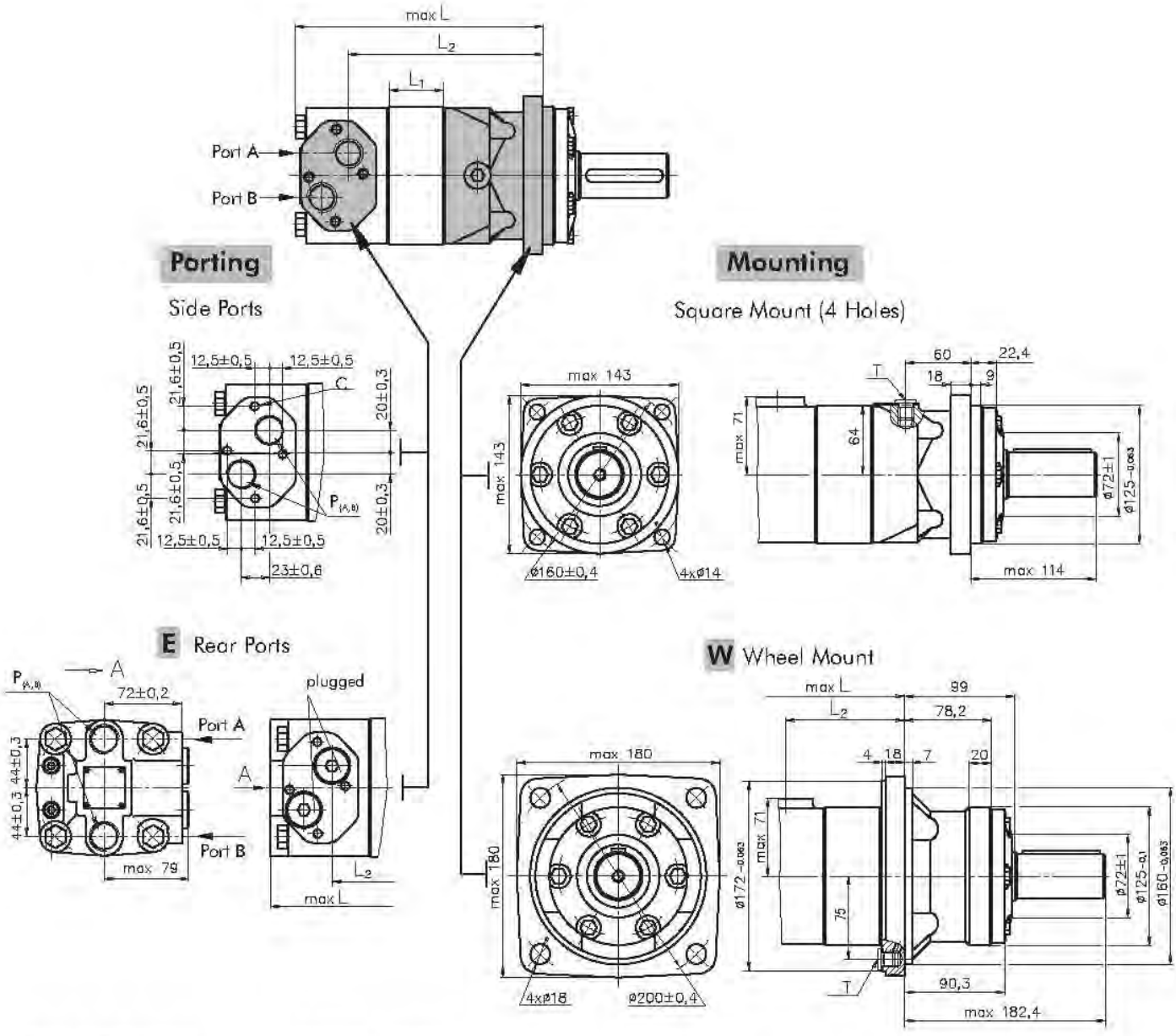


OT 500



The function diagrams data was collected at back pressure 5÷10 bar and oil with viscosity of 32 mm²/s at 50° C.

DIMENSIONS AND MOUNTING DATA



Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

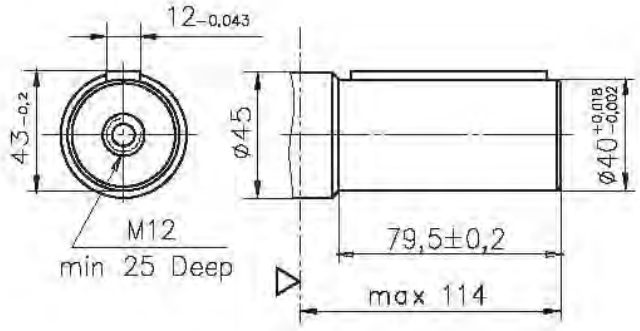
C: 4xM10-10 mm depth
$P_{(A,B)}$: 2xG3/4 or 2xM27x2-17 mm depth
T: G 1/4 or M14x1,5 - 12 mm depth (plugged)

Type	L, mm	Type	L, mm	L_2, mm	Type	L, mm	Type	L, mm	L_2, mm	*L_1, mm
OT 160	190	**OTE 160**	200	140	**OTW 160**	123	**OTWE 160**	133	73	16,5
OT 200	195	**OTE 200**	205	145	**OTW 200**	128	**OTWE 200**	138	78	21,5
OT 250	201	**OTE 250**	211	151	**OTW 250**	134	**OTWE 250**	144	84	27,8
OT 315	211	**OTE 315**	221	161	**OTW 315**	144	**OTWE 315**	154	94	37,0
OT 400	221	**OTE 400**	231	171	**OTW 400**	154	**OTWE 400**	164	104	47,5
OT 500	235	**OTE 500**	245	185	**OTW 500**	168	**OTWE 500**	178	118	61,5
OT 630	242,5	**OTE 630**	252,5	192,5	**OTW 630**	175,5	**OTWE 630**	185,5	125,5	72,5
OT 725	260	**OTE 725**	270	210	**OTW 725**	193	**OTWE 725**	193	143	86,5

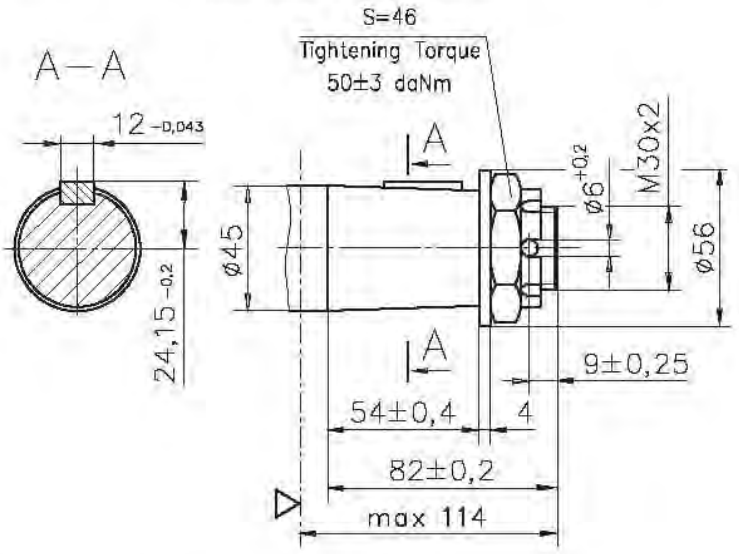
* The width of the gerolor is 3,5 mm greater than L_1.

SHAFT EXTENSIONS

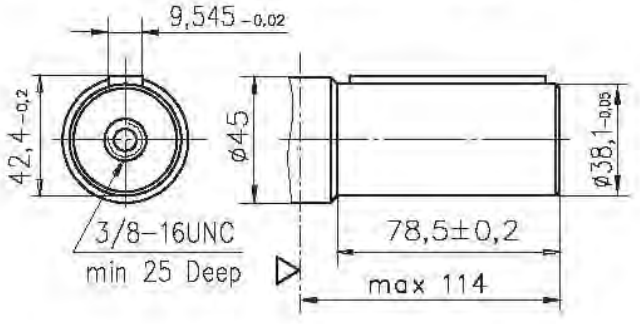
C -ø40 straight, Parallel key A12x8x70 DIN 6885
Max. Torque 132,8 daNm



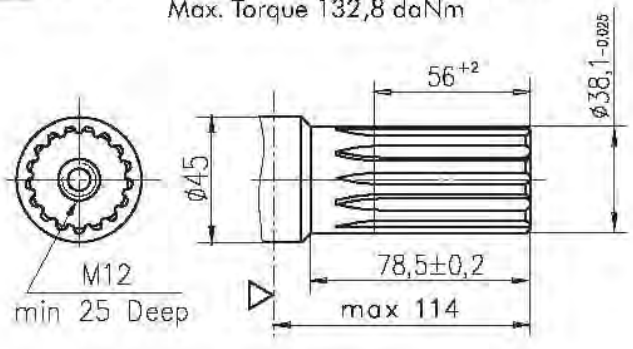
K -tapered 1:10, Parallel key B12x8x28 DIN 6885
Max. Torque 210,7 daNm



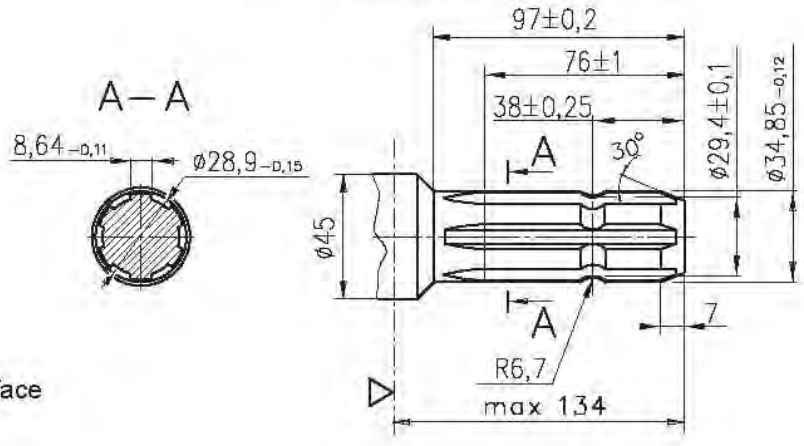
CO -ø1½" straight, Parallel key ⅜"x ⅜"x 2¼" BS46
Max. Torque 132,8 daNm



SH -ø1½" splined 17T, DP 12/24 ANSI B92.1-1976
Max. Torque 132,8 daNm

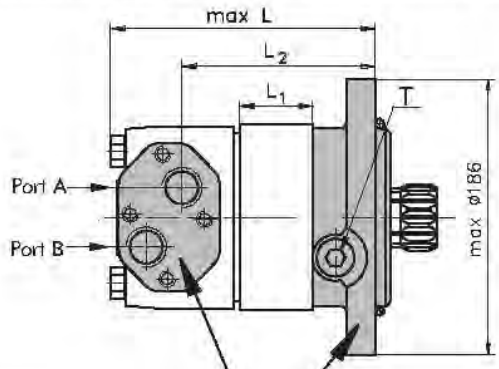


SL -ø34,85 p.t.o. DIN 9611 Form 1
Max. Torque 77 daNm



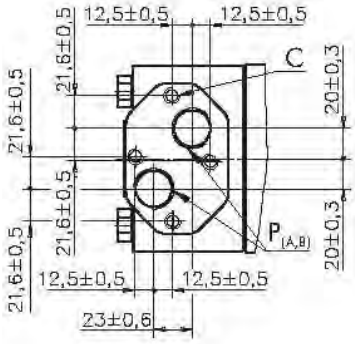
▽- Motor Mounting Surface

DIMENSIONS AND MOUNTING DATA - OTS and OTV

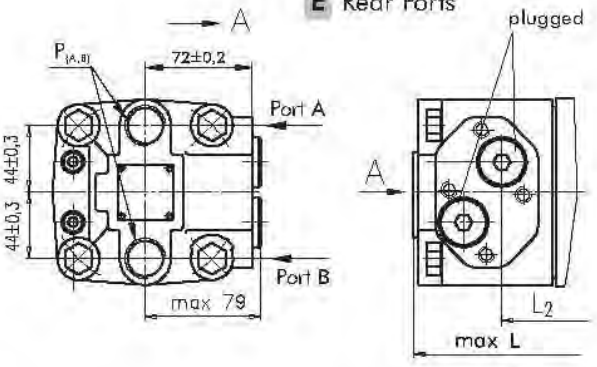


Porting

Side Ports

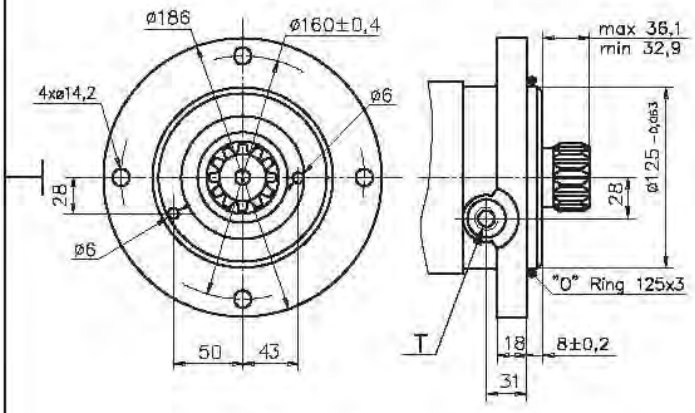


E Rear Ports

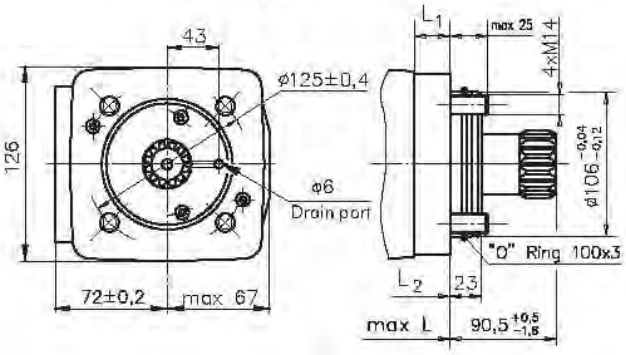


Mounting

S - Short Mount



V - Very Short Mount



Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

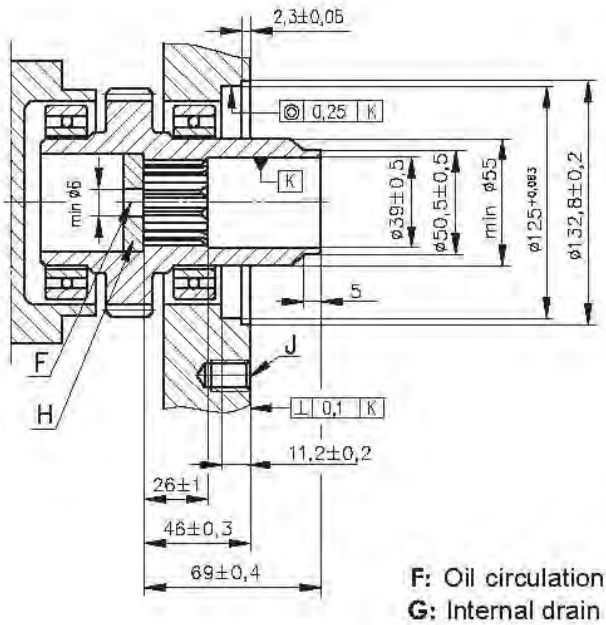
C: 4xM10-10 mm depth
$P_{(A,B)}$: 2xG3/4 or 2xM27x2-17 mm depth
T: G ¼ or M14x1,5 - 12 mm depth (plugged)

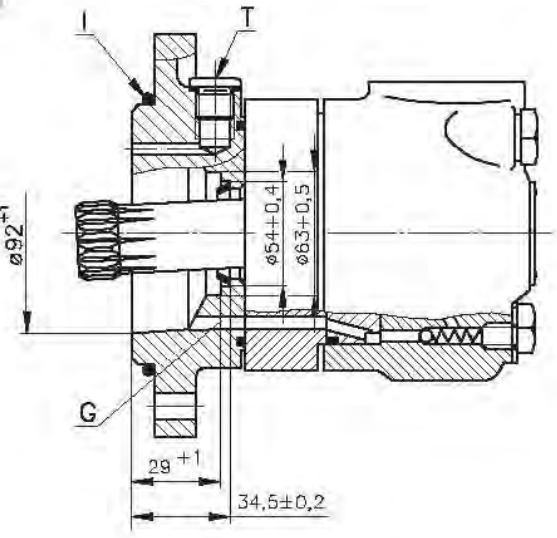
Type	L, mm	Type	L, mm	L_2, mm	Type	L, mm	Type	L, mm	L_2, mm	*L_1, mm
OTS 160	146	**OTSE 160**	156	96	**OTV 160**	101	**OTVE 160**	111	51,5	16,5
OTS 200	151	**OTSE 200**	161	101	**OTV 200**	106	**OTVE 200**	116	56,5	21,5
OTS 250	157	**OTSE 250**	167	107	**OTV 250**	112	**OTVE 250**	122	62,8	27,8
OTS 315	166	**OTSE 315**	176	116	**OTV 315**	121	**OTVE 315**	131	72	37,0
OTS 400	177	**OTSE 400**	187	127	**OTV 400**	132	**OTVE 400**	142	82,5	47,5
OTS 500	191	**OTSE 500**	201	142	**OTV 500**	146	**OTVE 500**	156	96,5.	61,5
OTS 630	198,5	**OTSE 630**	208,5	146,5	**OTV 630**	153,5	**OTVE 630**	163,5	104	72,5
OTS 725	216	**OTSE 725**	226	167	**OTV 725**	171	**OTVE 725**	181	121,5	86,5

* The width of the gerolor is 3,5 mm greater than L_1.

DIMENSIONS OF THE ATTACHED COMPONENT

OTS

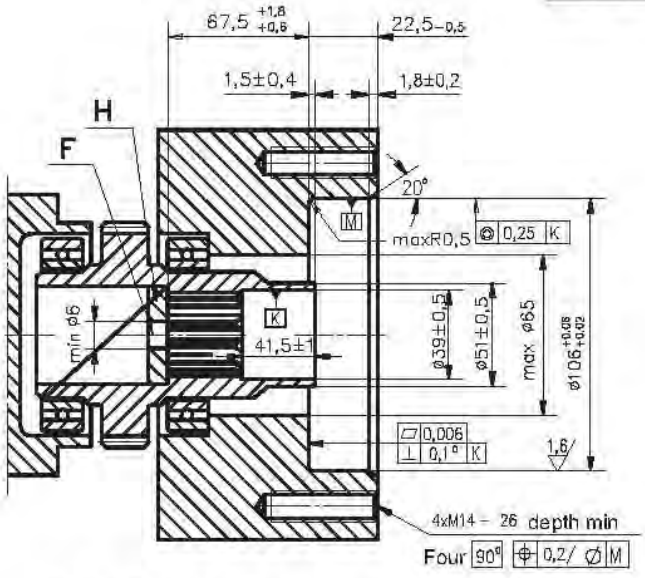


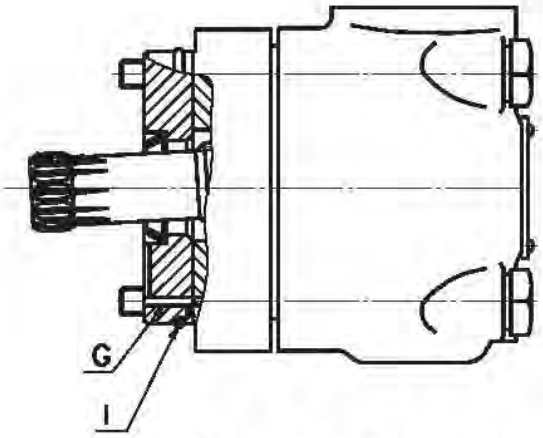


F: Oil circulation hole
G: Internal drain channel
H: Hardened stop plate

I: O- Ring 125x3mm
J: 4xM12-18 mm depth, 90°
T: Drain connection G1/4 or M14x1,5

OTV





F: Oil circulation hole
G: Internal drain channel

H: Hardened stop plate
I: O- Ring 100x3mm

DRAIN CONNECTION

A drain line ought to be used when pressure in the return line can exceed the permissible pressure. It can be connected:

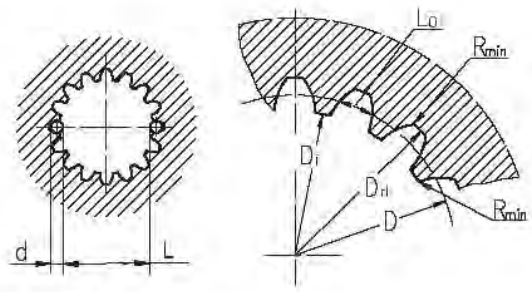
- For OTS at the drain port of the motor;
- For OTV at the drain connection of the attached component. The maximum pressure in the drain line is limited by the attachedcomponent and its shaft seal.

The drain line must be possible for oil to flow freely between motor and attached component and must be led to the tank. The maximum pressure in the drain line is limited by the attachedcomponent and its seal.

INTERNAL SPLINE DATA FOR THE ATTACHED COMPONENT

Standard ANSI B92.1-1976, class 5
[m = 2 . 1 1 6 6 ; corrected x.m=+1,0]

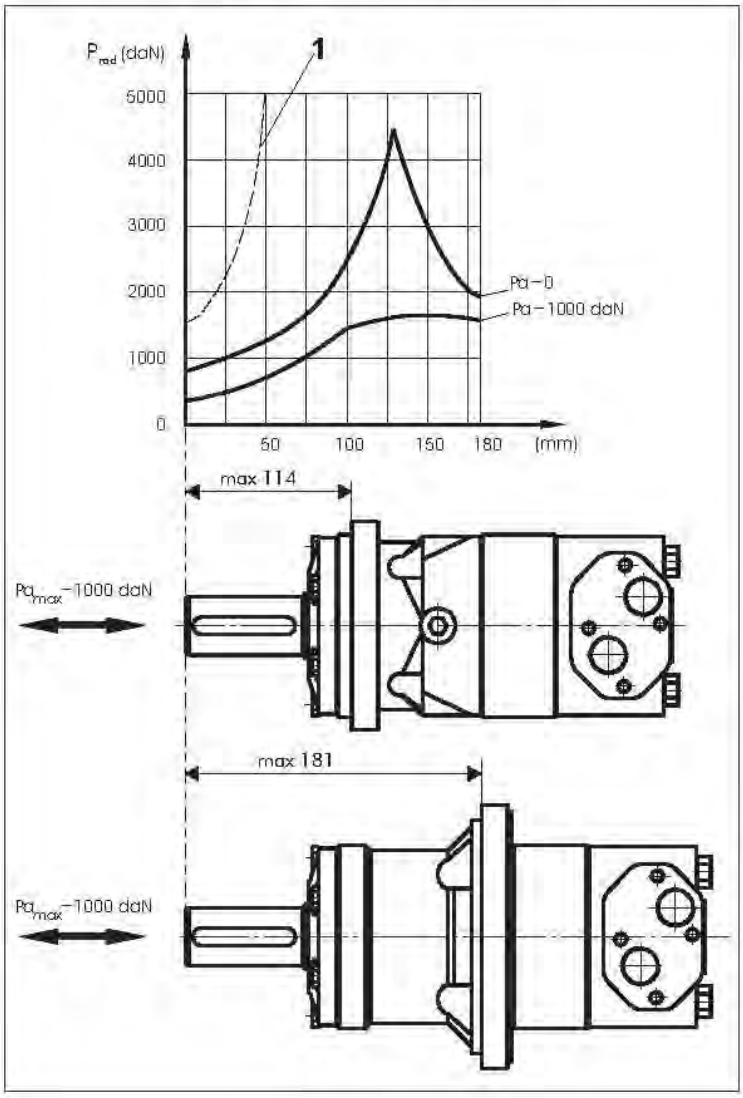
Fillet Root Side Fit		mm
Number of Teeth	z	16
Diametral Pitch	DP	12/24
Pressure Angle		30°
Pitch Dia.	D	33,8656
Major Dia.	Dri	$38,4^{+0,4}$
Minor Dia.	Di	$32,15^{+0,04}$
Space Width [Circular]	Lo	4,516±0,037
Fillet Radius	Rmin	0,5
Max. Measurement between Pin	L	$26,9^{+0,10}$
Pin Dia.	d	4,835±0,001



Hardening Specification:
HRC 60±2
HRC 52
0,7±0,2 mm effective case depth
Material 20 MoCr4 DIN 17210 or better

PERMISSIBLE SHAFT LOADS

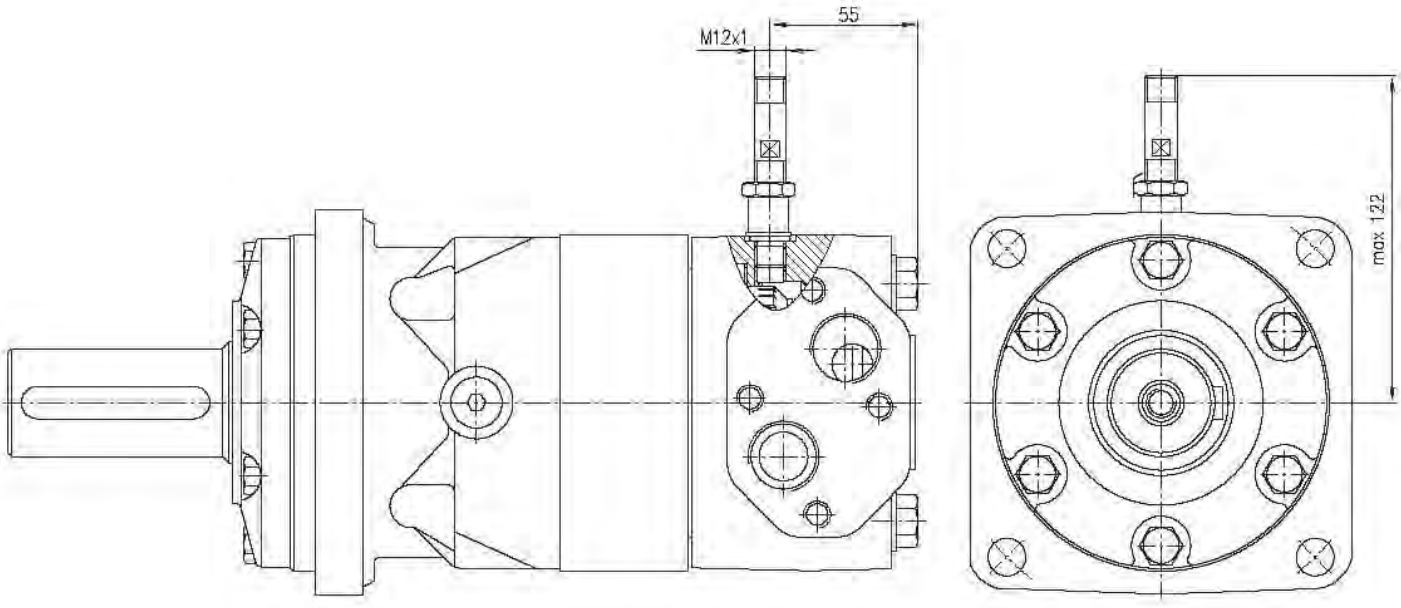
The output shaft runs in tapered bearings that permit high axial and radial forces. Curve "1" shows max. radial shaft load. Any shaft load exceeding the values quoted in the curve will seriously reduce motor life. The two other curves apply to a B10 bearing life of 3000 hours at 200 RPM.



Hydraulic motors with speed sensor type OT...RS

Fer Hydraulic is introducing a hydraulic motor with a new generation of speed sensor. The electric output signal is a standard voltage signal that can be used for regulating the speed of a motor.

The speed is measured by a sensor in accordance with the Hall principle. Signal processing and amplification are performed in the sensor housing. A connection is provided in the housing by a Plug connector M12 Series.



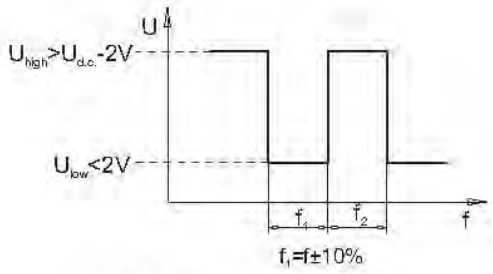
This performance is applicable for all motors of OT series. The main technical features correspond to the standard motors series OT.

DIFFERENTIAL HALL SENSOR

Technical data

Frequency range	3...20 000 Hz
Output	PNP
Power supply	10...36 VDC
Current input	20 mA (@24 VDC)
Current load	500 mA (@24 VDC;24°C)
Ambient Temperature	minus 40... plus 125°C
Protection	IP 67
Plug connector	M12-Series
Mounting principle	ISO 6149
Pulses per revolution	84

Output signal

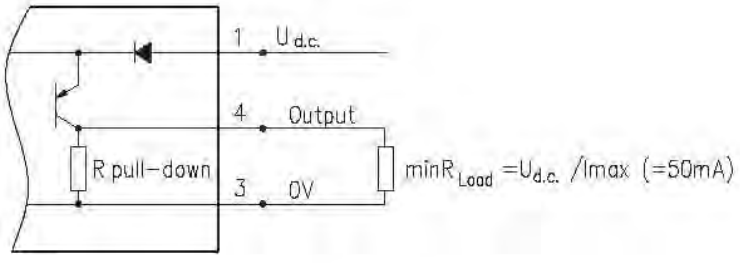


Load max.:I_{high}=I_{low}<50mA

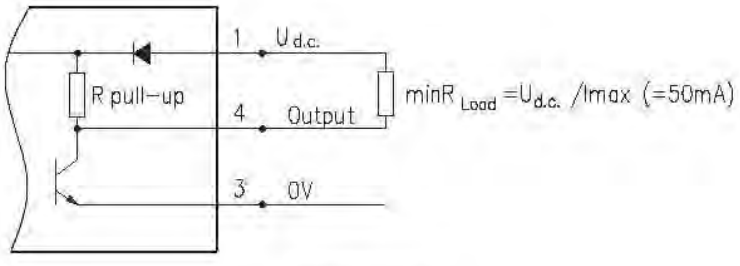
No load current, max: 20 mA

Wiring diagram

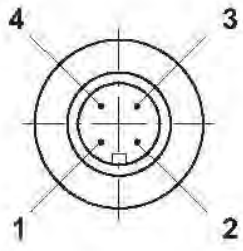
PNP



NPN

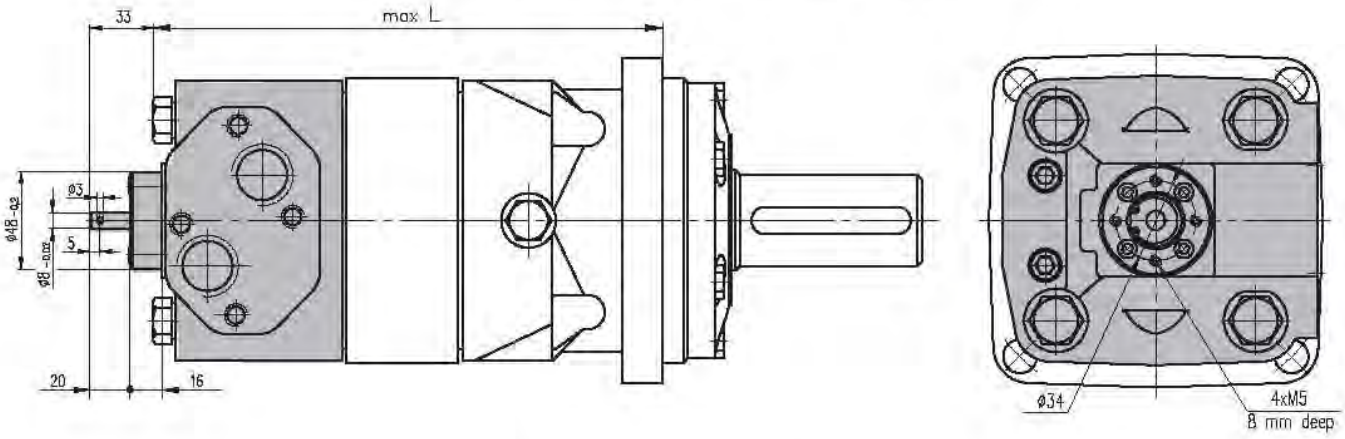


Stik type



Terminal No.	Connection
1	$U_{d.c.}$
2	No connection
3	0V
4	Output signal

MOTORS WITH TACHO CONNECTION - Option "T"



ORDER CODE

	1	2	3	4	5	6	7	8	9	10
O T										

Pos. 1 - Mounting Flange

omit - Square mount, four holes
S - Short mount
V - Veryshort mount
W - Wheel mount

Pos. 2 - Port type

omit - Side ports
E - Rear ports

Pos. 3 - Displacement code

160 - 161,1[cm³/rev]
200 - 201,4[cm³/rev]
250 - 251,8[cm³/rev]
315 - 326,3[cm³/rev]
400 - 410,9[cm³/rev]
500 - 523,6[cm³/rev]
630 - 612,3[cm³/rev] (without Function diagram)
725 - 725,0[cm³/rev] (without Function diagram)

Pos. 4 - Shaft Extensions*

C - ø40 straight, Parallel key A12x8x70 DIN6885
CO - ø1½ " straight, Parallel key 3/8"x3/8"x2¼" BS46
K - ø45 tapered 1:10, Parallel key B12x8x28 DIN6885
SL - ø34,85 p.t.o. DIN 9611 Form 1
SH - ø1½" splined 17T ANSI B92.1-1976

Pos. 5 - Ports

omit - BSPP (ISO 228)
M - Metric (ISO 262)

Pos. 6 - Speed Monitoring

omit - none
T - with tacho connection (only for side ports)
RS-P - with speed sensor (PNP pull-down resistor)
RS-N - with speed sensor (NPN pull-up resistor)

Pos. 7 - Special Features

omit - none
LL -Low Leakage
LSV - Low Speed Valve

Pos. 8 - Rotation

omit - Standard Rotation
R - Reverse Rotation

Pos. 9 - Option (Paint)**

omit - no Paint
P - Painted
PC - Corrosion Protected Paint

Pos. 10 - Design Series

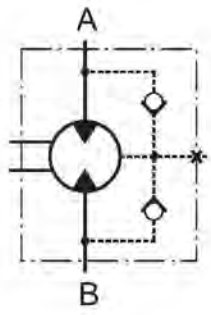
omit - Factory specified

NOTES:
* The permissible output torque for shafts must be not exceeded!
** Color at customer's request.

The hydraulic motors are mangano-phosphatized as standard.

LOW SPEED HIGH TORQUE MOTORS OTM

INTRODUCTION



Fer Hydraulic is now able to offer the new hydraulic motor type OTM, which is based on the well-known OT motor.

This motor is developed for transmission systems with larger pressure drop and higher torque. It's design is remarkable with strengthened inner element and new geroller set.

EXCELLENCE

» High torque and pressure drop;
» High inlet pressure;
» High starting torque;
» Improved efficiency at high pressure drop;
» Smooth operation at low speed.

APPLICATIONS

» Skid Steer Loaders;
» Metal working machines;
» Trenchers;
» Augers;
» Machines for agriculture;
» Road building machines;
» Mine machines;
» Woodworking and sawmill machinery;
» Conveyors etc;
» Special vehicles.

OPTIONS

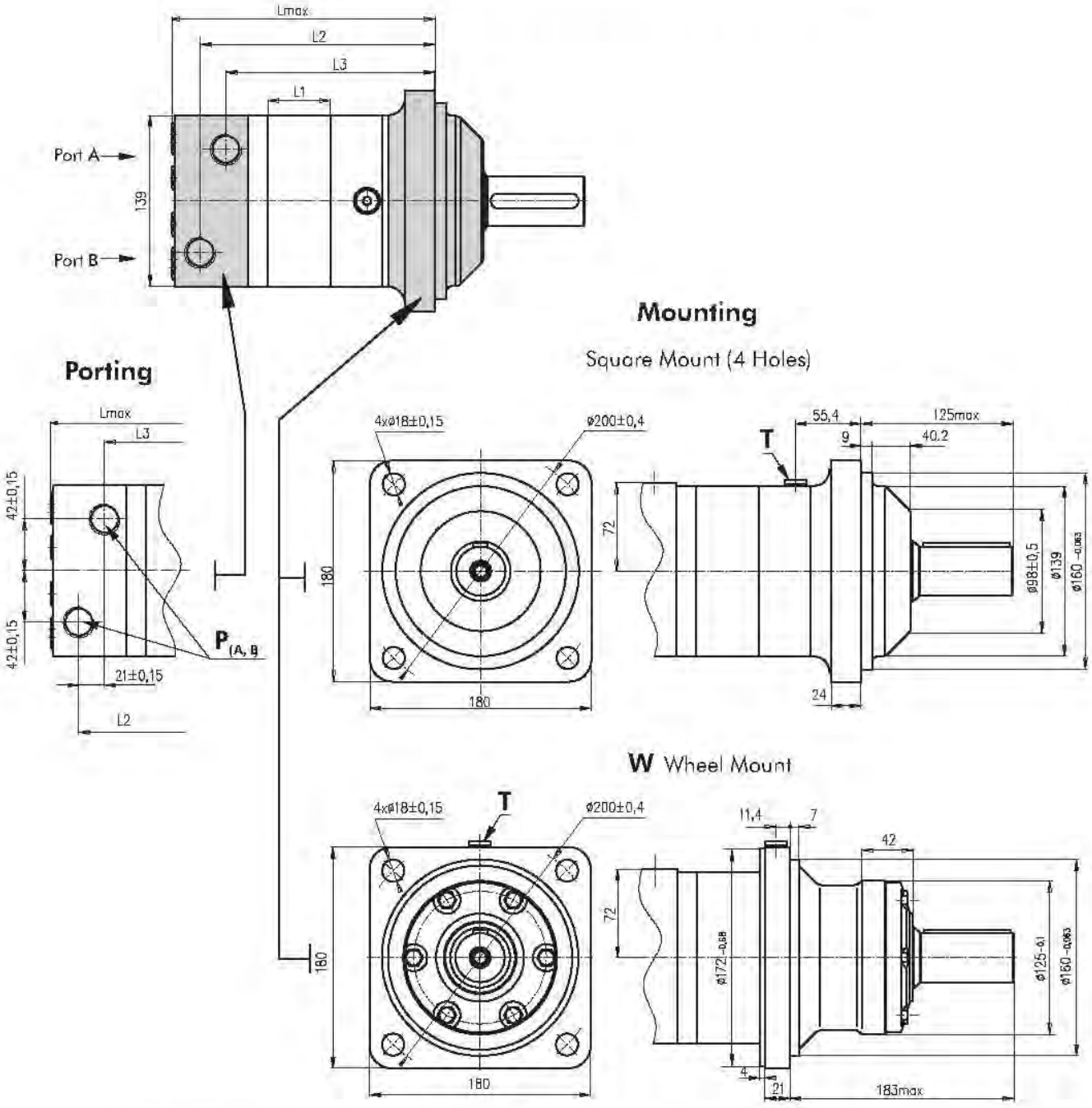
» Model- Disc valve, orbiting roller;
» Flange with wheel mount;
» Short motor;
» Side and rear ports;
» Shafts- straight, splined and tapered;
» Metric and BSPP ports;
» Other special features.

SPECIFICATION DATA

Code	Displa-cement [cm^3/rev]	Max. Speed [RPM]	Max. Torque [daNm]		Max. Output [kW]		Max. Pressure Drop [bar]		Max. Oil Flow [lpm]
		cont.	cont.	int*	cont.	int*	cont.	int*	cont.
OTM 200	201,4	625	72	102	41	65	250	350	125
OTM 250	251,8	500	90	128	41	70	250	350	125
OTM 315	326,3	380	116	163	41	70	250	350	125
OTM 400	410,9	305	147	206	41	70	250	350	125
OTM 470	475,0	260	171	215	41	55	250	315	125
OTM 500	523,6	240	172	215	37,5	51	230	280	125
OTM 630	665,0	185	175	215	29	45	185	225	125

* Intermittent operation: the permissible values may occur for max. 10% of every minute.

OUTLINE DIMENSIONS REFERENCE



Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

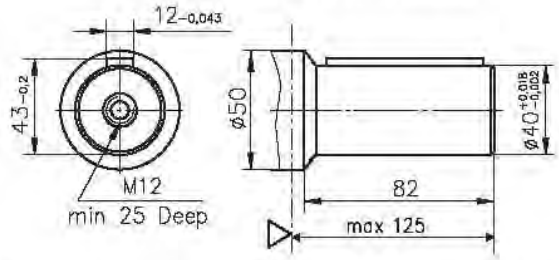
$P_{(A, B)}$: 2xG3/4 - 17 mm depth
T : G1/4 12 mm depth (plugged)

Type	L1, mm	L2, mm	L3, mm	L, mm	Type	L2, mm	L3, mm	L, mm
OTM 200	25	163,3	142,3	188	**OTMW 200**	104,8	83,3	129
OTM 250	31,3	169,6	148,3	194	**OTMW 250**	112,1	90,1	135
OTM 315	40,5	178,5	157,8	203	**OTMW 315**	120,3	99,3	144
OTM 400	50	189,3	168,3	214	**OTMW 400**	130,8	109,8	155
OTM 470	59	197,3	176,3	222	**OTMW 470**	138,8	117,8	163
OTM 500	65	203,3	182,3	228	**OTMW 500**	144,8	123,8	169
OTM 660	82,6	220,3	199,9	245	**OTMW 660**	162,4	141,4	187

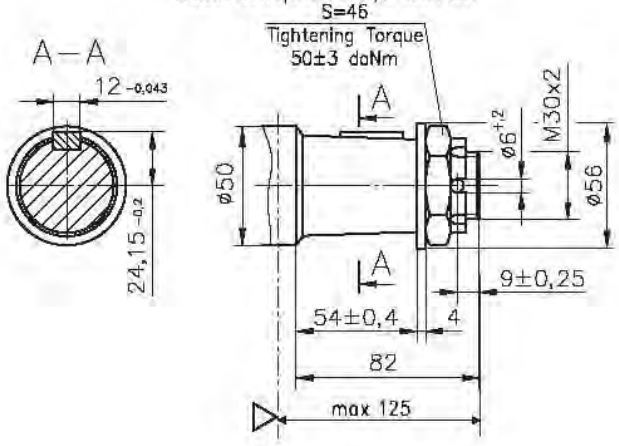
* The width of the gerolor is 3,5 mm greater than L_1.

SHAFT EXTENSIONS

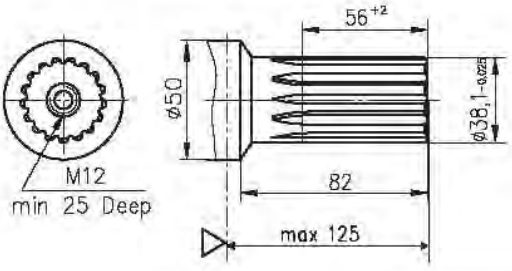
C -ø40 straight, Parallel key A12x8x70 DIN 6885
Max. Torque 132,8 daNm



K -tapered 1:10, Parallel key B12x8x28 DIN 6885
Max. Torque 210,7 daNm



SH -ø1½" splined 17T, DP 12/24 ANSI B92.1-1976
Max. Torque 132,8 daNm

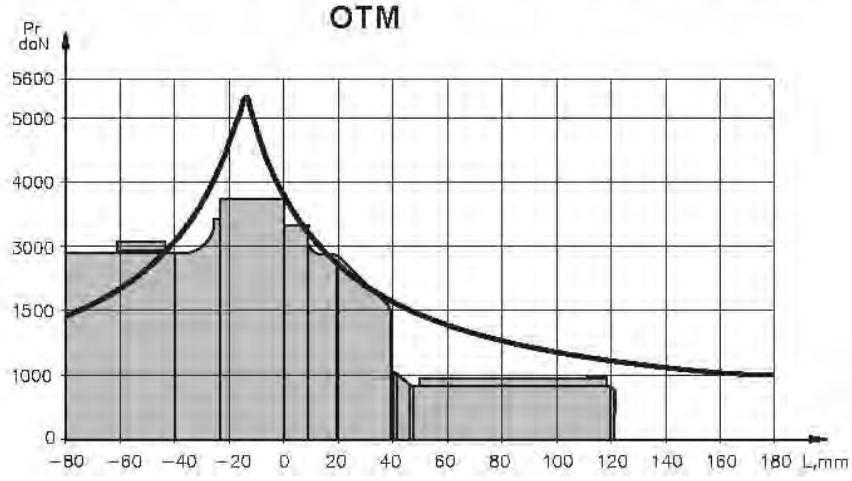


▽- Motor Mounting Surface

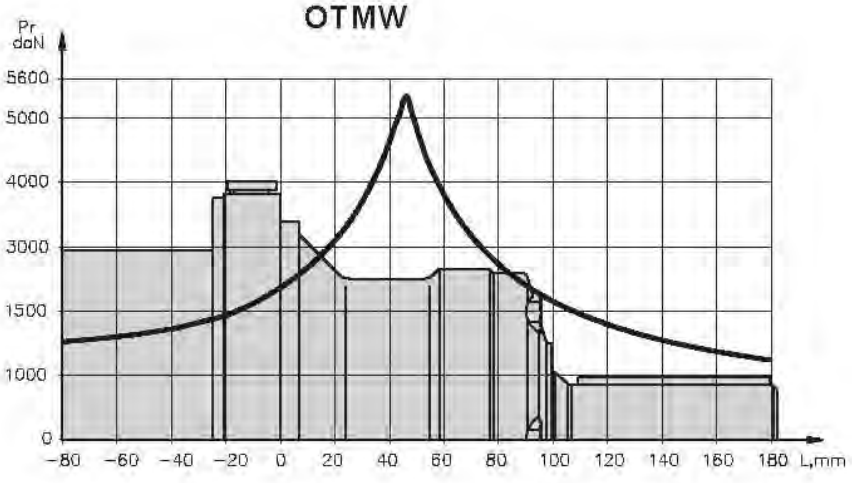
PERMISSIBLE SHAFT LOADS

The curves apply to a B_{10} bearing life (ISO281) of 2000 hours at 200 RPM.

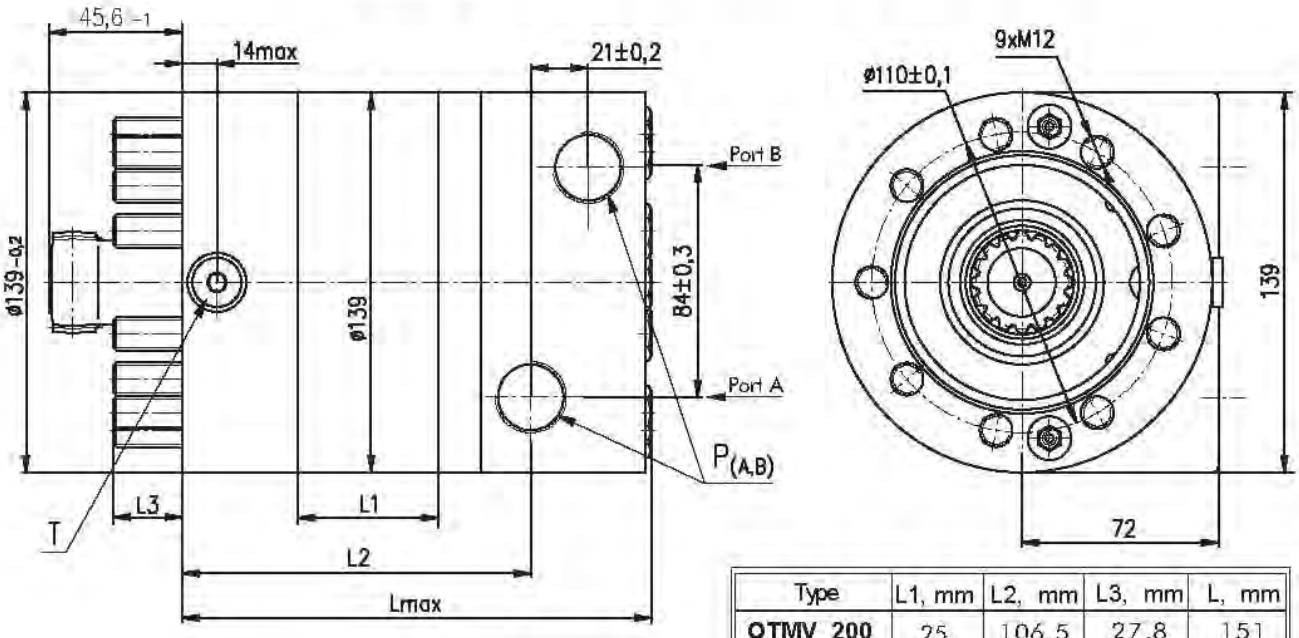
OTM



OTMW



OUTLINE DIMENSIONS REFERENCE FOR OTMV



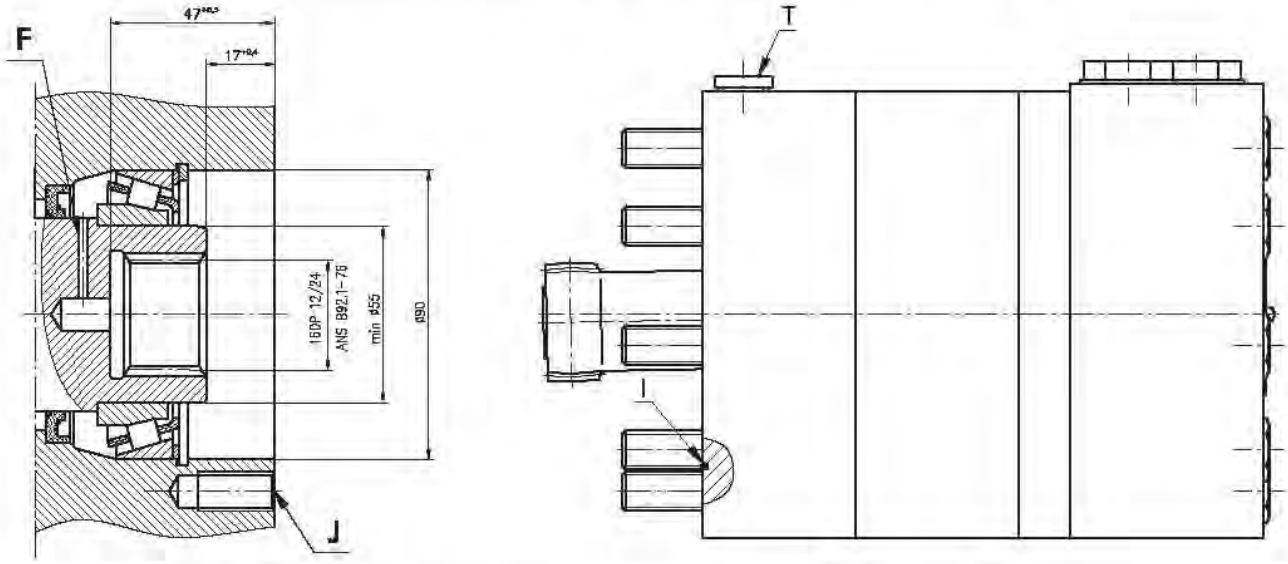
Type	L1, mm	L2, mm	L3, mm	L, mm
OTMV 200	25	106,5	27,8	151
OTMV 250	31,3	112,8	26,5	157
OTMV 315	40,5	122	22,3	167
OTMV 400	50	132,5	21,8	177
OTMV 470	59	140,5	23,8	185
OTMV 500	65	146,5	27,8	191
OTMV 660	82,6	164,1	20,2	209

$P_{(A, B)}$: 2xG3/4 - 17 mm depth
T : G1/4 12 mm depth (plugged)

Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

DIMENSIONS OF THE ATTACHED COMPONENT



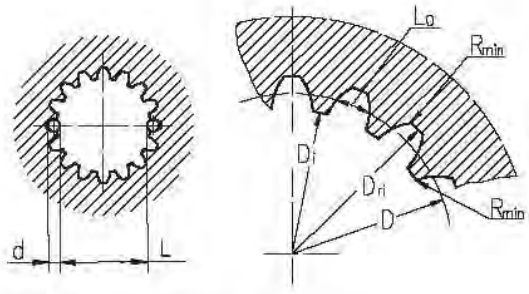
F: Oil circulation hole
J: 9xM12-24 mm depth, 90°, ø110±0,1

I: O- Ring 93x1,5 mm
T: Drain connection G1/4

INTERNAL SPLINE DATA FOR THE ATTACHED COMPONENT

Standard ANSI B92.1-1976, class 5
[m=2.1166; corrected x.m=+1,0]

Fillet Root Side Fit		mm
Number of Teeth	z	16
Diametral Pitch	DP	12/24
Pressure Angle		30^{O}
Pitch Dia.	D	33,8656
Major Dia.	Dri	$38,4^{+0,4}$
Minor Dia.	Di	$32,15^{+0,04}$
Space Width [Circular]	Lo	4,516±0,037
Fillet Radius	Rmin	0,5
Max. Measurement between Pin	L	$26,9^{+0,10}$
Pin Dia.	d	4,835±0,001



Hardening Specification:
HRC 60±2
HRC 52
0,7±0,2 mm effective case depth
Material 20 MoCr4 DIN 17210 or better

ORDER CODE

	1	2	3	4	5	6	7	8
O T M								

Pos. 1 - Mounting Flange

omit - Square mount, four holes
V - Very short mount
W - Wheel mount

Pos. 2 - Displacement code

200 - 201,4[cm^3/rev]
250 - 251,8[cm^3/rev]
315 - 326,3[cm^3/rev]
400 - 410,9[cm^3/rev]
470 - 475,0[cm^3/rev]
500 - 523,6[cm^3/rev]
660 - 665,0[cm^3/rev]

Pos. 3 - Shaft Extensions*

C - ø40 straight, Parallel key A12x8x70 DIN6885
K - ø45 tapered 1:10, Parallel key B12x8x28 DIN6885
SH - ø1½" splined 17T ANSI B92.1-1976

Pos. 4 - Ports

omit - Metric (ISO 262)
G - BSPP

Pos. 5 - Special Features

omit - none
LL -Low Leakage
LSV - Low Speed Valve

Pos. 6 - Rotation

omit - Standard Rotation
R - Reverse Rotation

Pos. 7 - Option (Paint)**

omit - no Paint
P - Painted
PC - Corrosion Protected Paint

Pos. 8 - Design Series

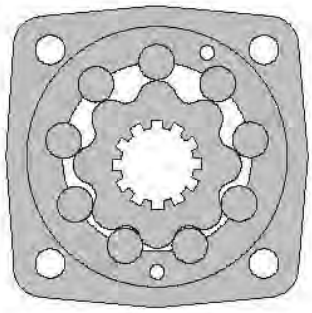
omit - Factory specified

NOTES:
* The permissible output torque for shafts must be not exceeded!
** Color at customer's request.
The hydraulic motors are mangano-phosphatized as standard.

HYDRAULIC MOTORS OV

APPLICATION

» Conveyors;
» Metal working machines;
» Machines for agriculture;
» Road building machines;
» Mining machinery;
» Food industries;
» Special vehicles;
» Plastic and rubber machinery etc.



CONTENTS

Specification data OV-02
Function diagrams ..... OV-03÷05
Permissible shaft loads OV-05
Dimensions and mounting OV-06
Dimensions and mounting- OVS ..... OV-06÷08
Internal Spline data OV-08
Tacho connection OV-08
Shaft extensions OV-11
Order code OV-11

OPTIONS

» Model- Disc valve, roll-gerotor
» Flange and wheel mount;
» Short motor;
» Tacho and speed sensor connection;
» Side ports;
» Shafts- straight, splined and tapered;
» Metric and BSPP ports;
» Other special features.

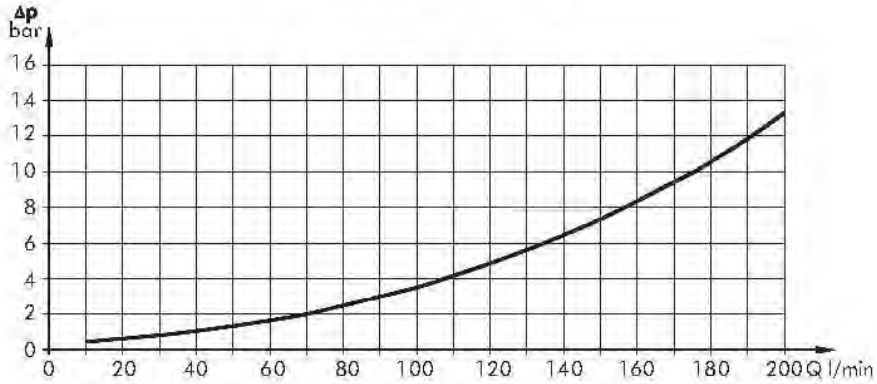
GENERAL

Displacement, [cm^3/rev.]	314,5÷801,8
Max. Speed, [RPM]	510÷250
Max. Torque, [daNm]	92÷188
Max. Output, [kW]	42,5÷53,5
Max. Pressure Drop, [bar]	200÷160
Max. Oil Flow, [l/min]	160÷200
Min. Speed, [RPM]	10÷5
Permissible Shaft Loads, [daN]	P_{rad}=2800; P_a=1500
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, [°C]	-30÷90
Optimal Viscosity range, [mm^2/s]	20÷75
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 micron)

Oil flow in drain line

Pressure drop (bar)	Viscosity (mm^2/s)	Oil flow in drain line (l/min)
140	20	3
	35	2
210	20	6
	35	4

Pressure Losses



SPECIFICATION DATA

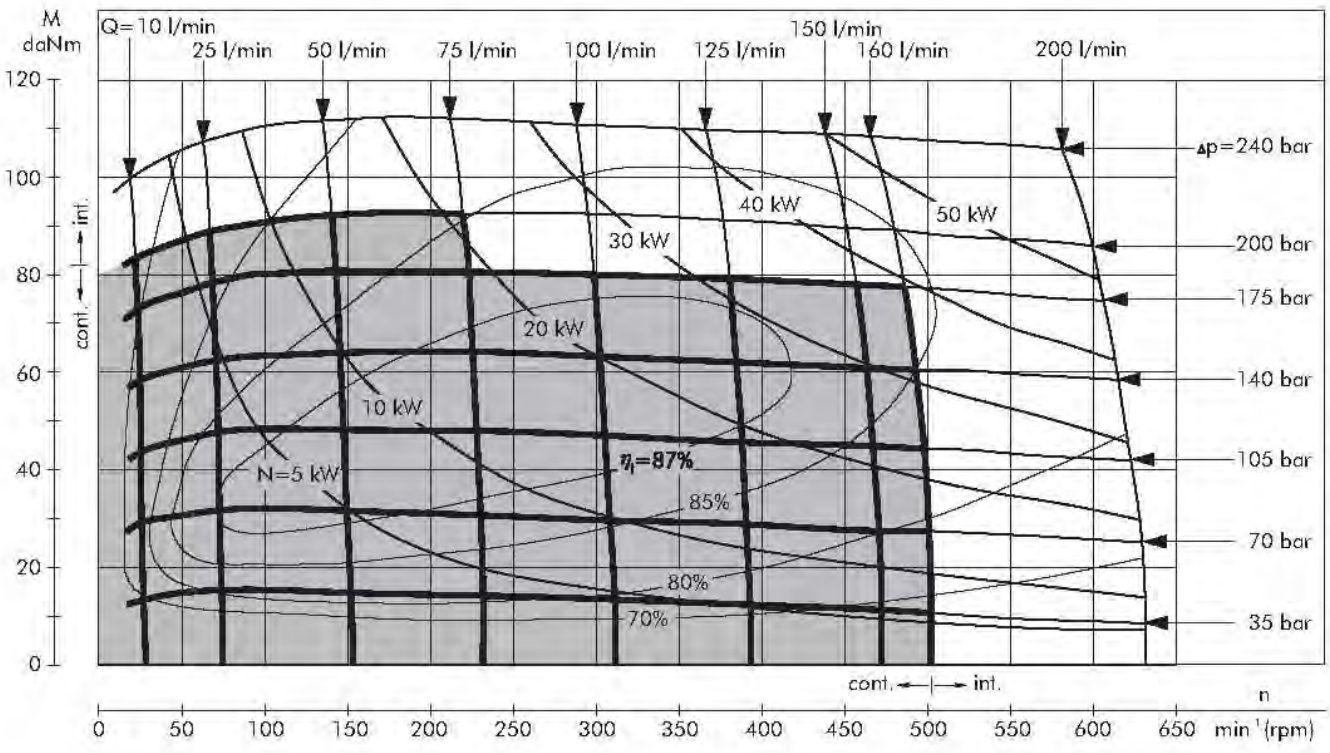
Type		OV 315	OV 400	OV 500	OV 630	OV 800
Displacement [cm³/rev.]		314.5	400,9	499,6	629,1	801,8
Max. Speed, [RPM]	cont.	510	500	400	315	250
	Int.*	630	600	480	380	300
Max. Torque [daNm]	cont.	92	118	146	166	188
	Int.*	111	141	176	194	211
	peak**	129	164	205	221	247
Max. Output [kW]	cont.	42,5	53,5	53,5	48	42,5
	int.*	51	64	64	56	48
Max. Pressure Drop [bar]	cont.	200	200	200	180	160
	Int.*	240	240	240	210	180
	peak**	280	280	280	240	210
Max. Oil Flow [l/min]	cont.	160	200	200	200	200
	Int.*	200	240	240	240	240
Max. Inlet Pressure [bar]	cont.	210	210	210	210	210
	Int.*	250	250	250	250	250
	peak**	300	300	300	300	300
Max. Return Pressure without Drain Line or Max. Pressure in Drain Line, [bar]	cont. 0-100 RPM	60	60	60	60	60
	cont. 100-300 RPM	30	30	30	30	30
	cont. >300 RPM	20	20	20	20	20
	Int.* 0-max. RPM	75	75	75	75	75
Max. Return Pressure with Drain Line [bar]	cont.	140	140	140	140	140
	Int.*	175	175	175	175	175
	peak**	210	210	210	210	210
Max. Starting Pressure with Unloaded Shaft, [bar]		8	8	8	8	8
Min. Starting Torque [daNm]	at max. press. drop cont.	71	91	113	133	151
	at max. press. drop Int.*	85	109	136	155	170
Min. Speed*, [RPM]**		10	9	8	6	5
Weight, [kg]	**OV**	31,8	32,6	33,5	34,9	36,5
	OVW	32,4	33,2	34,1	35,5	37,1
	OVS	22,7	23,5	24,4	25,6	27,7

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% of every minute.
*** For speeds of 5 RPM lower than given, consult factory or your regional manager.

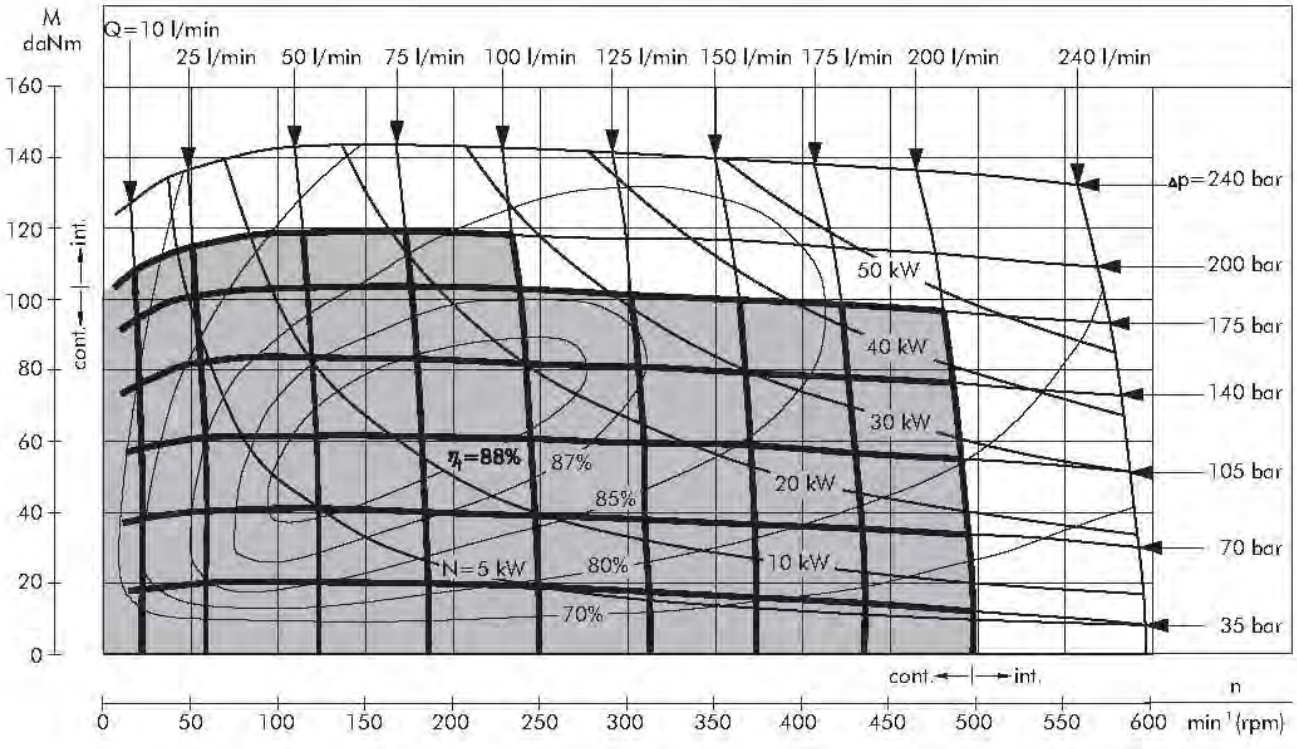
1) Intermittent speed and intermittent pressure must not occur simultaneously.
2) Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3) Recommend using a premium quality, anti-wear type mineral based hydraulic oil, HLP(DIN51524) or HM(ISO6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4) Recommended minimum oil viscosity 13 mm²/s at 50°C.
5) Recommended maximum system operating temperature is 82°C.
6) To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

FUNCTION DIAGRAMS

OV 315



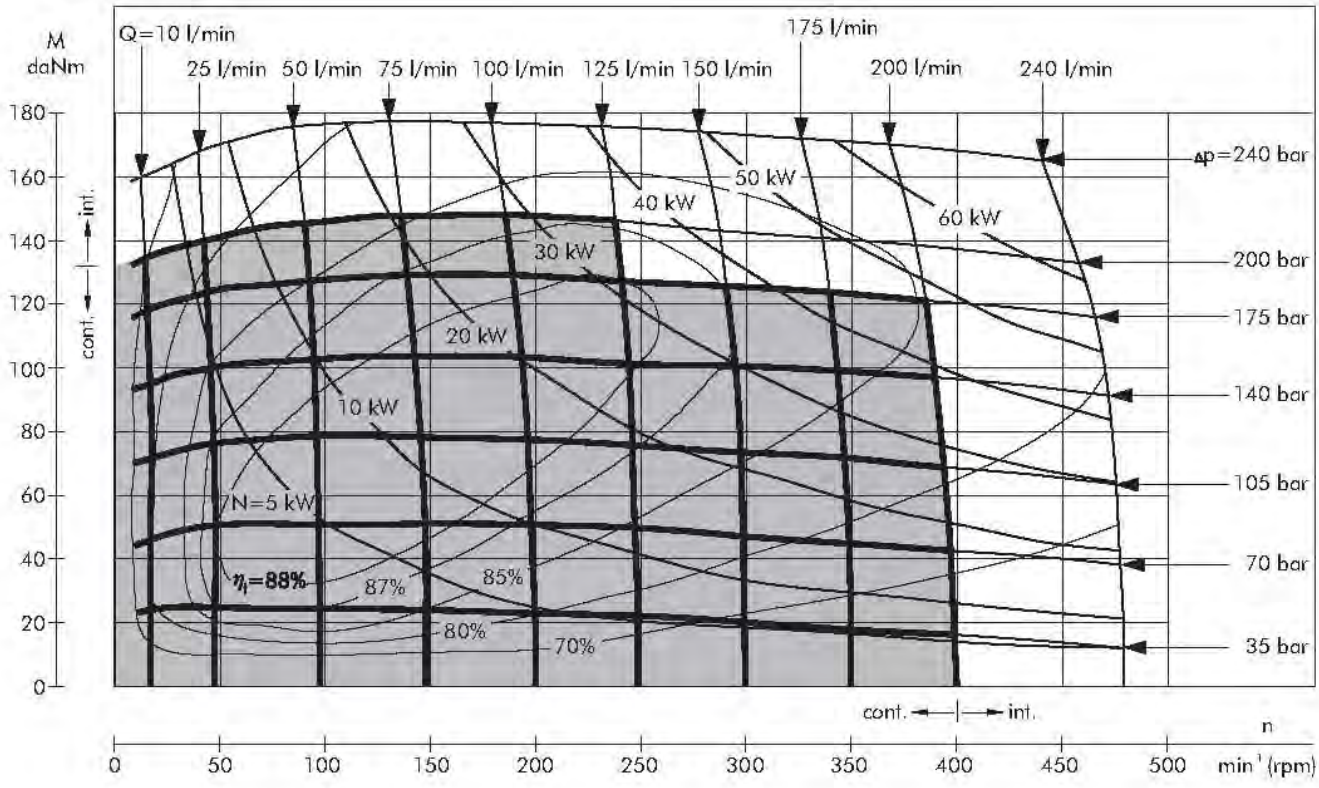
OV 400



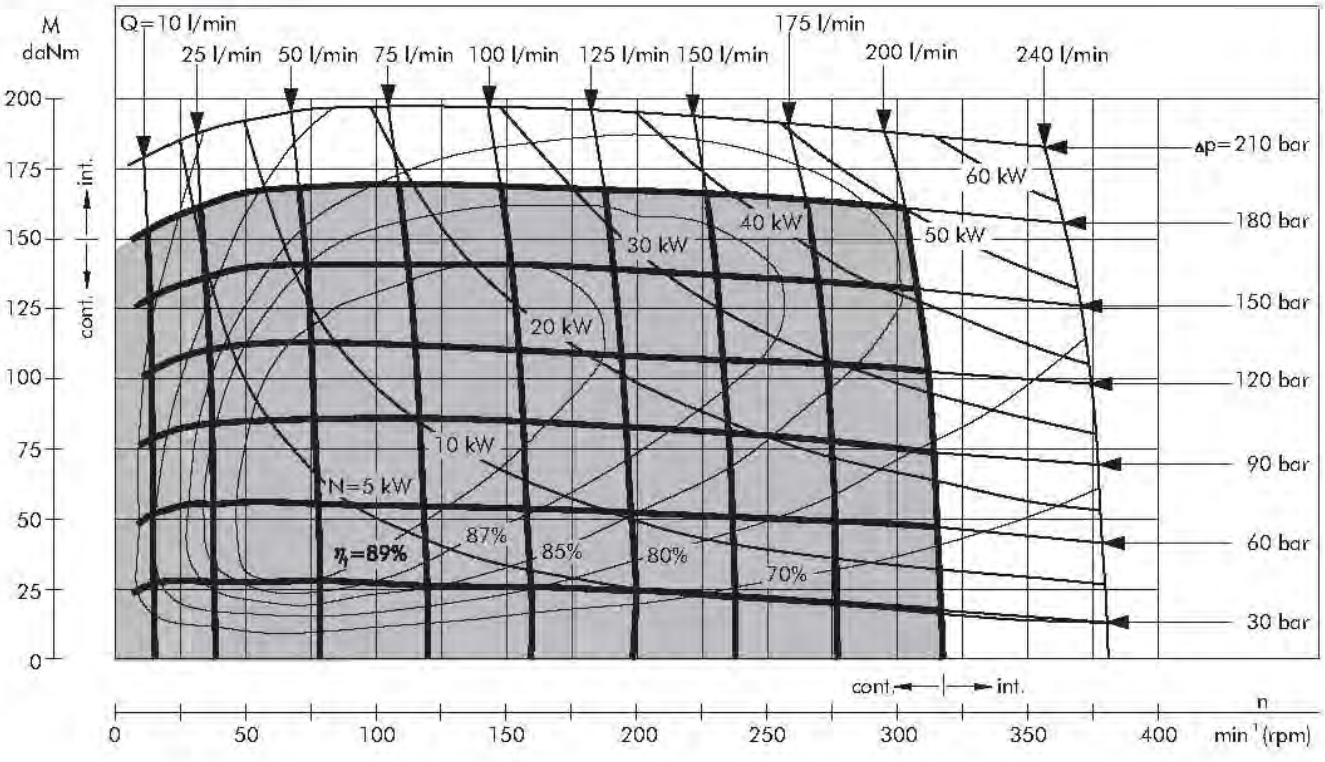
The function diagrams data was collected at back pressure 5÷10 bar
and oil with viscosity of 32 mm²/s at 50° C.

FUNCTION DIAGRAMS

OV 500



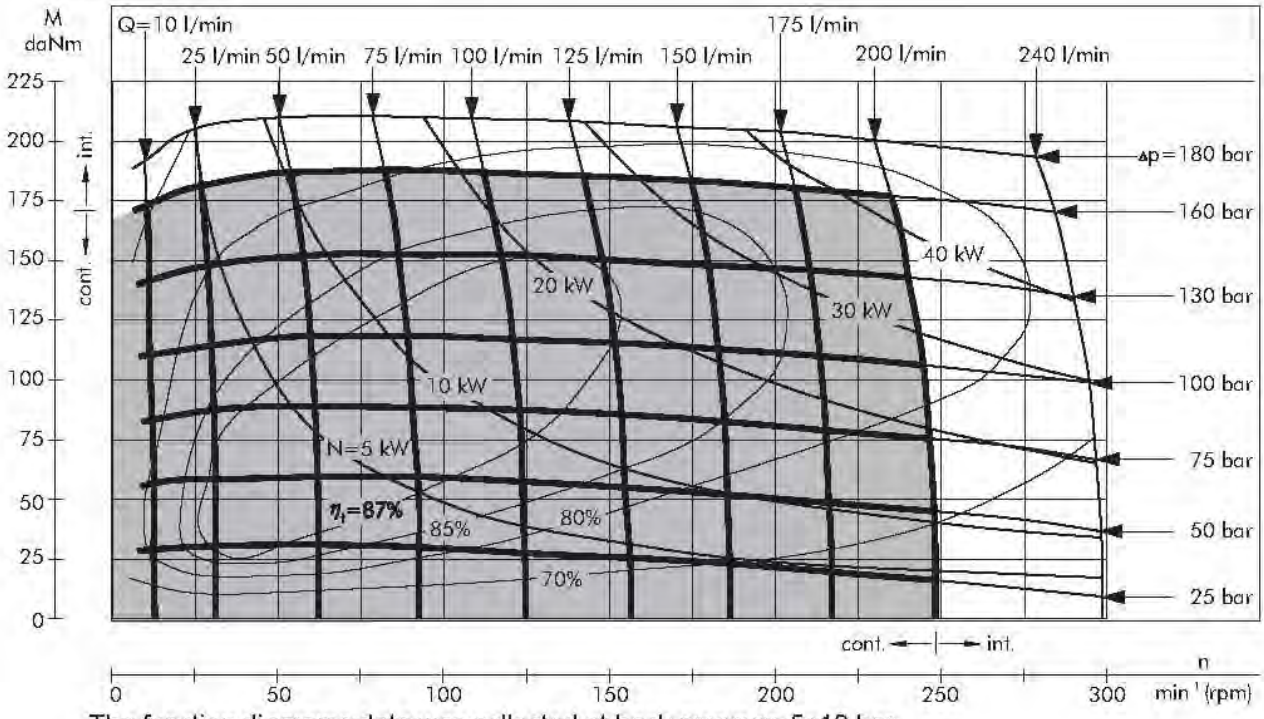
OV 630



The function diagrams data was collected at back pressure 5÷10 bar
and oil with viscosity of 32 mm²/s at 50° C.

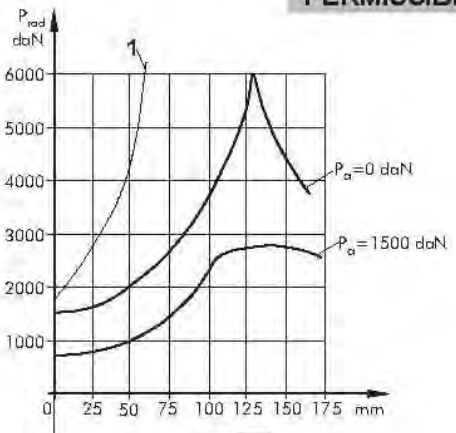
FUNCTION DIAGRAMS

OV 800

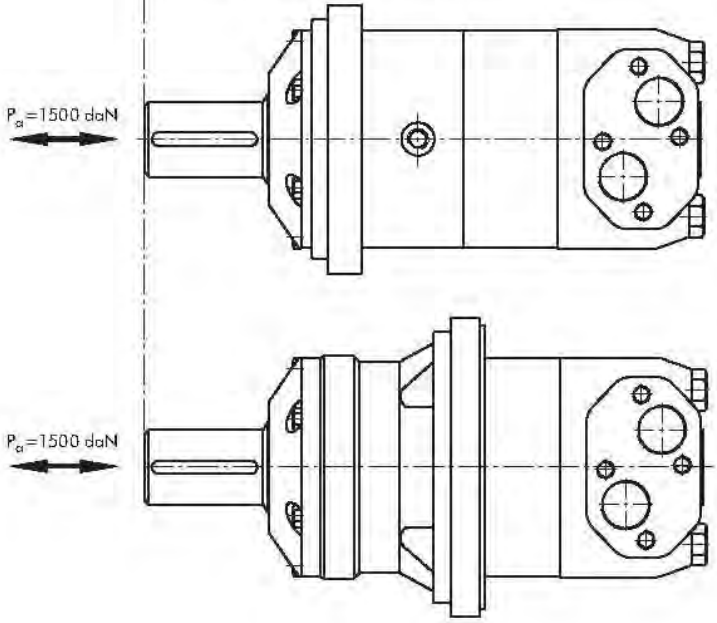


The function diagrams data was collected at back pressure 5÷10 bar and oil with viscosity of 32 mm²/s at 50° C.

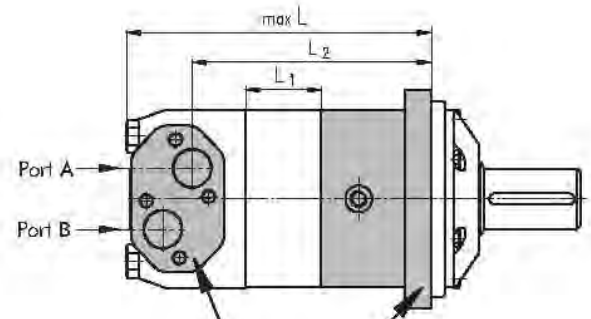
PERMISSIBLE SHAFT LOADS



The output shaft runs in tapered bearings that permit high axial and radial forces. Curve " **1**" shows max. radial shaft load. Any shaft load exceeding the values quoted in the curve will seriously reduce motor life. The two other curves apply to a B10 bearing life of 3000 hours at 200 RPM.

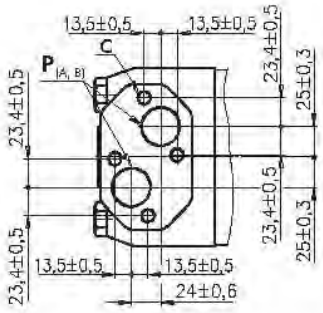


DIMENSIONS AND MOUNTING DATA



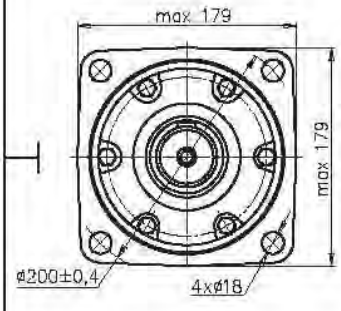
Porting

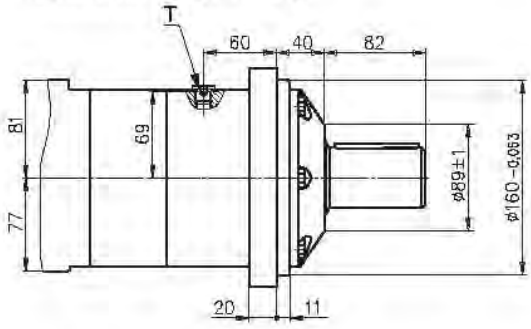
Side Ports



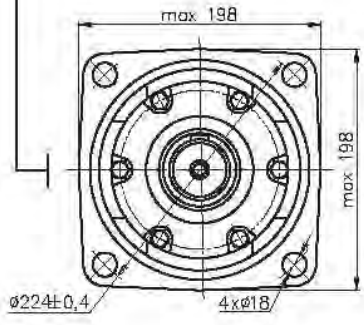
Mounting

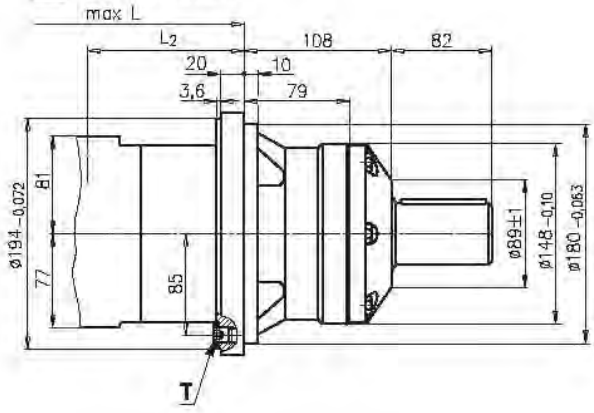
Square Mount (4 Holes)





W Wheel Mount





Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

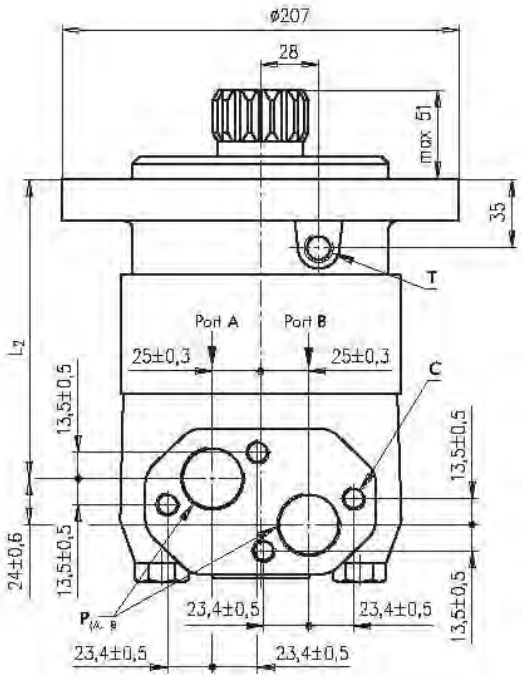
C: 4xM12- 12 mm depth
$P_{(A,B)}$: 2xG1 - 20 mm depth
T: G 1/4 - 12 mm depth

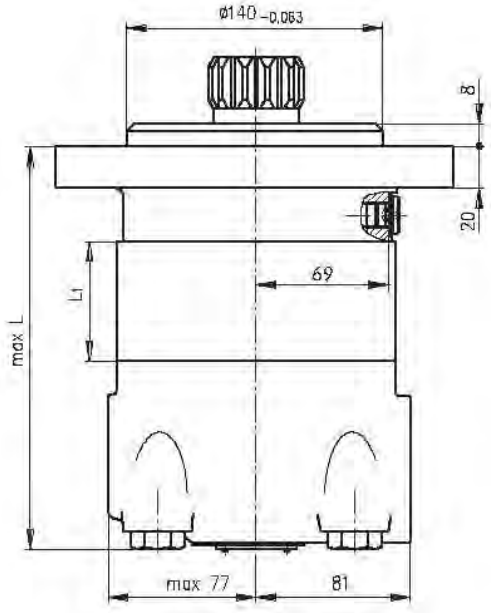
Type	L_1 mm	L_2 mm	Type	L_1 mm	L_2 mm	*L_1 mm
OV 315	214,5	160	**OVW 315**	146	92	22,0
OV 400	221,5	167	**OVW 400**	153	99	29,0
OV 500	229,5	175	**OVW 500**	161	107	37,0
OV 630	240,0	186	**OVW 630**	172	118	47,5
OV 800	254,0	200	**OVW 800**	185	132	61,5

* The width of the gerolor is 3,5 mm greater than L_1.

DIMENSIONS AND MOUNTING

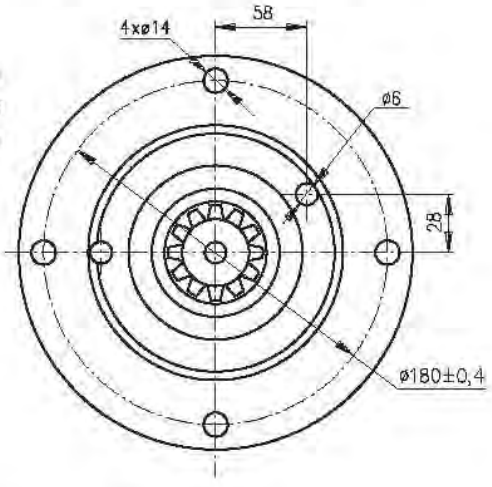
S Short Mount





Type	L, mm	*L_1, mm	L_2, mm
OVS 315	171	22,0	117
OVS 400	179	29,0	124
OVS 500	186	37,0	132
OVS 630	197	47,5	143
OVS 800	211	61,5	157

C: 4xM12- 12 mm depth
$P_{(A,B)}$: 2xG1 - 20 mm depth
T: G 1/4 - 12 mm depth



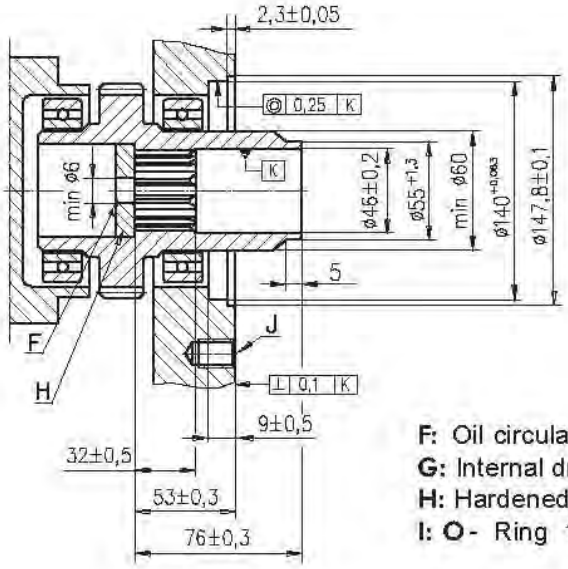
* The width of the gerolor is 3,5 mm greater than L_1.

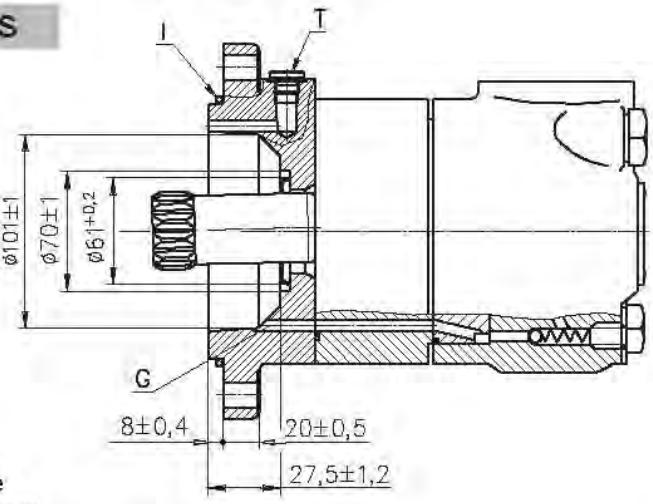
Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

DIMENSIONS OF THE ATTACHED COMPONENT

OVS





F: Oil circulation hole
G: Internal drain channel
H: Hardened stop plate
I: **O**- Ring 140x3mm

J: 4xM12-18 mm depth, 90°
T: Drain connection G1/4 - 12 mm depth

DRAIN CONNECTION

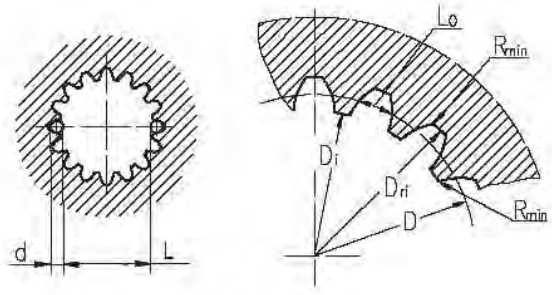
A drain line ought to be used when pressure in the return line can exceed the permissible pressure. It can be connected for OVS at the drain port of the motor.

The drain line must be possible for oil to flow freely between motor and attached component and must be led to the tank. The maximum pressure in the drain line is limited by the attachedcomponent and its seal.

INTERNAL SPLINE DATA FOR THE ATTACHED COMPONENT

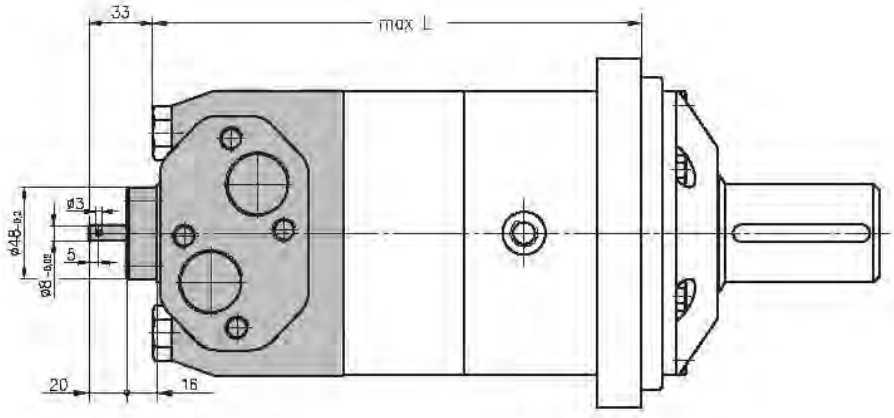
Standard ANSI B92.1-1976, class 5
[m=2.54;corrected x.m=+1,0]

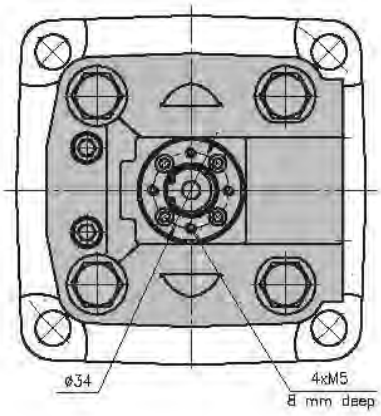
Fillet Root Side Fit		mm
Number of Teeth	z	16
Diametral Pitch	DP	10/20
Pressure Angle		30^{O}
Pitch Dia.	D	40,640
Major Dia.	Dri	$45{,}2^{+0{,}4}$
Minor Dia.	Di	$38{,}5^{+0{,}039}$
Space Width [Circular]	Lo	$5{,}18 \pm 0{,}037$
Fillet Radius	Rmin	0,4
Max. Measurement between Pin	L	$32{,}47^{+0{,}15}$
Pin Dia.	d	$5{,}5 \pm 0{,}001$



Hardening Specification:
HRC 60±2
HRC 52
0,7±0,2 mm effective case depth
Material 20 MoCr4 DIN 17210 or better

MOTORS WITH TACHO CONNECTION - Option "T"

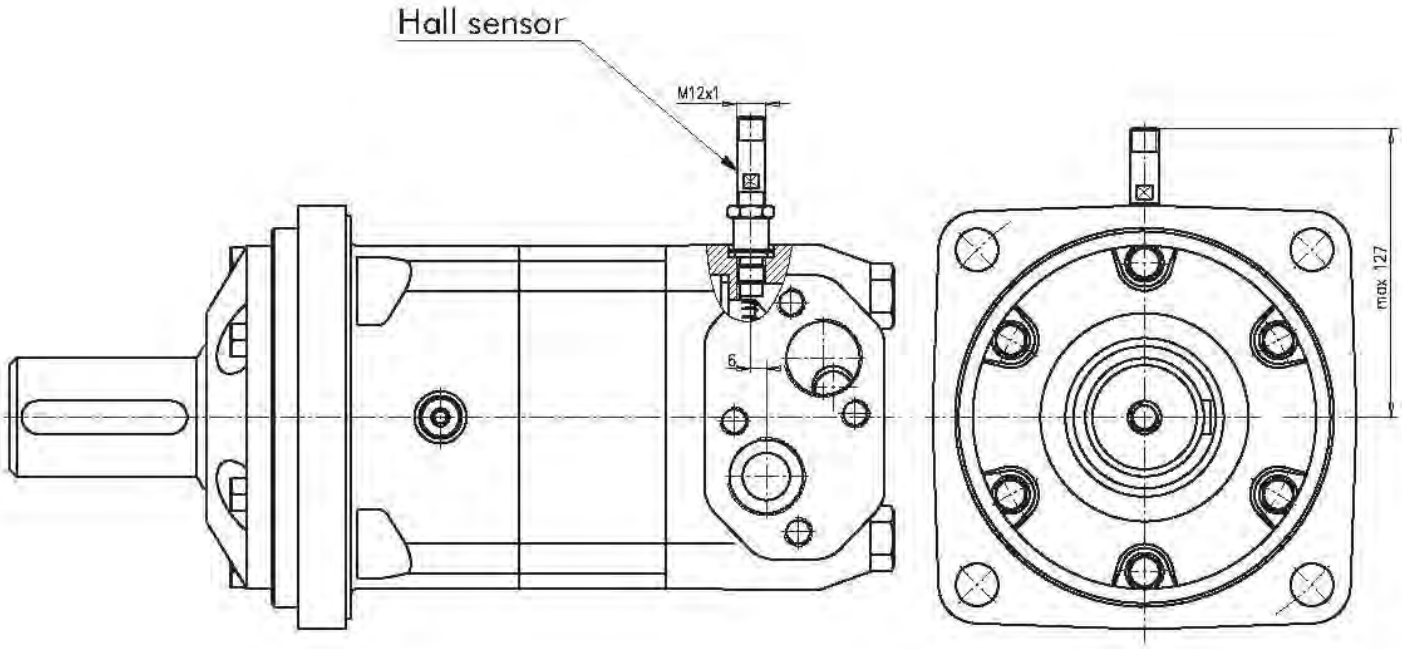




Hydraulic motors with speed sensor type OV...RS

Fer Hydraulic is introducing hydraulic motor with a new generation of speed sensor. The electric output signal is a standard voltage signal that can be used for regulating the speed of a motor.

The speed is measured by a sensor in accordance with the Hall principle. Signal processing and amplification are performed in the sensor housing. A connection is provided in the housing by a Plug connector M12 Series.



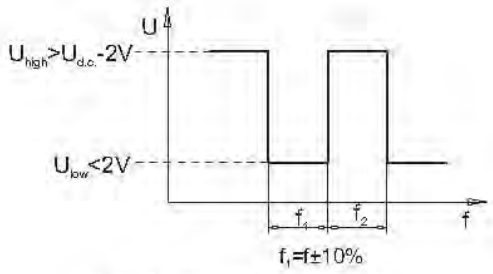
This performance is applicable for all motors of OV series. The main technical features correspond to the standard motors series OV.

DIFFERENTIAL HALL SENSOR

Technical data

Frequency range	3...20 000 Hz
Output	PNP
Power supply	10...36 VDC
Current input	20 mA (@24 VDC)
Current load	500 mA (@24 VDC;24°C)
Ambient Temperature	minus 40... plus 125°C
Protection	IP 67
Plug connector	M12-Series
Mounting principle	ISO 6149
Pulses per revolution	102

Output signal

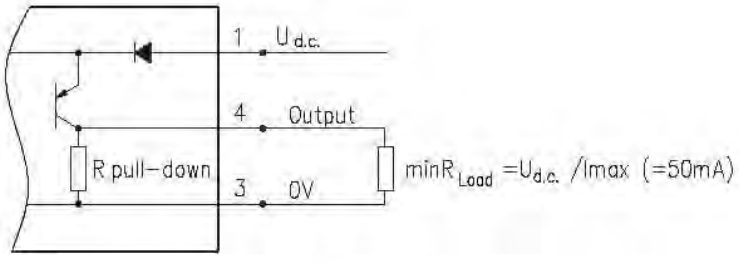


Load max.:I_{high}=I_{low}<50mA

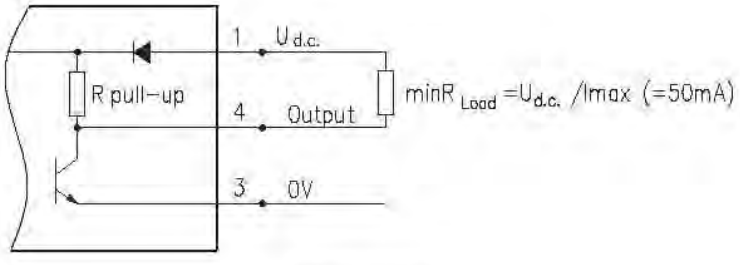
No load current, max: 20 mA

Wiring diagram

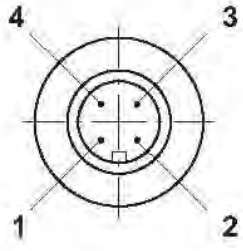
PNP



NPN



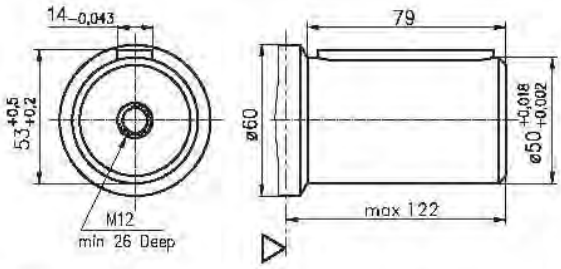
Stik type



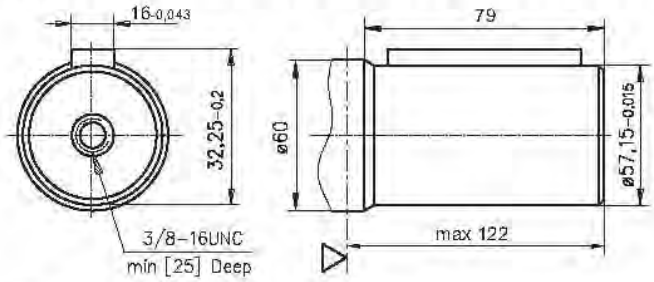
Terminal No.	Connection
1	$U_{d.c.}$
2	No connection
3	0V
4	Output signal

SHAFT EXTENSIONS

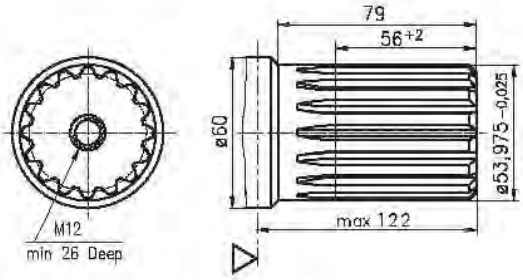
C - ø50 straight, Parallel key A14x9x70 DIN 6885



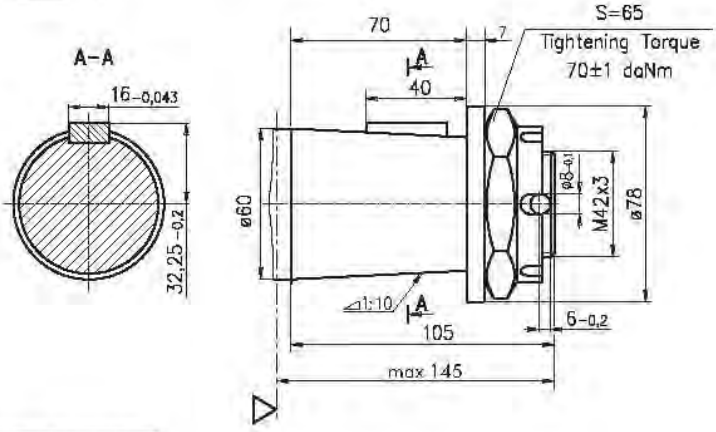
CO - ø2¼"[57,15] straight, Parallel key ½ "x½"x 2¼" BS46



SH -ø2 1/8"splined, 16 DP 8/16 ANSI B92.1-1976



K -tapered 1:10, Parallel key B16x10x32 DIN 6885



▽- Motor Mounting Surface

ORDER CODE

	1	2	3	4	5	6	7	8
OV								

Pos.1 - Mounting Flange

omit - Square mount, four holes

S	- Short mount
W*	- Wheel mount

Pos.2 - Displacement code

315	- 314,5 [cm³/rev]
400	- 400,9 [cm³/rev]
500	- 499,6 [cm³/rev]
630	- 629,1 [cm³/rev]
800	- 801,8 [cm³/rev]

Pos.3 - Shaft extensions**

C	- ø50 straight, Parallel key A14x9x70 DIN6885
CO	- ø2¼ straight, Parallel key ½ "x½"x 2¼" BS46
K	- ø60 tapered 1:10, Parallel key B16x10x32 DIN6885
SH	- ø2 1/8" splined, ANSI B92.1-1976

Pos. 4 - Speed Monitoring

omit - none

T	- with tacho connection
RS-P	- with speed sensor (PNP pull-down resistor)
RS-N	- with speed sensor (NPN pull-up resistor)

Pos. 5 - Special Features

omit - none

LL	-Low Leakage
LSV	- Low Speed Valve

Pos. 6 - Rotation

omit - Standard Rotation

R	- Reverse Rotation

Pos. 7 - Option (Paint)***

omit - no Paint

P	- Painted
PC	- Corrosion Protected Paint

Pos. 8 - Design Series

omit - Factory specified

NOTES:

* The motor type OVW is only available with shaft type **C, CO, K**

** The permissible output torque for shafts must be not exceeded!

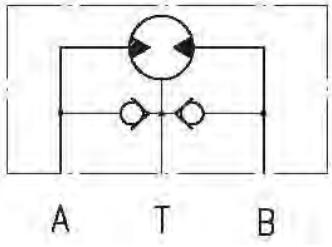
*** Color at customer's request.

The hydraulic motors are mangano- phosphatized as standard.

Hydraulic motors with Dual shaft type ORB160

INTRODUCTION

Fer Hydraulic introduces a new series of hydraulic motors, type ORB with two shafts, which are based on well-known OR motors.



OPTIONS

- » Model-Spool valve, roll-gerotor;
- » Dual shaft;
- » Oval flange;
- » Side port;
- » Straight shafts;
- » BSPP ports;
- » Other special features

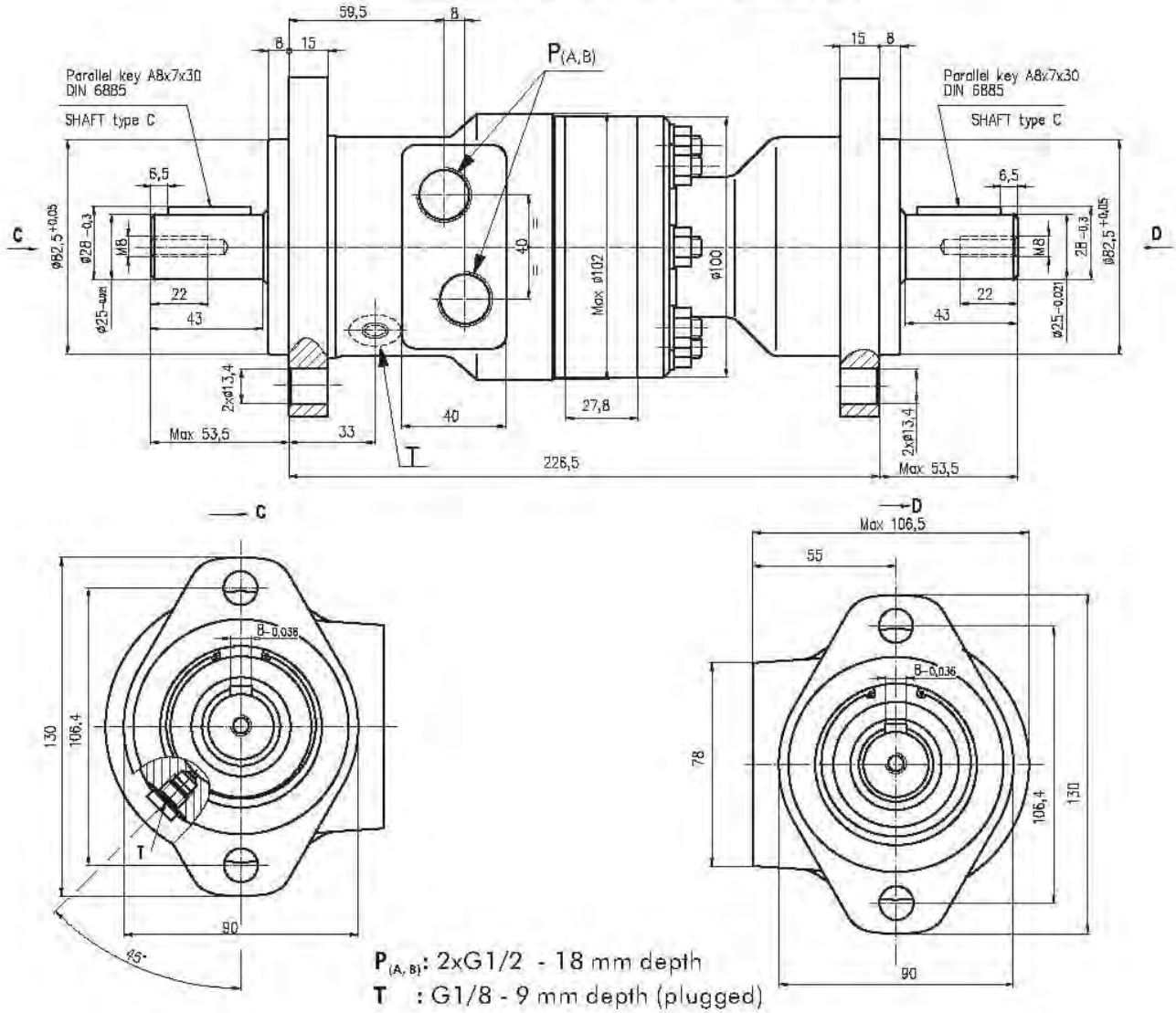
APPLICATION

- » Conveyors;
- » Feeding mechanism of robots and manipulators;
- » Metal working machines;
- » Textile machines;
- » Machines for agriculture;
- » Food industries;
- » Mining machinery, etc.

SPECIFICATION DATA

Type			ORB 160	ORB 160 LSV
Displacement, $cm^3/rev.$			159,6	159,6
Max. Speed,	cont.		375	200
RPM	int.		470	300
Max. Torque,	cont.		29	29
daNm	int.		35	35
Max. Torque "A"Shaft,	cont.		20	20
daNm	int.		23	23
Max. Torque "B"Shaft,	cont.		20	20
daNm	int.		23	23
Max. Pressure Drop,	cont.		150	150
bar	int.		190	190
Max. Oil Flow,	cont.		60	32
lpm	int.		75	48
Max. Return Pressure	cont.	0 - 100 RPM	75	75
without Drain Line, bar	cont.	100-200 RPM	40	40
	cont.	200-500 RPM	20	20
	int.	0 - max RPM	75	75

OUTLINE DIMENSINS REFERENCE

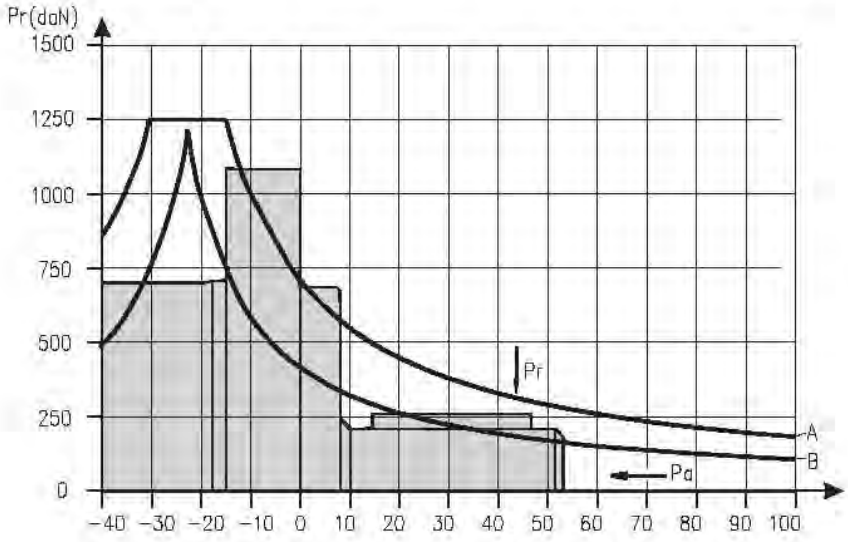


$P_{(A,B)}$: 2xG1/2 - 18 mm depth

T : G1/8 - 9 mm depth (plugged)

PERMISSIBLE SHAFT LOADS

The load diagrams are valid for an average bearings life of 1600 hrs at 200 r.p.m. with mineral base lubricating containing antiwear additives (ref. ISO 281 (3.3) standard).
The "A" curve gives the maximum static load affordable by the bearings.
The "B" curve gives the radial load top limit without axial load of 200 daN.



Pa Max=210daN

HYDRAULIC MOTORS

MOTOR APPLICATION

VEHICLE DRIVE CALCULATIONS

1.Motorspeed:n, [min^{-1}]

$$n=\frac{2,65 \times v \times i}{R}$$

v- vehicle speed, [km/h];
R- wheel rolling radius, [m];
i- gear ratio between motor and wheels.
If no gearbox,use i=1.

2.Rolling resistance: RR, [daN]
The resistance force resulted in wheels contact with different surfaces:

$$RR=G \times \rho$$

G- total weight loaded on vehicle, [daN];
ρ- rolling resistance coefficient (Table 1).

Table 1

Rolling resistance coefficient In case of rubber tire rolling on different surfaces	
Surface	ρ
Concrete- faultless	0,010
Concrete- good	0,015
Concrete- bad	0,020
Asphalt- faultless	0,012
Asphalt- good	0,017
Asphalt- bad	0,022
Macadam- faultless	0,015
Macadam- good	0,022
Macadam- bad	0,037
Snow- 5 cm	0,025
Snow- 10 cm	0,037
Polluted covering- smooth	0,025
Polluted covering- sandy	0,040
Mud	0,037 ÷ 0,150
Sand- Gravel	0,060 ÷ 0,150
Sand- loose	0,160 ÷ 0,300

3.Grade resistance: GR, [daN]

$$GR=G \times (\sin\alpha + \rho \times \cos\alpha)$$

α- gradient negotiation angle (Table 2)

Table 2

Grade %	α Degrees	Grade %	α Degrees
1%	0° 35'	12%	6° 5'
2%	1° 9'	15%	8° 31'
5%	2° 51'	20%	11° 19'
6%	3° 26'	25%	14° 3'
8%	4° 35'	32%	18°
10%	5° 43'	60%	31°

4.Accelerate force: FA, [daN]
Force FA necessary for acceleration from 0 to maximum speed v and time t can be calculated with a formula:

$$FA=\frac{v \times G}{3,6 \times t}, \text{ [daN]}$$

FA- accelerate force, [daN];
t- time, [s].

5.Tractive effort: DP, [daN]
Tractive effort **DP** is the additional force of trailer. This value will be established as follows:
- -according to constructor's assessment;
- -as calculating forces in items 2, 3 and 4 of trailer; the calculated sum corresponds to the tractive effort requested.

6.Total tractive effort: TE, [daN]
Total tractive effort TE is total effort necessary for vehicle motion; that the sum of forces calculated in items from 2 to 5 and increased with 10 % because of air resistance.

$$TE=1,1 \times (RR + GR + FA + DP)$$

RR - force acquired to overcome the rolling resistance;
GR- force acquired to slope upwards;
FA- force acquired to accelerate (acceleration force);
DP- additional tractive effort (trailer).

7.Motor Torque:M, [daNm]
Necessary torquemoment for every hydraulic motor:

$$M=\frac{TE \times R}{N \times i \times \eta_M}$$

N- motor numbers;
η_M- mechanical gear efficiency (if it is available).

8.Cohesion between tire and road covering: M_w, [daNm]

$$M_w=\frac{G_w \times f \times R}{i \times \eta_M}$$

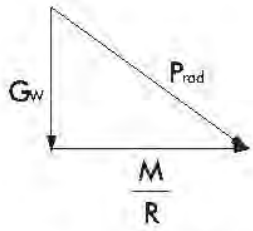
To avoid wheel slipping, it should be observed the following condition $M_w > M$
f - frictional factor;
G_w- total weight over the wheels, [daN].

Table 3

Surface	Frictional factor f
Steel on steel	0,15 ÷ 0,20
Rubber tire on polluted surface	0,5 ÷ 0,7
Rubber tire on asphalt	0,8 ÷ 1,0
Rubber tire on concrete	0,8 ÷ 1,0
Rubber tire on grass	0,4

9. Radial motor loading: P_{rad} , [daN]

When motor is used for vehicle motion with wheels mounted directly on motor shaft, the total radial loading of motor shaft P_{rad} is a sum of motion force and weight force acting on one wheel.



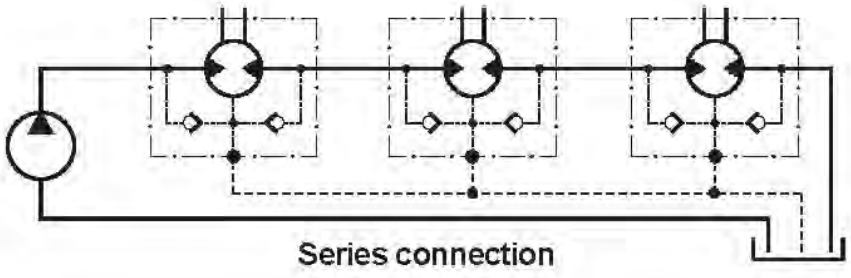
G_w - Weight held by wheel;
P_{rad} - Total radial loading of motor shaft;
M/R - Motion force.

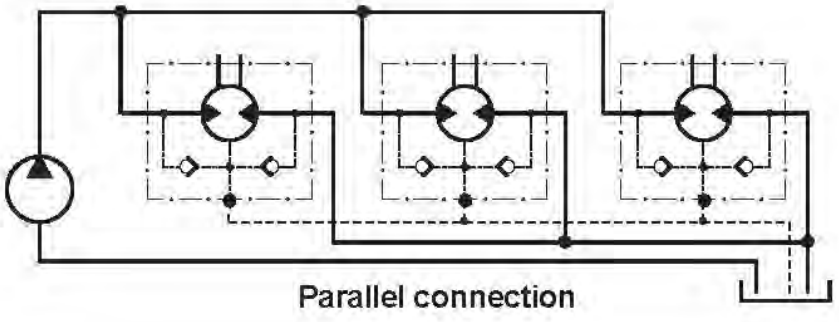
$$P_{rad} = \sqrt{G_w^2 + \left(\frac{M}{R}\right)^2}$$

In accordance with calculated loadings the suitable motor from the catalogue is selected.

DRAINAGE SPACE AND DRAINAGE PRESSURE

Advantages in oil drainage from drain space: Cleaning; Cooling and Seal lifetime prolonging.





HYDRAULIC DISC BRAKES AND BRAKE-MOTOR UNITS

INDEX

➢ DISC BRAKES

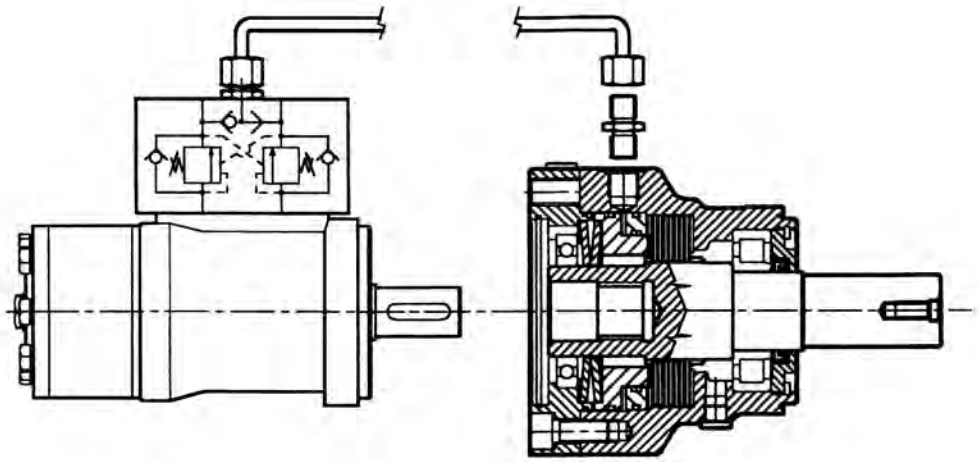
- MTF SERIES MTF-01-03
- ELB, LBV SERIES ELB-01-11

➢ INTEGRATED BRAKE-MOTOR UNITS

- SV, TV SERIES ..... SV,TV 01-03
- PW SERIES PW-01-02
- TW SERIES TW-01-02

HYDRAULIC DISC BRAKE MTF Series

MTF brakes are multiple disc negative brakes (normaly closed), to be coupled with SAE A 2 holes orbit motors.
Normaly used for static braking as parking brakes or as emergency brakes in low power application such as aerial platforms, cranes, mini escavators, whiches, ...
Applying the correct pressure al disc are realeased and motors can freely be driven.
The brake can be used dinamicaly only under careful control of the temperature and only for short time.

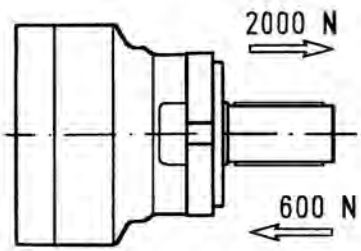


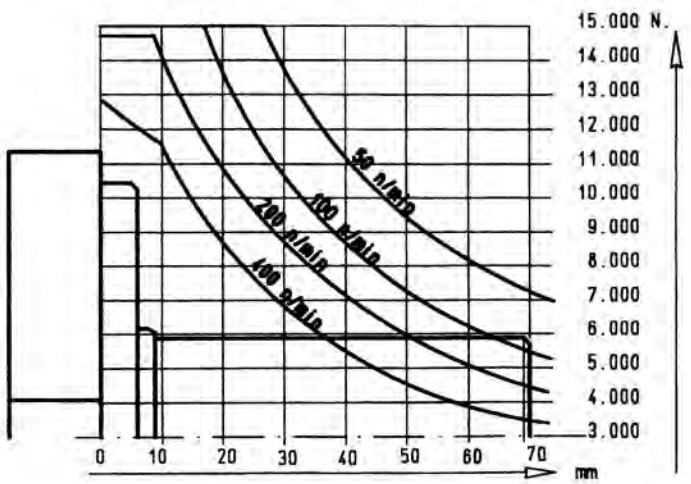
TECHNICAL DATA

Type		MTF/20	MTF/30	MTF/40	MTF/50	MTF/60
Static Torque	Nm	200	300	400	500	600
Dynamic Torque	Nm	140	210	280	350	420
Max N° dynamic braking per hour		50	40	30	20	15
Releasing Pressure	bar	18	18	25	25	30
Max inlet pressure	bar	250	250	250	250	250

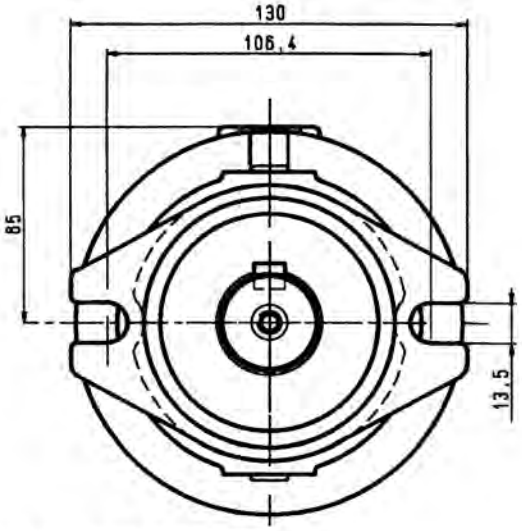
Static torque with 0 bar pressure.
Use oil with viscosity grade within 30-60 Cst range.
Oil quantity 3cc.

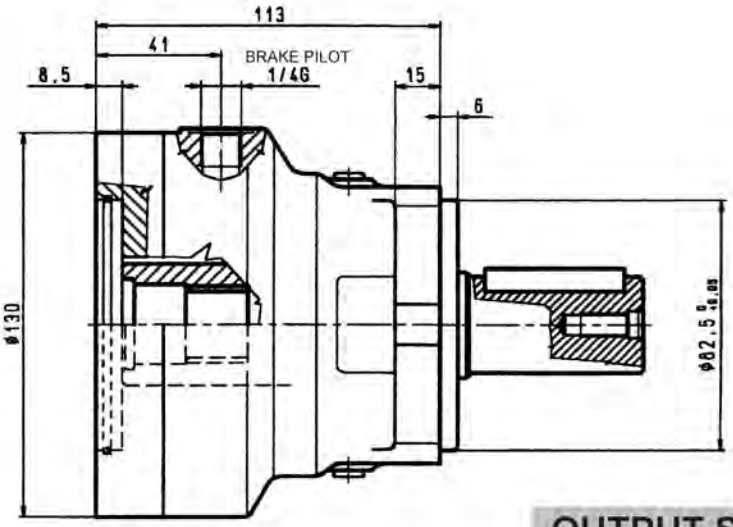
Shaft loads for 2000 working hour



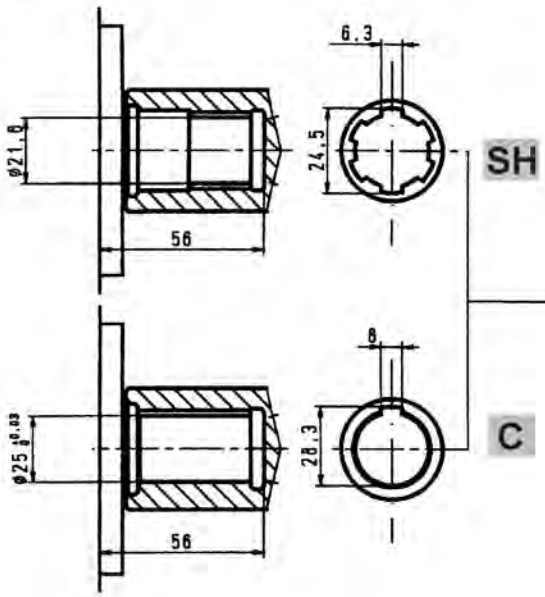


DIMENSIONS

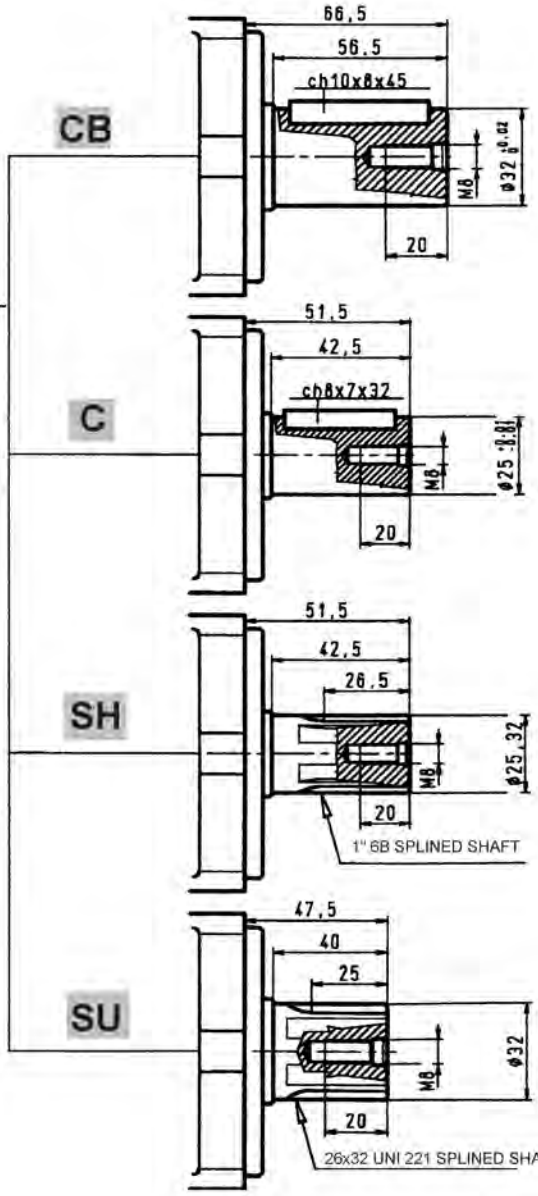


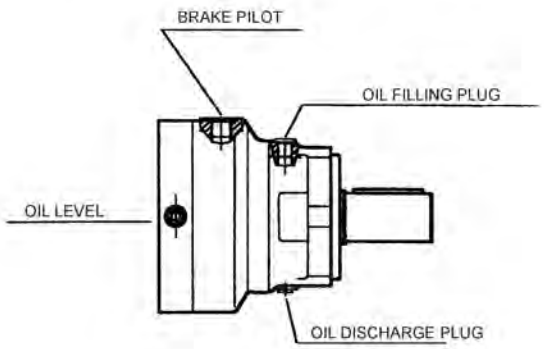


INPUT SHAFTS



OUTPUT SHAFTS





ORDER CODE

	1	2	3	4
MTF	400			

Pos.1 - Brake Type

Pos.2 - Static Torque [Nm]

20	- 200 Nm
30	- 300 Nm
40	- 400 Nm
50	- 500 Nm
60	- 600 Nm

Pos.3 - Inlet Shaft Type

SH	- 1" 6B SAE Splined
C	- 25mm cilindrical Shaft

Pos.4 - Output Shaft Type

CB	- 32 mm cilindrical Shaft
C	- 25 mm cilindrical Shaft
SH	- 1"6B SAE Splined Shaft
SU	- 26x32 UNI221 Splined Shaft

HYDRAULIC DISC BRAKES ELB, LBV

APPLICATION

» Heavy Duty machinery;
» Wheel drives;
» Material handling;
» Mining;
» Agriculture;
» Conveyors;
» Door openers and swing drives etc.

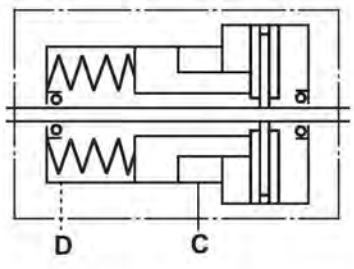
GENERAL

Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, °C	-30÷90
Viscosity range, mm²/s	20÷75
Filtration	ISO code 20/16 (nominal filtration of 25 micron)
Maintenance	Changed after the first 50-100 h, then after every 500-1500 h.

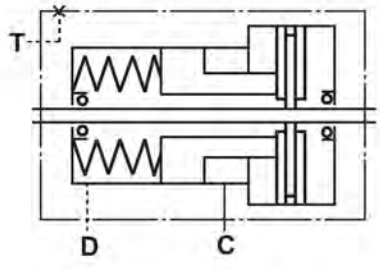
CONTENTS

Hydraulic Disc Brake for OP, OR and OS Motors type ELB/288 ... ELB LBV-02÷03
Hydraulic Disc Brake for OSS and OSV type ELB(LBV)/289 ..... ELB LBV-04
Hydraulic Disc Brake for OSS and OSV type ELB(LBV)/290 ..... ELB LBV-05
Specification data for ELB(LBV)/289, 290 ..... ELB LBV-06
Load curve for ELB(LBV)/289, 290 ..... ELB LBV-06
Output Shafts for ELB(LBV)/289, 290 ..... ELB LBV-06
Internal Spline data .....ELB LBV-07
Order code for ELB(LBV)/289, 290 ..... ELB LBV-07
Hydraulic Disc Brake for OTS and OTV type ELB(LBV)/314 .....ELB LBV-08
Hydraulic Disc Brake for OTS and OTV type ELB(LBV)/315 .....ELB LBV-09
Specification data for ELB(LBV)/314, 315 .....ELB LBV-10
Load curve for ELB(LBV)/314, 315 .....ELB LBV-10
Output Shafts for ELB(LBV)/314, 315 .....ELB LBV-11
Order code for ELB(LBV)/314, 315 ..... ELB LBV-11

ELB

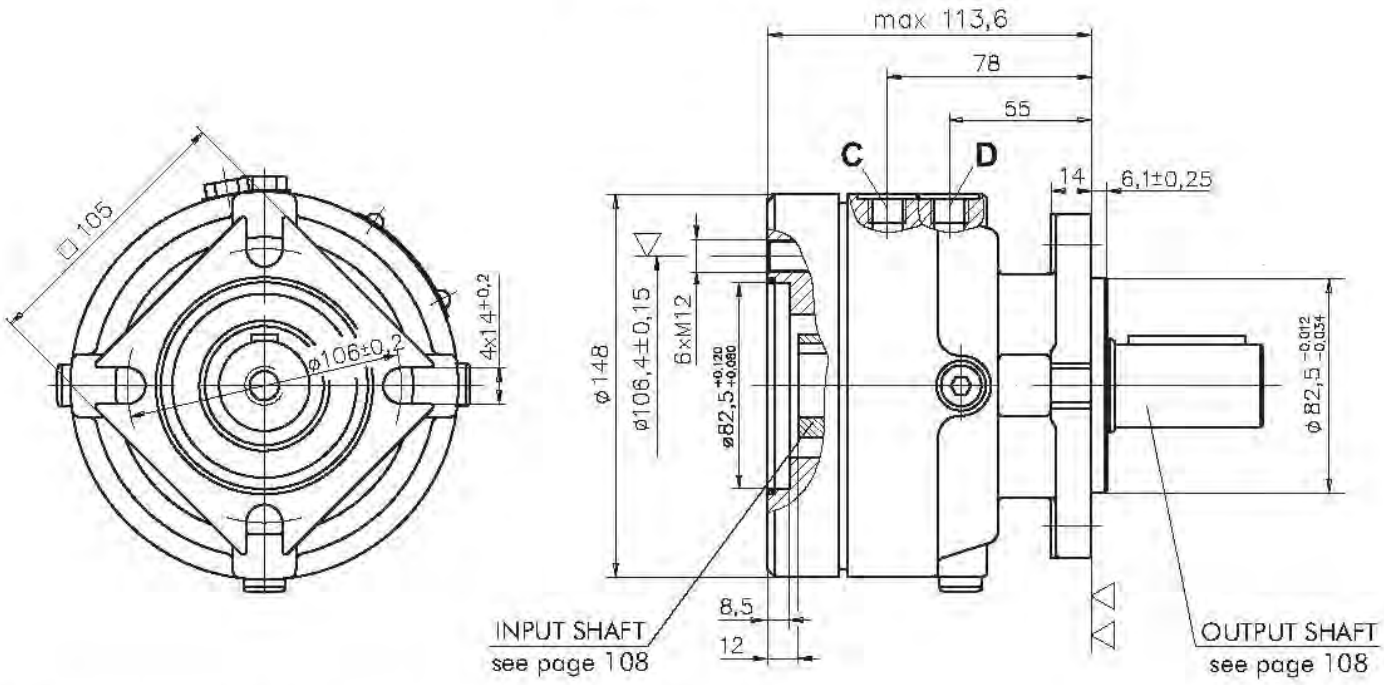


LBV



HYDRAULIC DISC BRAKE FOR FLANGE ATTACHMENT TO OP, OR AND OS HYDRAULIC MOTORS

TYPE ELB/288



C : Brake release Port - G¼, 9 mm depth

D : Drainage tap - G¼, 9 mm depth

▽- Place for attachment
(tightening torque for bolts M12x30 - 8.8 DIN 931 - 7 daNm)

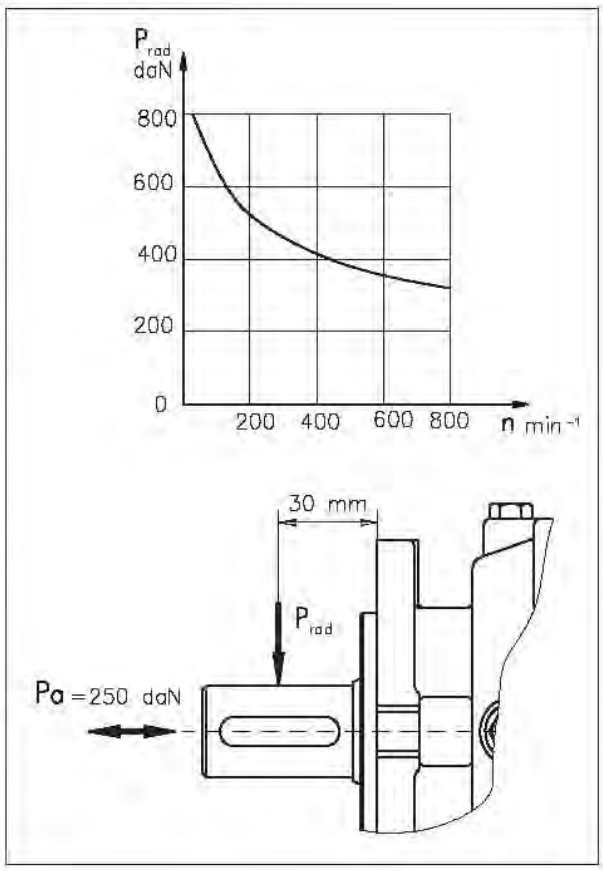
▽▽- Place for attachment

SPECIFICATION DATA

Description **ELB/288...**		7	14	21	32	43
*Static Torque	[daNm]	6-8	13-15	20-22	31-34	41-45
Opening Pressure [bar]	min	4-5	8-9	12-13	18-20	24-26
	max	300				
Min. oil quantity for brake releasing	[cm³]	7- 8				
Oil quantity	[cm³]	50 - 120				
Max. Pressure in drain space	[bar]	0,5				
Weight	[kg]	9				

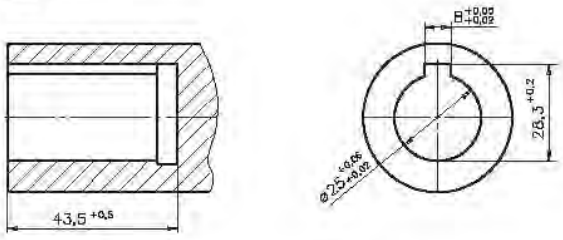
*Static torque is obtained at working pressure - 0 bar.

LOAD CURVE

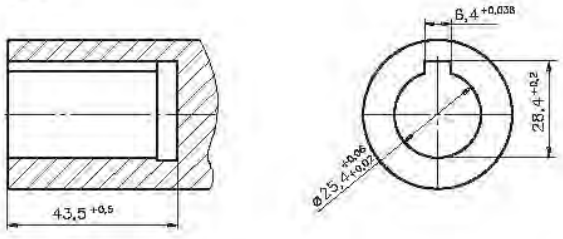


INPUT SHAFT HOLES

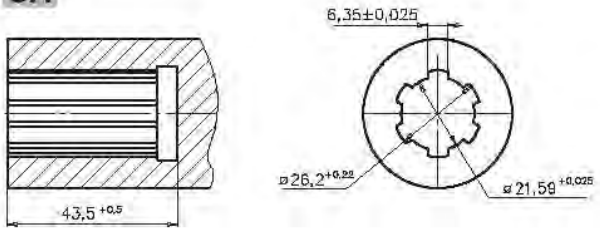
C



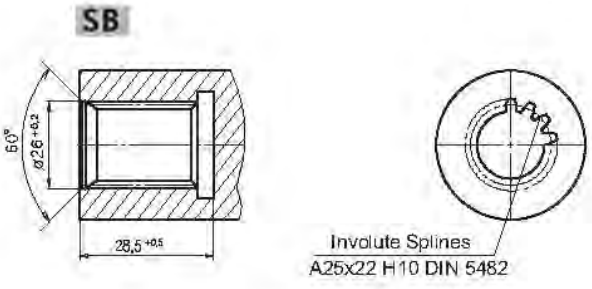
CO



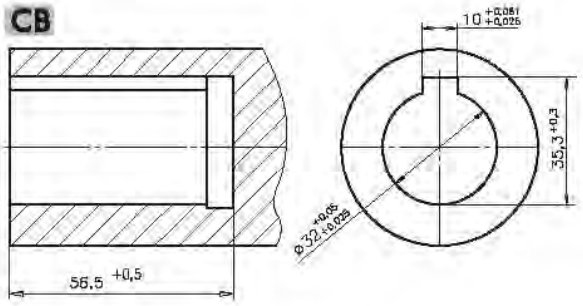
SH



SB

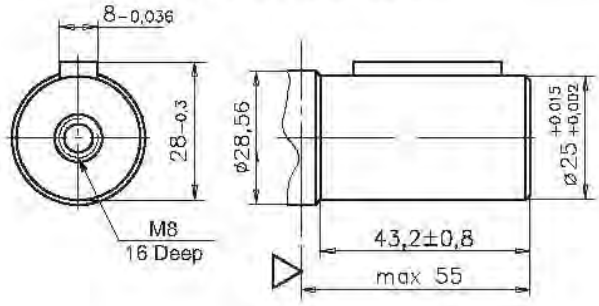


CB

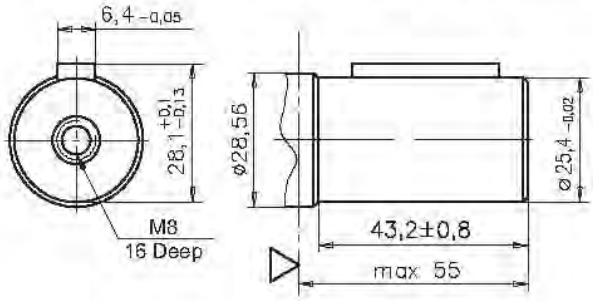


OUTPUT SHAFT EXTENSIONS

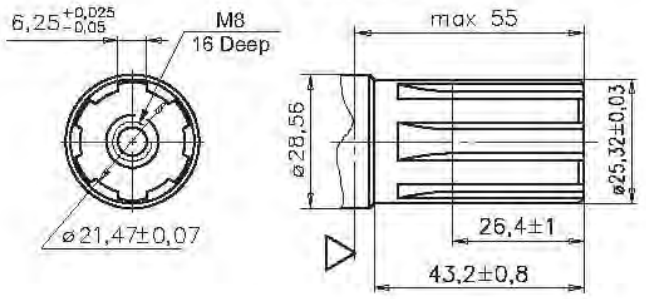
C - ø25 straight, Parallel key A8x7x32 DIN 6885
Max. Torque 34 daNm



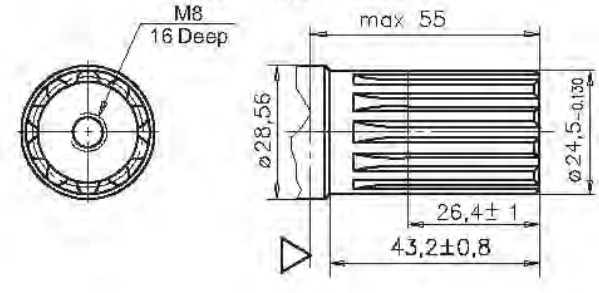
CO - ø1" straight Parallel key ¼"x¼"x1¼" BS46
Max. Torque 34 daNm



SH - splined BS 2059 (SAE 6B)
Max. Torque 34 daNm



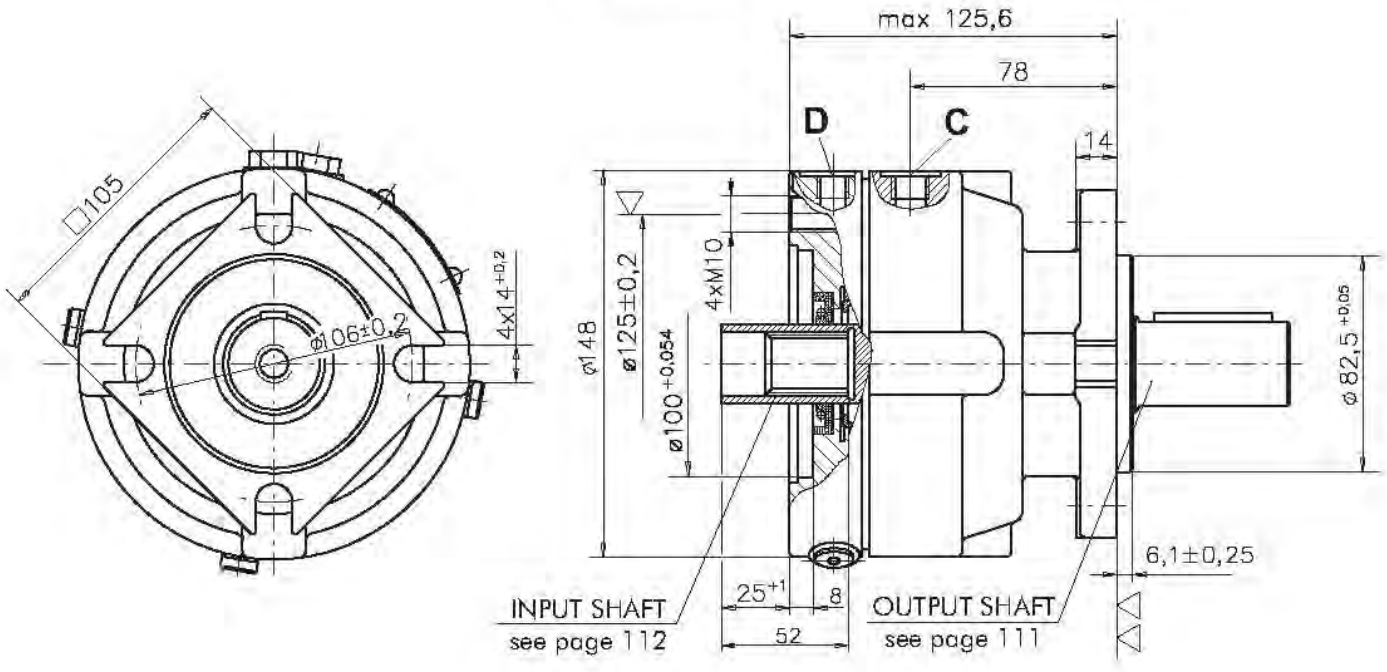
SA - splined B25x22 h9 DIN 5482
Max. Torque 40 daNm



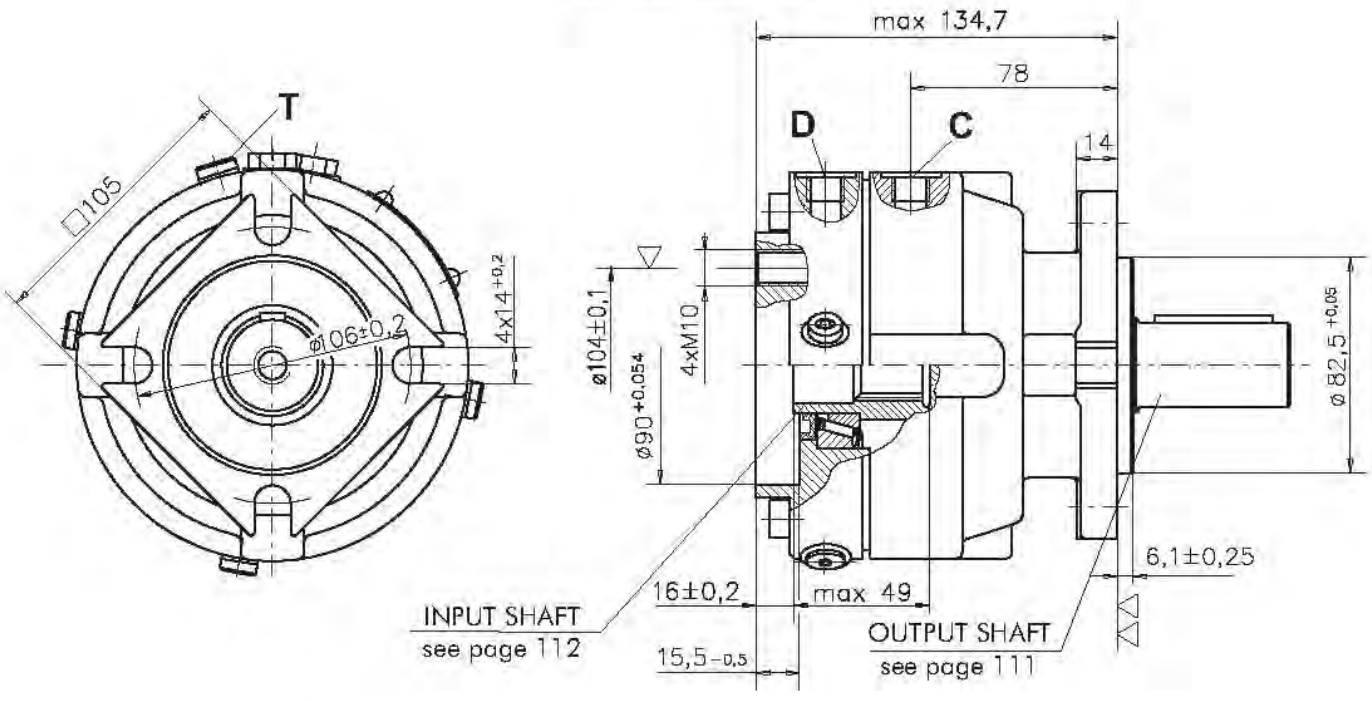
▽ - Disc Brake Mounting Surface

HYDRAULIC DISC BRAKE FOR FLANGE ATTACHMENT TO OSS AND OSV HYDRAULIC MOTORS

TYPE ELB/289



TYPE LBV/289



▽- Place for attachment
(tightening torque for bolts M10x35 - 8.8 DIN 912 - 5 daNm)

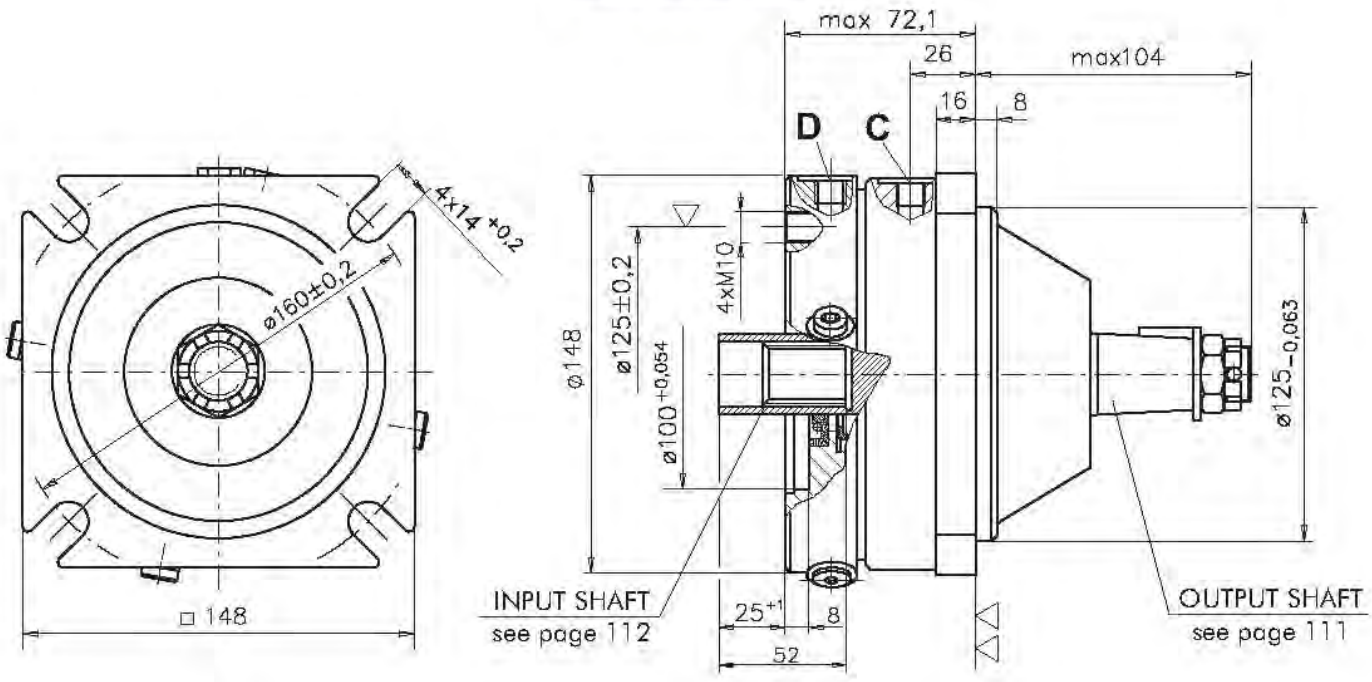
▽▽- Place for attachment

C : Brake release Port - G¼, 9 mm depth

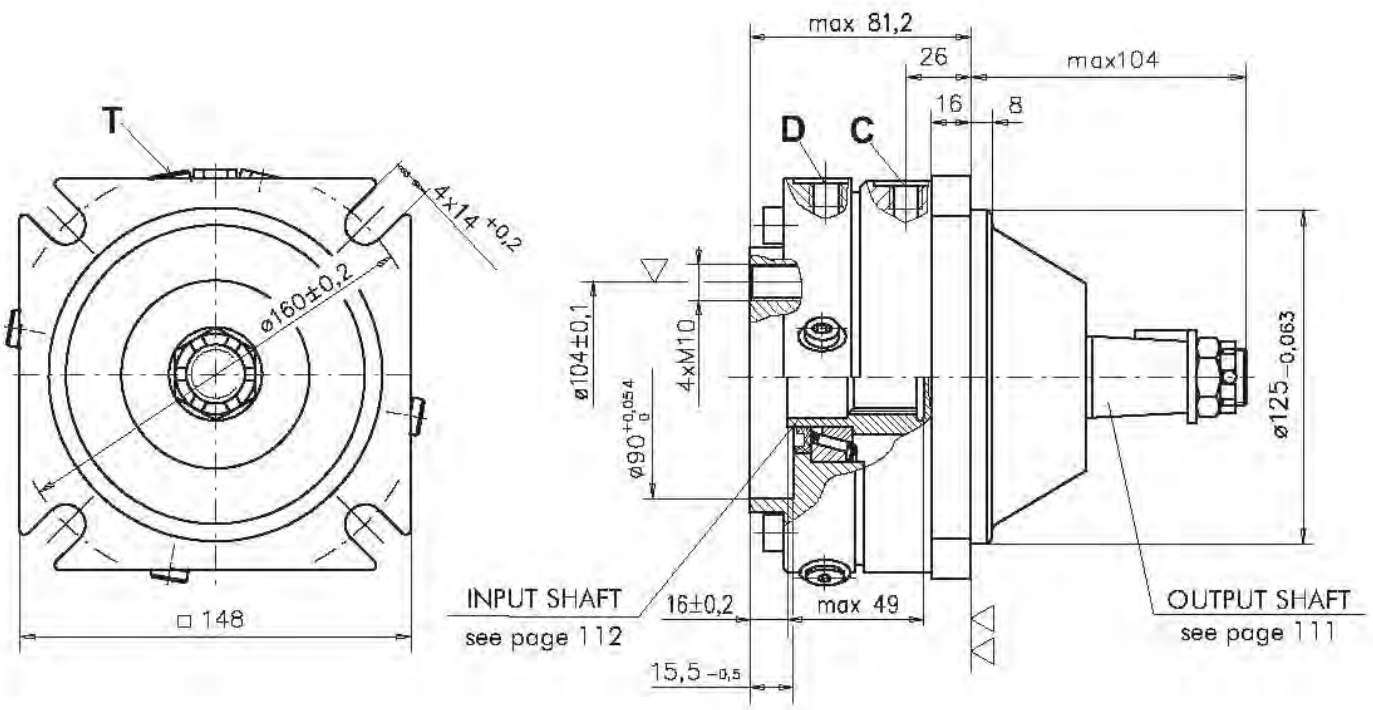
D, T : Drainage tap - G¼, 9 mm depth

HYDRAULIC DISC BRAKE FOR FLANGE ATTACHMENT TO OSS AND OSV HYDRAULIC MOTORS

TYPE ELB/290



TYPE LBV/290



▽ - Place for attachment
(tightening torque for bolts M10x35 - 8.8 DIN 912 - 5 daNm)

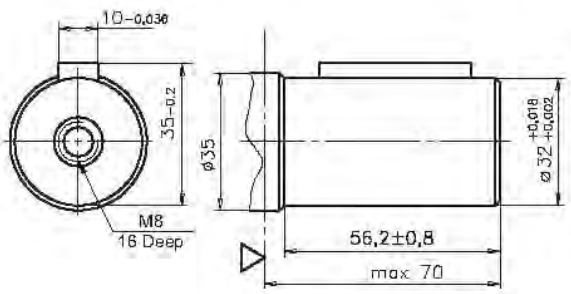
▽▽ - Place for attachment

C : Brake release Port - G¼, 9 mm depth

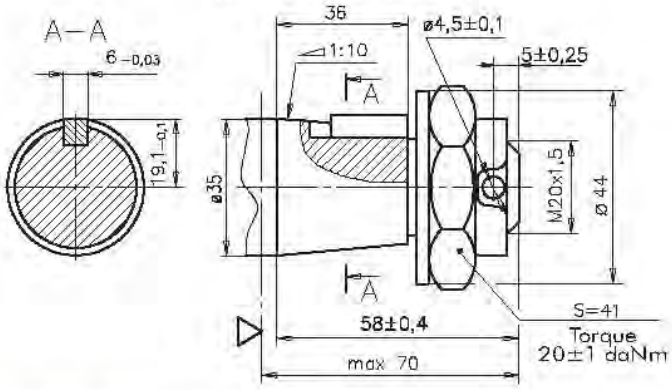
D, T : Drainage tap - G¼, 9 mm depth

OUTPUT SHAFT EXTENSIONS

CB - ø32 straight, Parallel key A10x8x45 DIN6885
Max. Torque 77 daNm



KB - tapered 1:10, Parallel key B6x6x20 DIN6885
Max. Torque 77 daNm



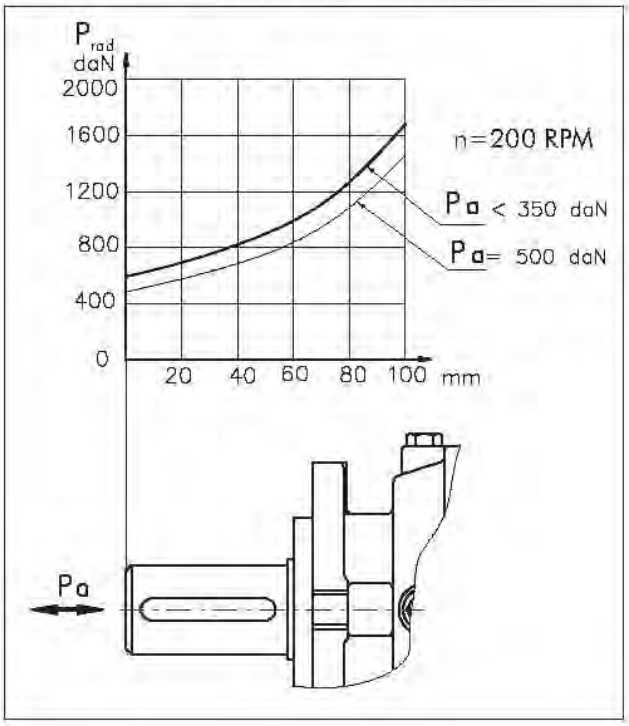
SPECIFICATION DATA

Description **ELB/289(290) LBV/289(290)**		21	32	43	63
*Static Torque	[daNm]	20-22	31-34	41-45	61-64
Opening Pressure [bar]	min	12-13	18-20	24-26	38-39
	max	300			
Min. oil quantity for brake releasing	[cm³]	7-8			
Oil quantity	[cm³]	50 - 120			
Max. Pressure in drain space	[bar]	5			
Weight .../289(290)	[kg]	10(11)			

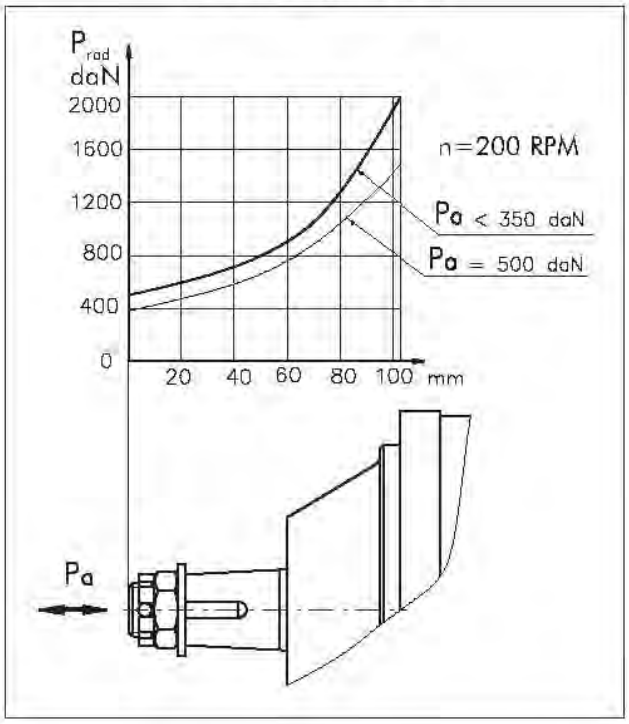
*Static torque is obtained at working pressure - 0 bar.

LOAD CURVE

ELB(LBV) .../289



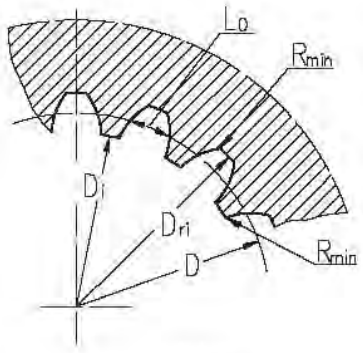
ELB(LBV) .../290

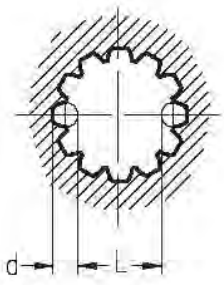


INTERNAL SPLINE DATA FOR THE ATTACHED COMPONENT

Standard ANSI B92.1-1976, class 5
[m=2,1166]

Fillet Root Side Fit			ELB(LBV)/289 ELB(LBV)/290	ELB(LBV)/314 ELB(LBV)/315
Number of Teeth	z		12	16
Diametral Pitch	DP		12/24	12/24
Pressure Angle			30°	30°
Pitch Dia.	D	[mm]	25,4	33,8656
Major Dia.	Dri	[mm]	$28,0_{-0,1}$	$38,4^{+0,4}$
Minor Dia.	Di	[mm]	$23,0^{+0,033}$	$32,15^{+0,06}$
Space Width [Circular]	Lo	[mm]	4,308±0,020	4,516±0,037
Fillet Radius	Rmin	[mm]	0,2	0,5
Max. Measurement between Pin	L	[mm]	$17,62^{+0,15}$	$26,9^{+0,10}$
Pin Dia.	d	[mm]	4,835±0,001	4,835±0,001
Corrected	x.m	[mm]	+0,8	+1,0





ORDER CODE

1		2	3		4	5	6	7
	/			-				

Pos.1 - Type

ELB	- Euro Disc Brake
LBV	- Disc Brake for very short motor V - OSV

Pos.2 - Design code

288	- for OP, OR and OS Motors
289	- for OSS and OSV Motors
290	- for OSS and OSV Motors (Wheel Mount)

Pos.3 - Input Shaft Hole*

C, CO, SH, CB, SB

Pos.4 - Static Torque code (See Specification data)

7, 14, 21, 32 ,43 ,63

Pos. 5 - Output Shaft Extensions**

C*	- ø25 straight, Parallel key A8x7x32 DIN 6885
CO*	- ø1" straight, Parallel key 1/4"x1/4"x1 1/4" BS46
SH*	- ø25,32 splined BS 2059 (SAE 6B)
SA*	- ø24,5 splined B25x22 DIN 5482
CB	- ø32 straight, Parallel key A10x8x45 DIN 6885
KB	- ø35 tapered 1:10, Parallel key B6x6x20 DIN6885

Pos. 6 - Option (Paint)***

omit	- no Paint
P	- Painted
PC	- Corrosion Protected Paint

Pos. 7 - Design Series

omit - Factory specified

NOTES:

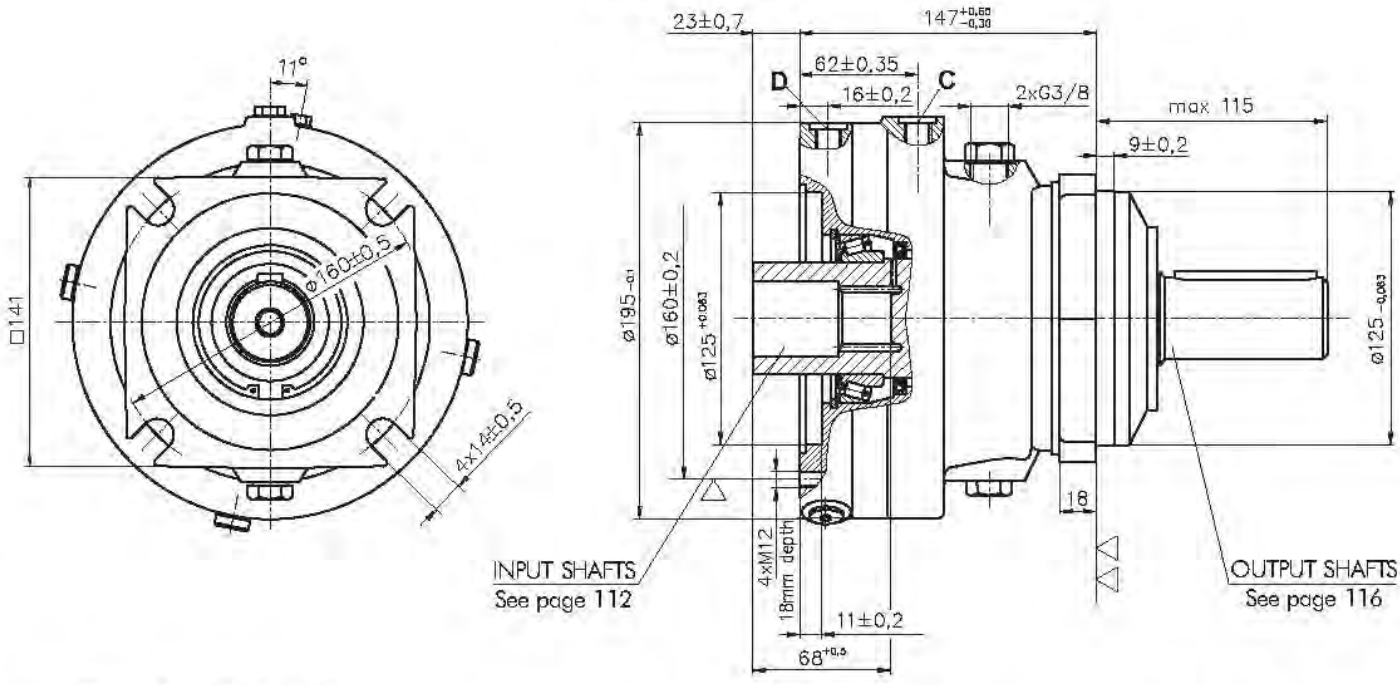
* Used for ELB/288 only (see page ELB LBV-03).

** The permissible output torque for shafts must be not exceeded!
For Max. Torque values see data on page ELB LBV-03 and ELB LBV-06.

*** The color is by customer's request.
The Disc Brakes are mangano-phosphatized as standard.

HYDRAULIC DISC BRAKES
FOR FLANGE ATTACHMENT TO OTS AND OTV HYDRAULIC MOTORS

TYPE ELB/314



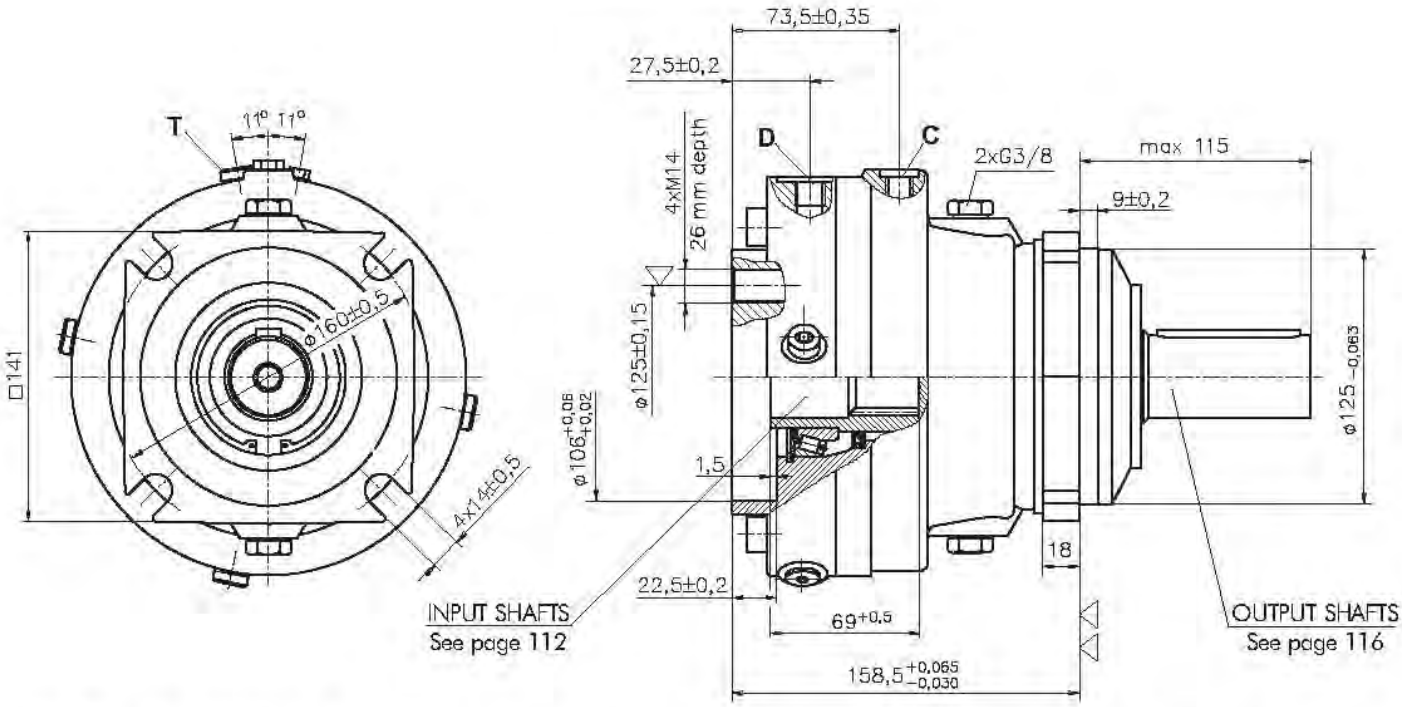
▽- Place for attachment
(tightening torque for bolt M12 - 8.8 - 8,5 daNm)

▽▽- Place for attachment

C : Brake release Port - G¼, 9 mm depth

D : Drainage tap - G¼, 9 mm depth

TYPE LBV/314



▽- Place for attachment
(tightening torque for bolt M14 - 8.8 - 14 daNm)

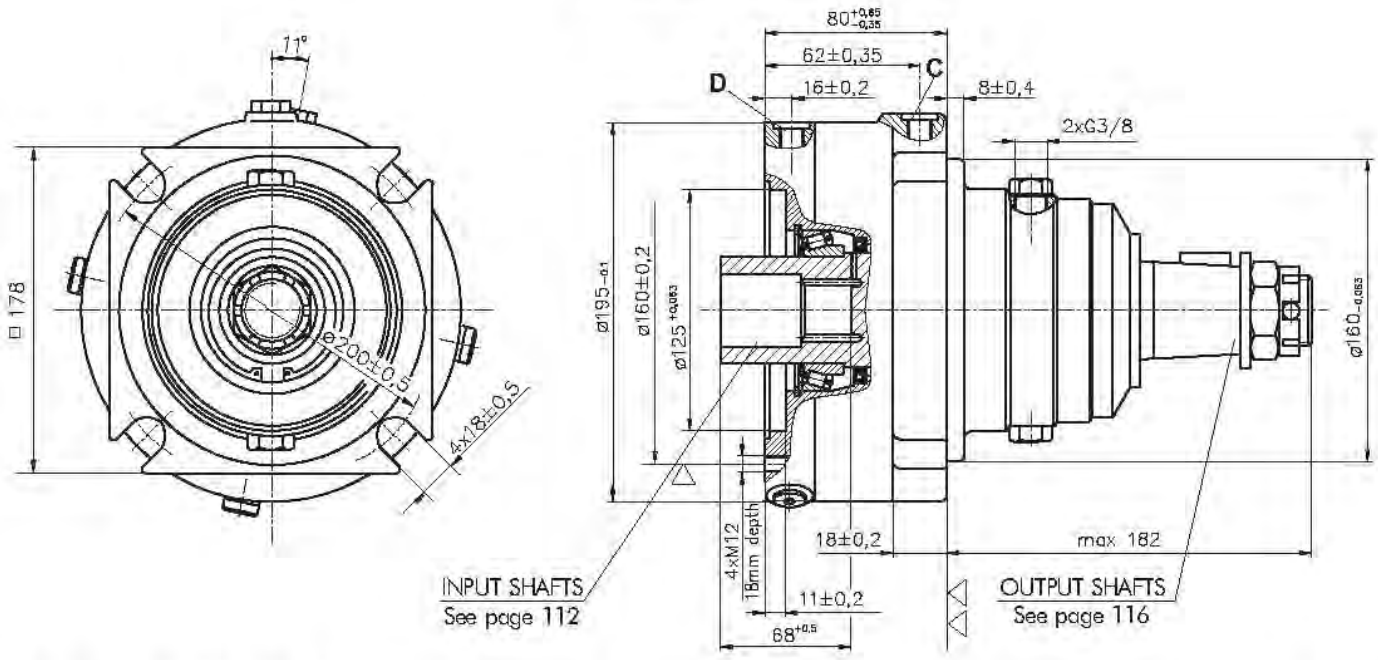
▽▽- Place for attachment

C : Brake release Port - G¼, 9 mm depth

D,T : Drainage tap - G¼, 9 mm depth

HYDRAULIC DISC BRAKES
FOR FLANGE ATTACHMENT TO OTS AND OTV HYDRAULIC MOTORS

TYPE ELB/315



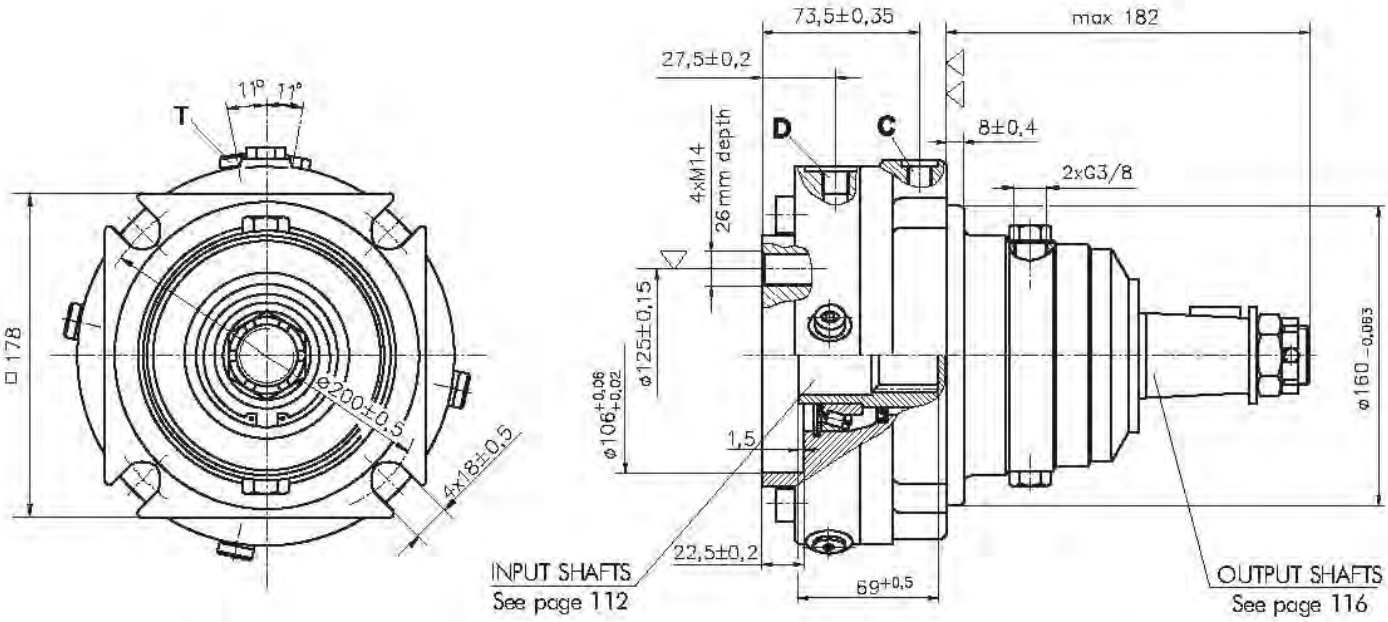
▽- Place for attachment
(tightening torque for bolt M12 - 8.8 - 8,5 daNm)

▽▽- Place for attachment

C : Brake release Port - G¼, 9 mm depth

D : Drainage tap - G¼, 9 mm depth

TYPE LBV/315



▽- Place for attachment
(tightening torque for bolt M14 - 8.8 - 14 daNm)

▽▽- Place for attachment

C : Brake release Port - G¼, 9 mm depth

D,T : Drainage tap - G¼, 9 mm depth

HYDRAULIC DISC BRAKES
FOR FLANGE ATTACHMENT TO OTS AND OTV HYDRAULIC MOTORS

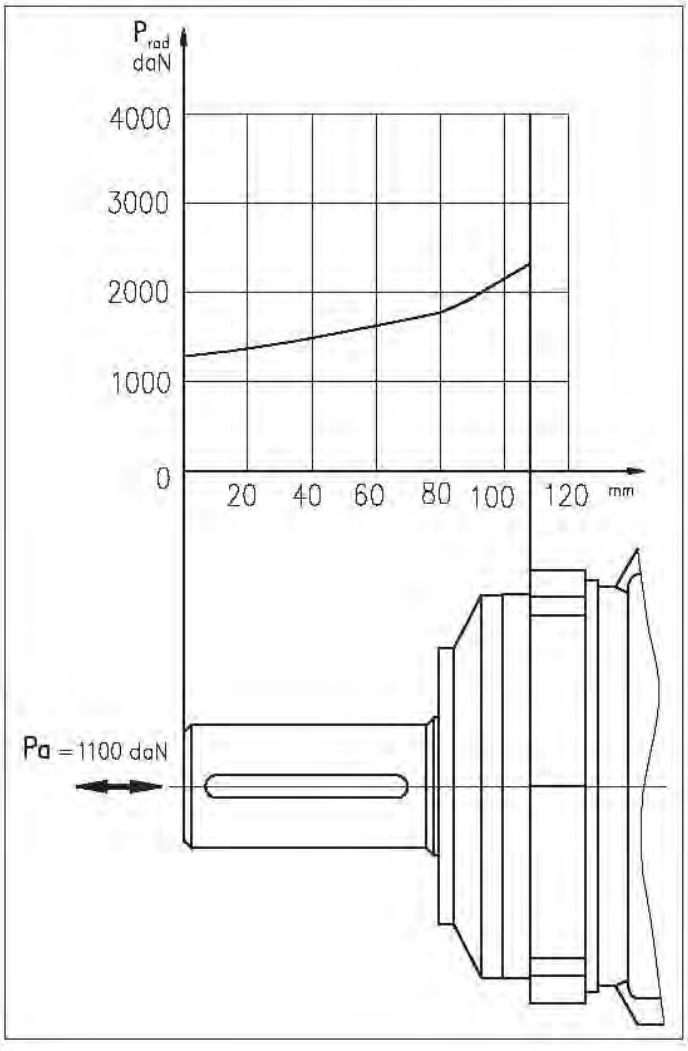
SPECIFICATION DATA

Description **ELB/314(315) LBV/314(315)**		**21**	**29**	**43**	**65**	**85**	**110**	**130**
*Static Torque	[daNm]	18-23	28-33	42-46	61-70	83-92	108-118	126-136
Opening Pressure [bar]	min	4-5	6-7	9-10	13-15	18-20	23-25	27-29
	max	300						
Min. oil quantity for brake releasing	[cm³]	8-9						
Oil quantity	[cm³]	150-300						
Max. Pressure in drain space	[bar]	5						
Weight for .../314(315)	[kg]	24(25)						

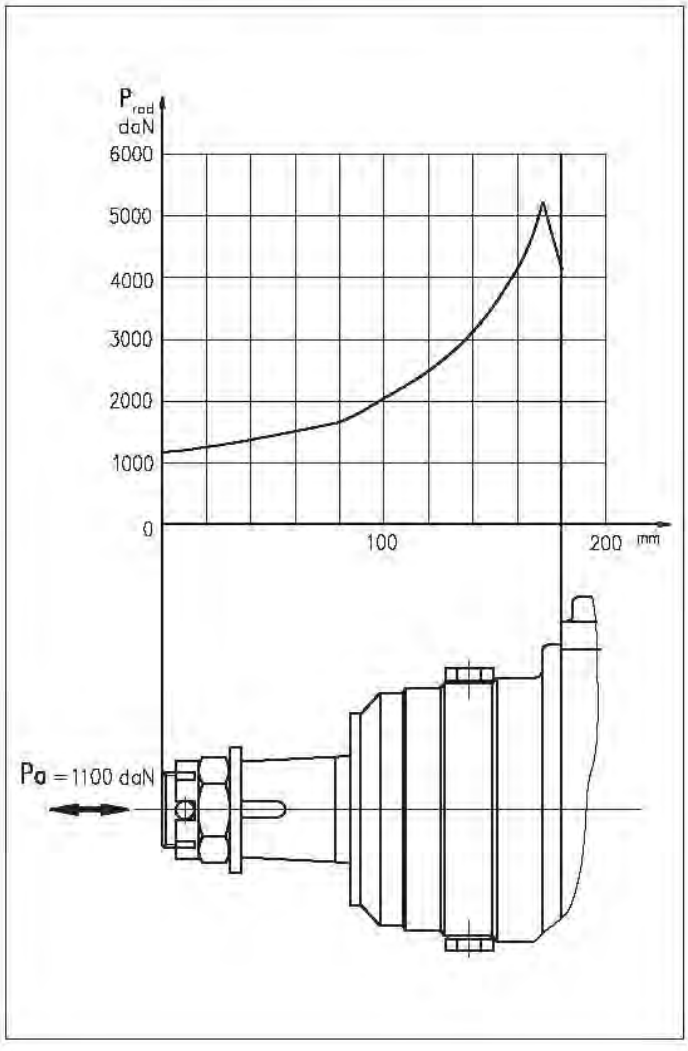
*Static torque is obtained at working pressure - 0 bar.

LOAD CURVE

ELB(LBV) ... /314

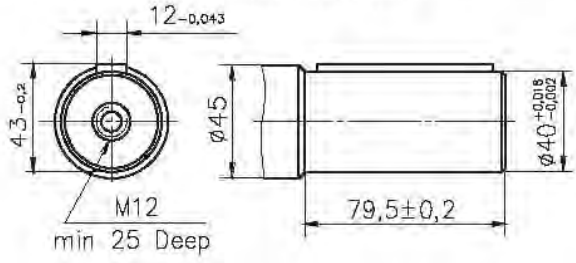


ELB(LBV) ... /315

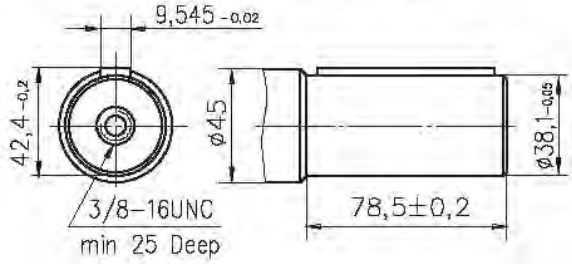


OUTPUT SHAFT EXTENSIONS

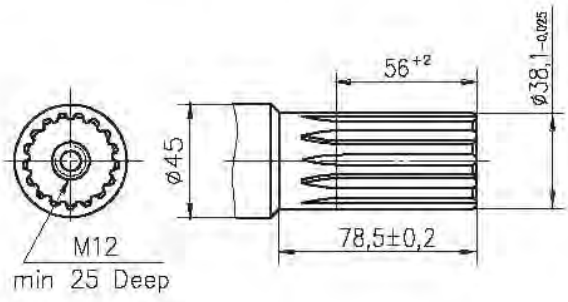
C - ø40 straight, Parallel key A12x8x70 DIN 6885
Max. Torque 132,8 daNm



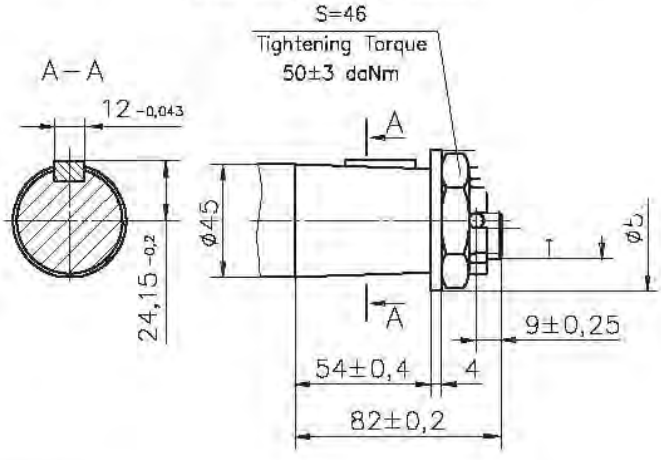
CO - ø1½" straight, Parallel key ⅜"x ⅜"x 2¼" BS46
Max. Torque 132,8 daNm



SH - ø1½" splined 17T, DP12/24 ANSI B92.1-1976
Max. Torque 132,8 daNm



K - tapered 1:10, Parallel key B12x8x28 DIN 6885
Max. Torque 210,7 daNm



ORDER CODE

1	2	3	4	5	6
	/		-			

Pos.1 - Type

ELB	- Euro Disc Brake
LBV	- Disc Brake for very short motor V- OTV

Pos.2 - Design code

314	- for OTS and OTV Motors
315	- for OTS and OTV Motors (Wheel Mount)

Pos.3 - Static Torque code (See Specification data)

21, 29, 43, 63, 65, 85, 110, 130

Pos. 4 - Output Shaft Extensions*

C	- ø40 straight, Parallel key A12x8x70 DIN 6885
CO	- ø1½" straight, Parallel key ⅜"x ⅜"x2¼" BS46
SH	- ø1½" splined 17T, ANSI B92.1-1976
K	- ø45 tapered 1:10, Parallel key B12x8x28 DIN6885

Pos. 5 - Option (Paint)**

omit	- no Paint
P	- Painted
PC	- Corrosion Protected Paint

Pos. 6 - Design Series

omit - Factory specified

NOTES:

* The permissible output toruqe for shafts must be not exceeded!

** The color is by customer's request.

The Disc Brakes are mangano-phosphatized as standard.

INTEGRATED BRAKE-MOTOR UNIT SV, TV SERIES

INTRODUCTION

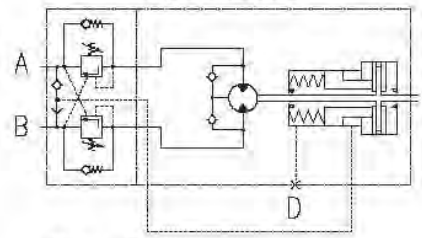
Our brakes are intended for hydraulic drive of operating systems, where the block and the release of the drive must be by means of hydraulic energy. The system has small overall dimensions and minimum weight. In the package are combined efficient hydraulic power of hydromotors type OS or OT with a reliable integral hydraulic disc brake type ELB and a valve block type KPBR.

The brake torque at the spring applied , hydraulically released brake reaches 14500 in-lb [160daNm].

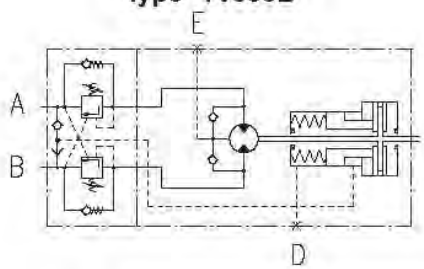
Typical applications include wheel drives, conveyors , rotators, positioners, winches, swing drives and dooropeners.

The Meta brakes are intended to operate as static or parking brakes. System circuitry must be designet to bring the load to a stop before applying the brake.

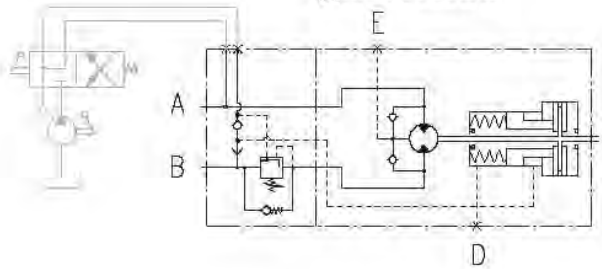
Motor/Brake Type SV500B



Motor/Brake Type TV500B



Motor/Brake Type TV500BC



SPECIFICATION DATA

Type		SV500B	TV500B
Displacement, in.³/rev. [cm.³/rev.]		29 [475,3]	29 [475]
Max. Speed,	Cont.	16	84
RPM	Int.*	25	115
Max. Torque,	Cont.	7260 [82]	10 000 [114]
in-lb [daNm]	Int.*	8420 [95]	12 000 [135]
Max. Output,	Cont.	1.3 [0,9]	11 [8,2]
HP [kW]	Int.*	3.3 [2,4]	17 [12,5]
Max. Pressure Drop,	Cont.	1800 [125]	2500 [170]
PSI [bar]	Int.*	2100 [145]	2900 [200]
Max. Oil Flow,	Cont.	2 [8]	10,5 [40]
GPM [lpm]	Int.*	3 [12]	14,5 [55]
Max. Return Pressure without Drain Line or Max. Pressure in Drain Line, PSI [bar]		1450 [100]	1088 [75]
Min. Starting Torque,	At max. press. drop Cont.	6400 [72]	8400 [95]
in-lb [daNm]	At max. press. drop Int.*	6650 [75]	9940 [112]
Min. Speed**, RPM		5	5
Static Torque for the Brake***, in-lb [daNm]		14 515 [164]	14 515 [164]
Release Pressure ±10%,	initial	363...406 [25...28]	363...406 [25...28]
PSI [bar]	full	449,6 [31]	449,6 [31]
Max. Steering Pressure, PSI [bar]		3553 [245]	3553 [245]
Max. Pressure in Drain Space for the Brake, PSI [bar]		7 [0,5]	7 [0,5]
Pilot Ratio for the Valve		4,25:1	4,25:1

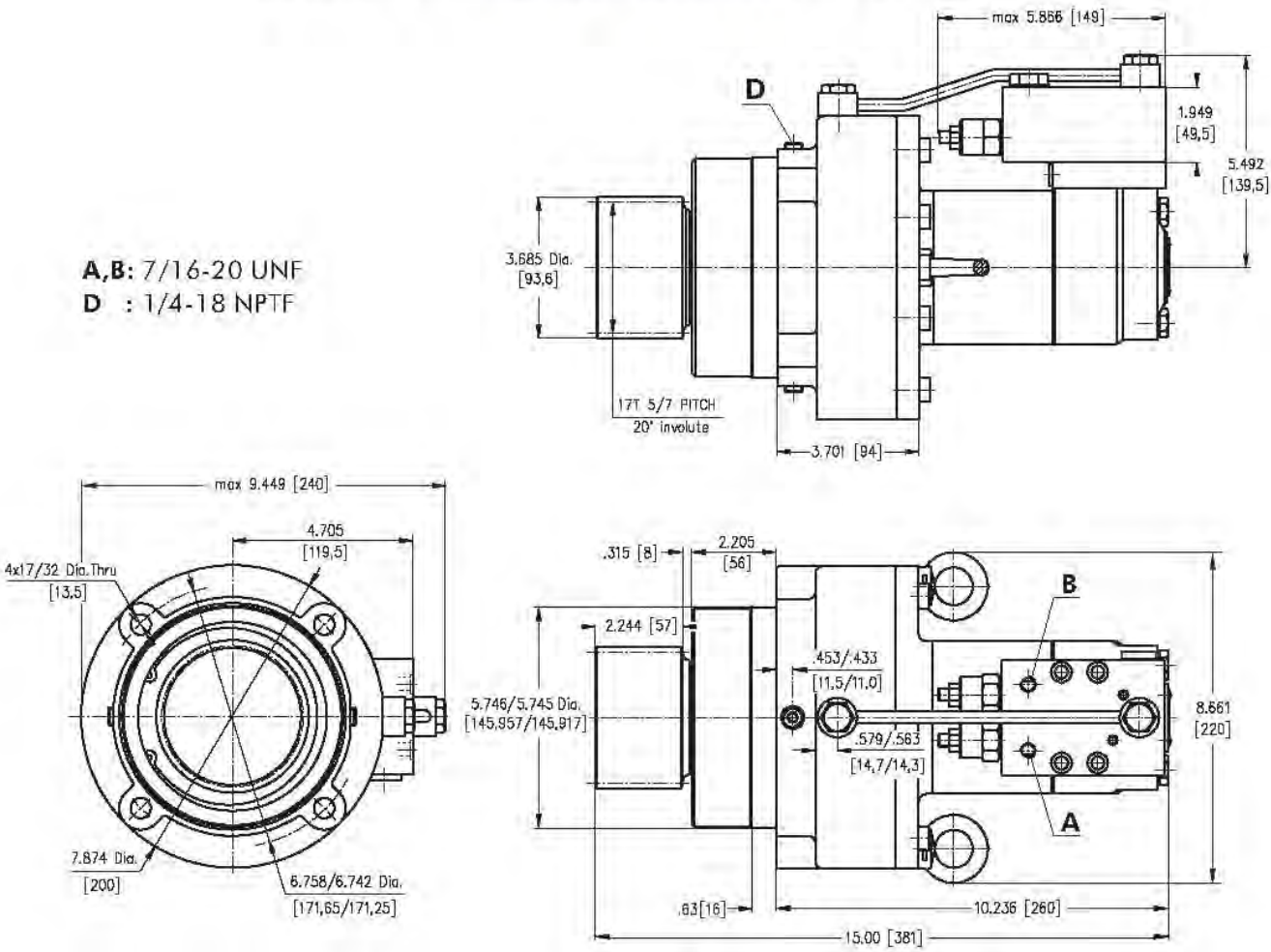
* Intermittent operation: the permissible values may occur for max. 10% of every minute.

** For speeds of 5 RPM lower than given, consult factory or your regional manager.

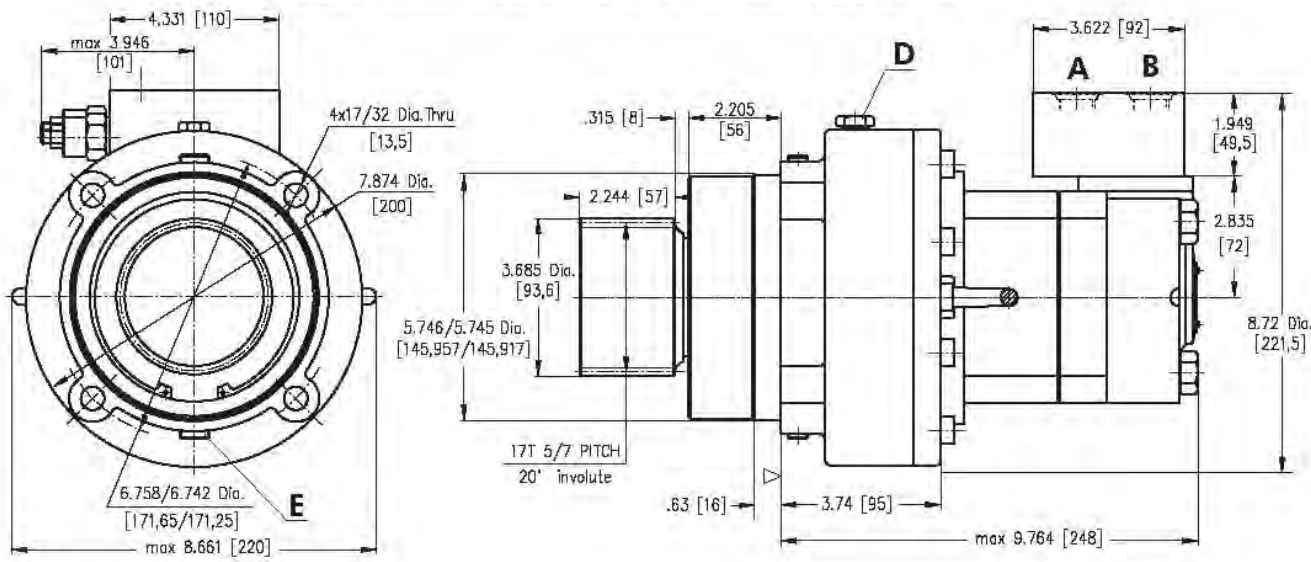
*** Static torque is obtained at working pressure - 0 PSI [0 bar].

OUTLINE DIMENSIONS REFERENCE OF SV500B

A,B: 7/16-20 UNF
D : 1/4-18 NPTF



OUTLINE DIMENSIONS REFERENCE OF TV500B

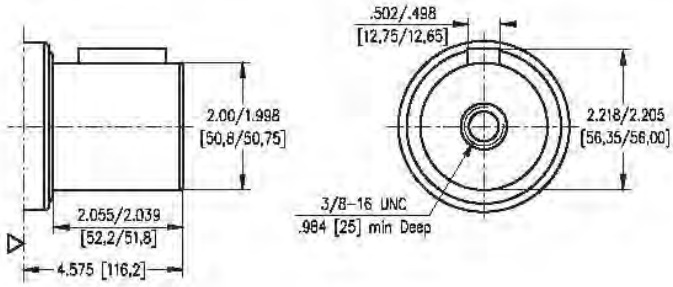


A,B : 7/8-14 UNF
D : 1/4-18 NPTF
E : G1/4

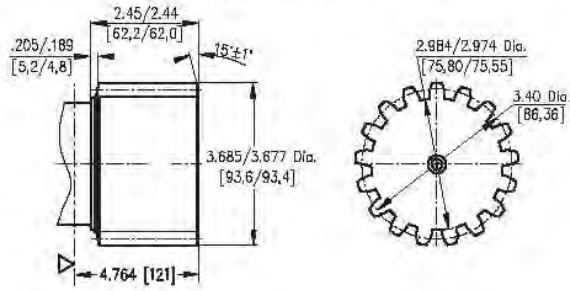
in.
[mm]

SHAFT EXTENSIONS

C - 2" [50,8] Straight key 1/2"x1/2"x1 1/2"



17T 5/7 PITCH Splined



in. / [mm]

∇- Motor Mounting Surface

ORDER CODE

1		2	3	4	5	6	7	8
	V	500	B					

Pos. 1 - Type

S - motor OS
T - motor OT

Pos. 2 - Displacement code

Pos. 3 - Brake

Pos. 4 - Type of a Brake

Pos. 5 - Shaft Extensions

omit - 17T 5/7 PITCHSplined
C* - 2" [50,8] Straight key 1/2"x1/2"x1 1/2"

Pos. 6 - Valve

Pos. 7 - Option (Paint)**

omit - no Paint
P - Painted
PC - Corrosion Protected Paint

Pos. 8 - Design Series

omit - Factory specified

NOTES:
* For code name see scheme on page 6.
**Color at customer's request.
The motor/brakes are mangano-phosphatized as standard.

INTEGRATED BRAKE-MOTOR UNIT PW SERIES

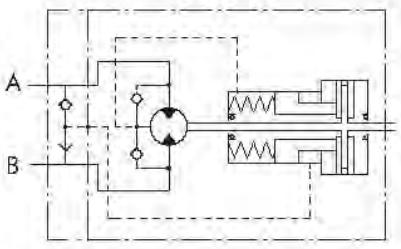
INTRODUCTION

This Brake-Motor Unit is intended for hydraulic drive of operating systems, where the block and the release of the drive must be by means of hydraulic energy. The system has small overall dimensions and minimum weight.

Typical applications include wheel drives, conveyors , rotators, positioners, winches, swing drives and door openers.

These Brake Motor are intended to operate as static or parking brakes. System circuitry must be designetto bring the load to a stop before applying the brake.

Brake-Motor Unit
Type PW



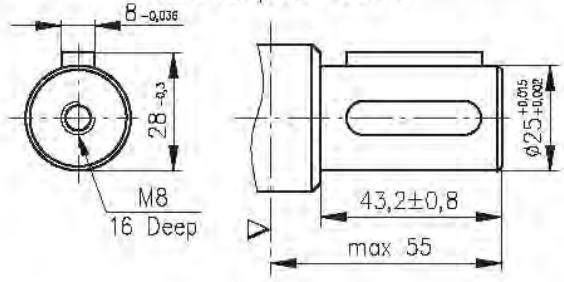
SPECIFICATION DATA

Type		PW 160	PW 400
Displacement, [cm.^{3}/rev.]		158,4	396
Max. Speed,	Cont.	300	150
RPM	Int.*	370	190
Max. Torque,	Cont.	26,4	28,5
[daNm]	Int.*	37,8	36,0
Max. Pressure Drop,	Cont.	120	55
[bar]	Int.*	175	70
Max. Oil Flow,	Cont.	60	60
[lpm]	Int.*	75	75
Static Torque, [daNm]		41...45	41...45
Release Pressure, [bar]		24...26	24...26
Max. Inlet pressure,	Cont.	140	140
[bar]	Int.*	175	175
Drain line,	0 - 100 RPM	75	75
[bar]	100 - 300 RPM	30	30
L, mm		236	268
L_1, mm		21,33	53,33

* Intermittent operation: the permissible values may occur for max. 10% of every minute.

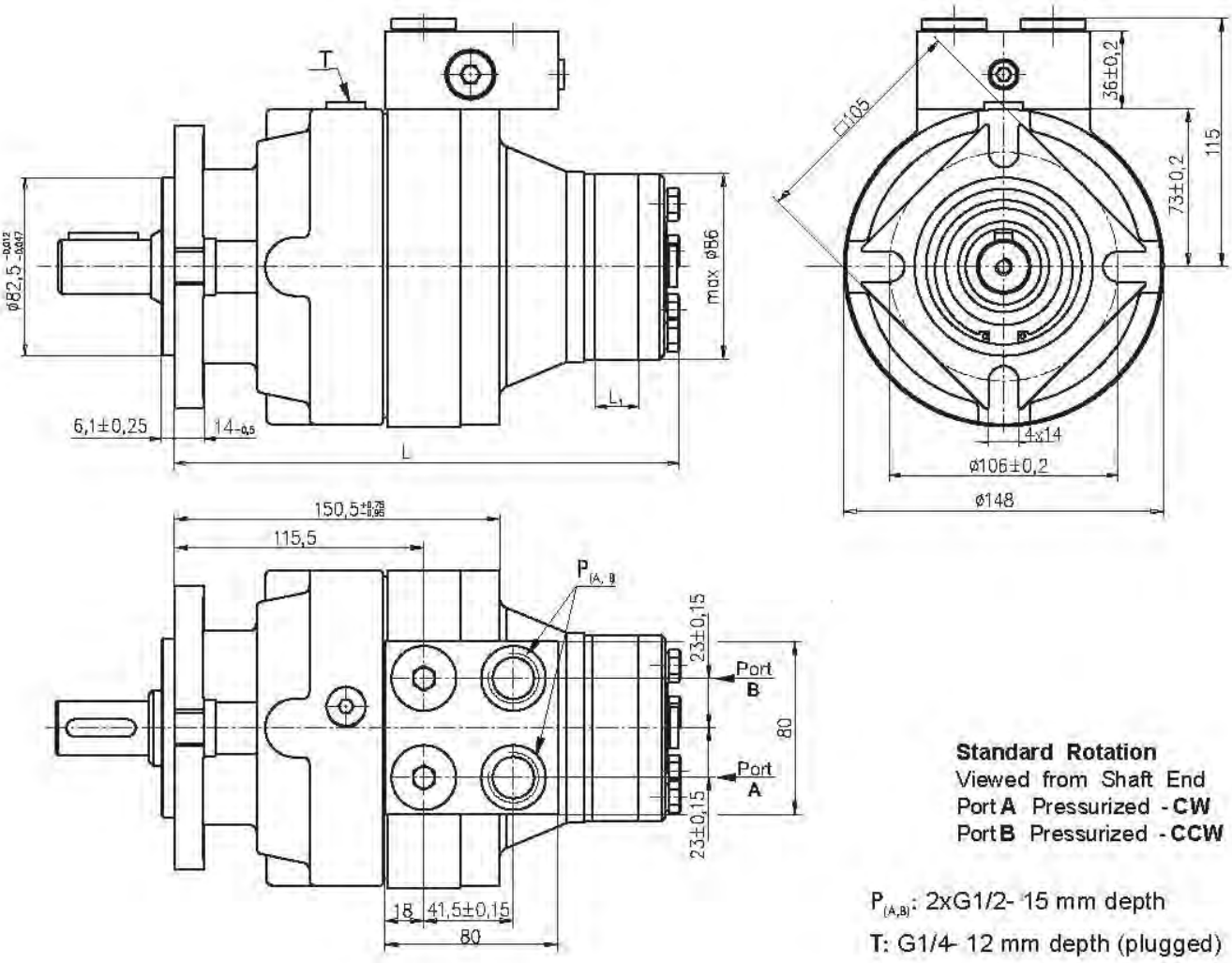
SHAFT EXTENSIONS

C -ø25 straight, Parallel key A8x7x32 DIN 6885
Max. Torque 34 daNm



∇- Motor Mounting Surface

OUTLINE DIMENSIONS REFERENCE OF PW



Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

$P_{(A,B)}$: 2xG1/2- 15 mm depth

T: G1/4- 12 mm depth (plugged)

ORDER CODE

1		2	3	4
P	W			

Pos.1 - Type

P - motor OP

Pos.2 - Displacement code

160 - 158,4[cm³/rev]

400 - 396,0[cm³/rev]

Pos.3 - Option (Paint)*

omit - no Paint

P - Painted

PC - Corrosion Protected Paint

Pos.4 - Design Series

omit - Factory specified

NOTES:

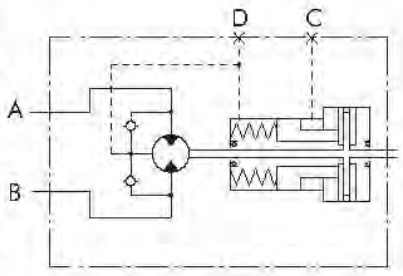
* Color at customer's request.

The brake motor is mangano-phosphatized as standard.

INTEGRATED BRAKE-MOTOR UNIT TW SERIES

INTRODUCTION

The Brake-Motor Units are intended for hydraulic drive of operating systems, where the block and the release of the drive must be by means of hydraulic energy. The system has small overall dimensions and minimum weight. In the package are combined efficient hydraulic power of hydromotors type OT 500 with a reliable integral hydraulic disc brake type ELB.



Typical applications include wheel drives, conveyors , rotators, positioners, winches, swing drives and door openers.

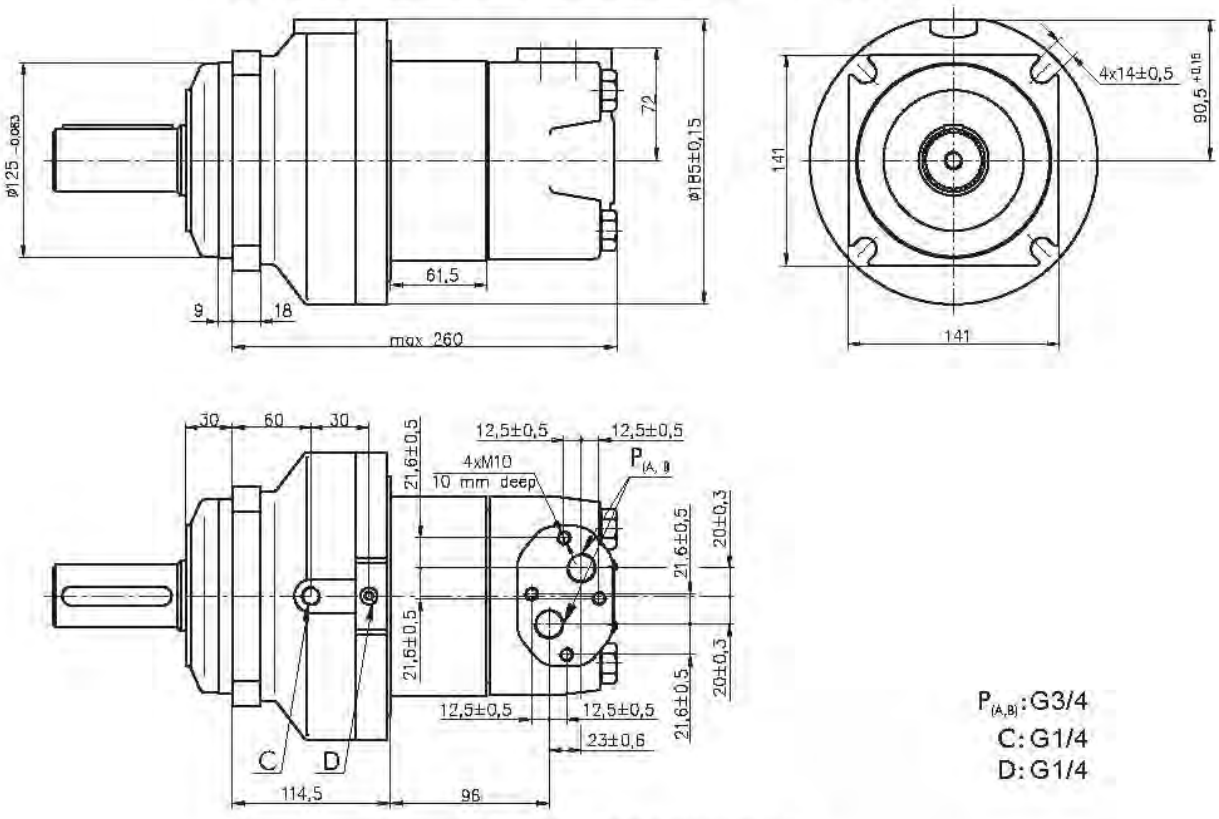
The Meta Brake-Motor Units are intended to operate as static or parking brakes. System circuitry must be designed to bring the load to a stop before applying the brake.

SPECIFICATION DATA

Type		TW500B314
Displacement, [cm.^{3}/rev.]		524
Max. Speed, RPM		200
Max. Torque,	Cont.	122
[daNm]	Int.*	137
Max. Output, [kW]		28
Max. Pressure Drop,	Cont.	160
[bar]	Int.*	180
Max. Oil Flow, [lpm]		125
Max. Return Pressure without Drain Line or Max. Pressure in Drain Line, [bar]		5
Min. Speed**, RPM		5
Static Torque for the Brake**, [daNm]		142
Release Pressure ±10%, [bar]		24...29
Max. Steering Pressure, [bar]		300

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Static torque is obtained at working pressure - 0 PSI [0 bar].

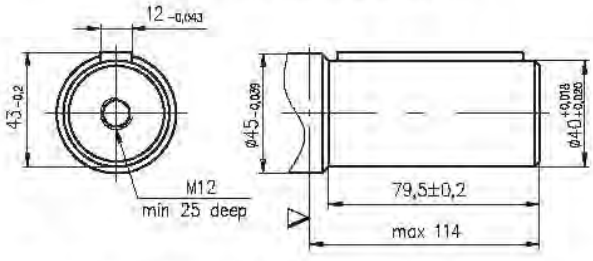
OUTLINE DIMENSIONS REFERENCE OF TW 500-314 ...



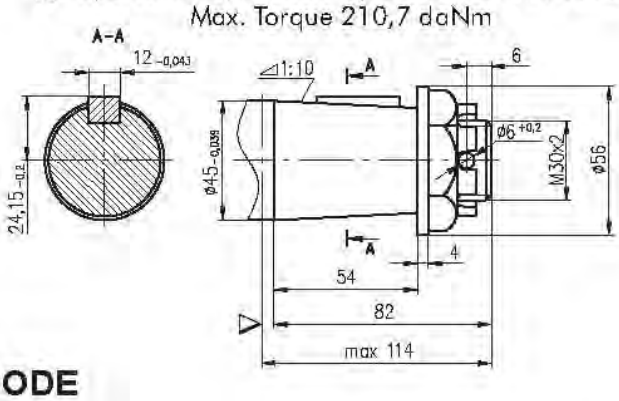
$P_{(A,B)}$: G3/4
C: G1/4
D: G1/4

SHAFT EXTENSIONS

C -ø40 straight, Parallel key A12x8x70 DIN 6885
Max. Torque 132,8 daNm



K -tapered 1:10, Parallel key B12x8x28 DIN 6885
Max. Torque 210,7 daNm



∇- Motor Mounting Surface

ORDER CODE

	1		2	3	4	5
TW	500	-	314			

Pos. 1 - Displacement code

Pos.2 - Type of a Brake (ELB 314)

Pos.3 - Shaft Extensions

C	- ø40 straight, Parallel key A12x8x70 DIN 6885
K	- tapered 1:10, Parallel key B12x8x28 DIN 6885

Pos. 4 - Option (Paint)*

omit - no Paint

P	- Painted
PC	- Corrosion Protected Paint

Pos. 5 - Design Series

omit - Factory specified

NOTES:

* Color at customer's request.

The brake-motor unit is mangano-phosphatized as standard.

Many thanks to the production company M+S for the use of Technical Drawing

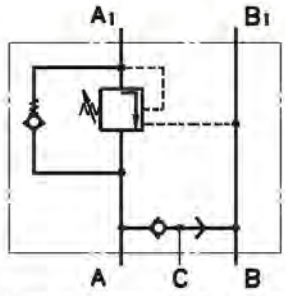
HYDRAULIC VALVES FOR HYDRAULIC MOTORS

INDEX

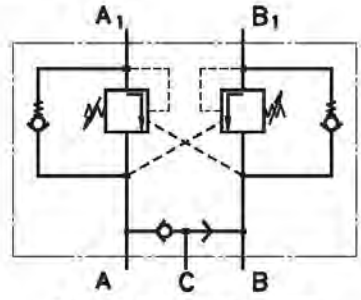
- **OVERCENTER VALVES … … … … … … … … … VALVES-01**
  - VALVE TYPE VAKR VALVES-02
  - VALVE TYPE VAKS VALVES-03
  - VALVE TYPE VAKT VALVES-04
- **SWITCH VALVES … … … … … … … … … … … … VALVES-05**
  - VALVE TYPE VAAR1 .... VALVES-05
  - VALVE TYPE VAAS1 .... VALVES-05
- **CROSSOVER RELIEF VALVES … … … … … … VALVES-06**
  - VALVE TYPE VABR VALVES-07
  - VALVE TYPE VABS VALVES-08
  - VALVE TYPE VABT VALVES-09

VALVES FOR HYDRAULIC MOTORS

OVERCENTER VALVES WITH BRAKE CONTROL



Single Overcenter Valves
with Brake Control



Dual Overcenter Valves
with Brake Control

CONTENTS

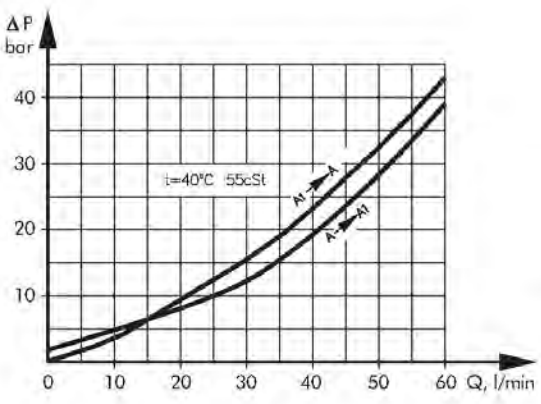
Valves for OP and OR type VAKR ... Valves-02
Valves for OS type VAKS Valves-03
Valves for OT type VAKT Valves-04
Switch valves type VAAR1 and VAAS1. Valves-05
Order Code Valves-10

SPECIFICATION DATA

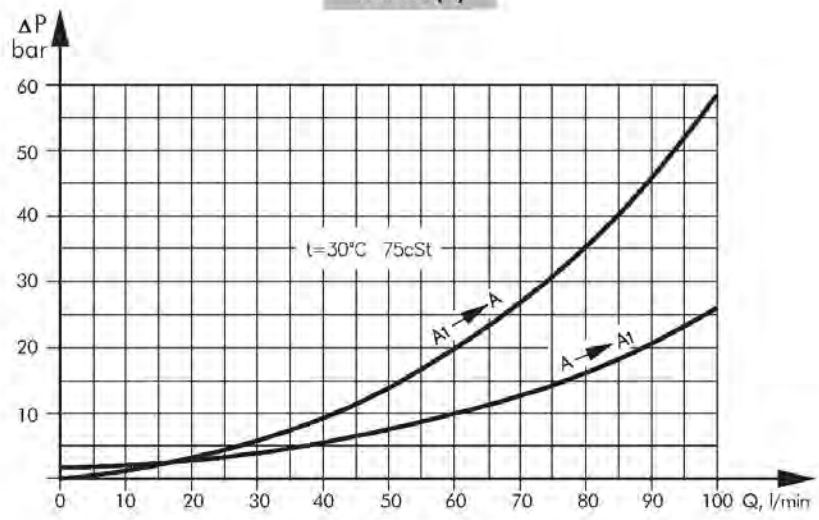
Parameters	Type					
	VAKR1	VAKS1	VAKR2	VAKS2	VAKT1	VAKT2
Flow Rate, l/min	60				100	
Rated Pressure , bar	250				250	
Pilot Ratio	4,25:1				4,25:1	
Weight , kg	3,300	3,340	3,350	3,390	5,400	5,800

PRESSURE LOSSES

VAKR1(2) and VAKS1(2)

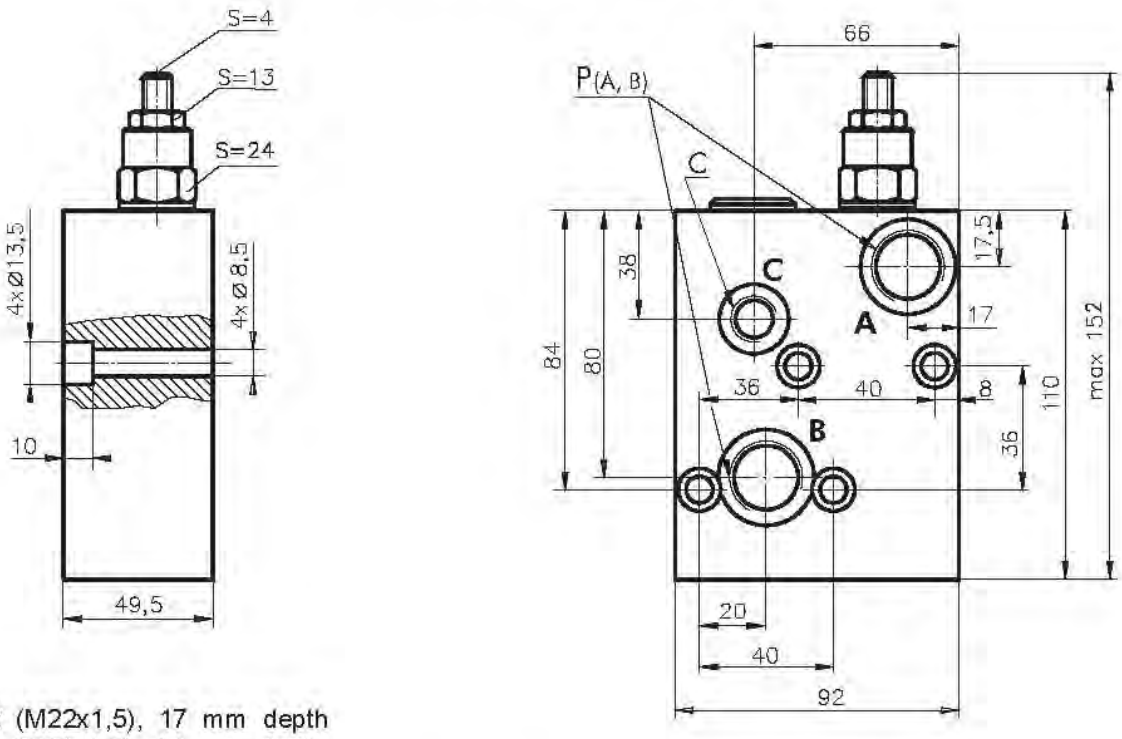


VAKT1(2)



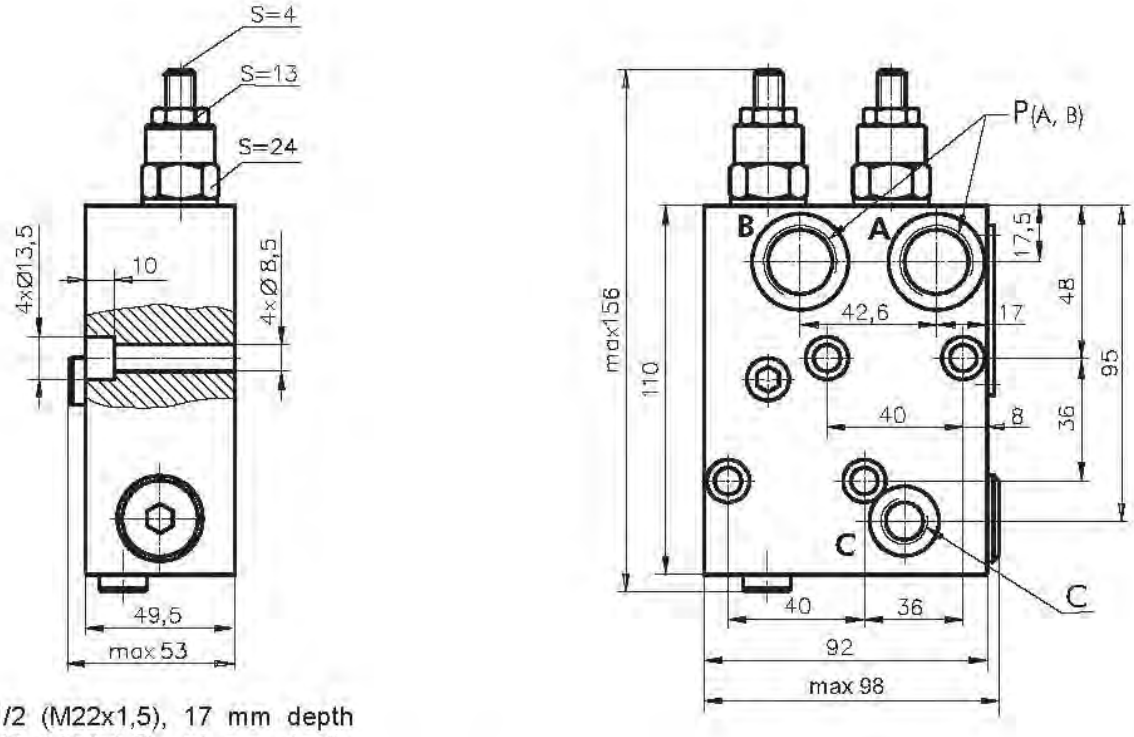
VALVES FOR OP, OR HYDRAULIC MOTORS

SINGLE VALVE VAKR1.. - Series 2



P(A,B) : G1/2 (M22x1,5), 17 mm depth
C : G1/4 (M14x1,5), 14 mm depth

DUAL VALVE VAKR2 ... - Series 2

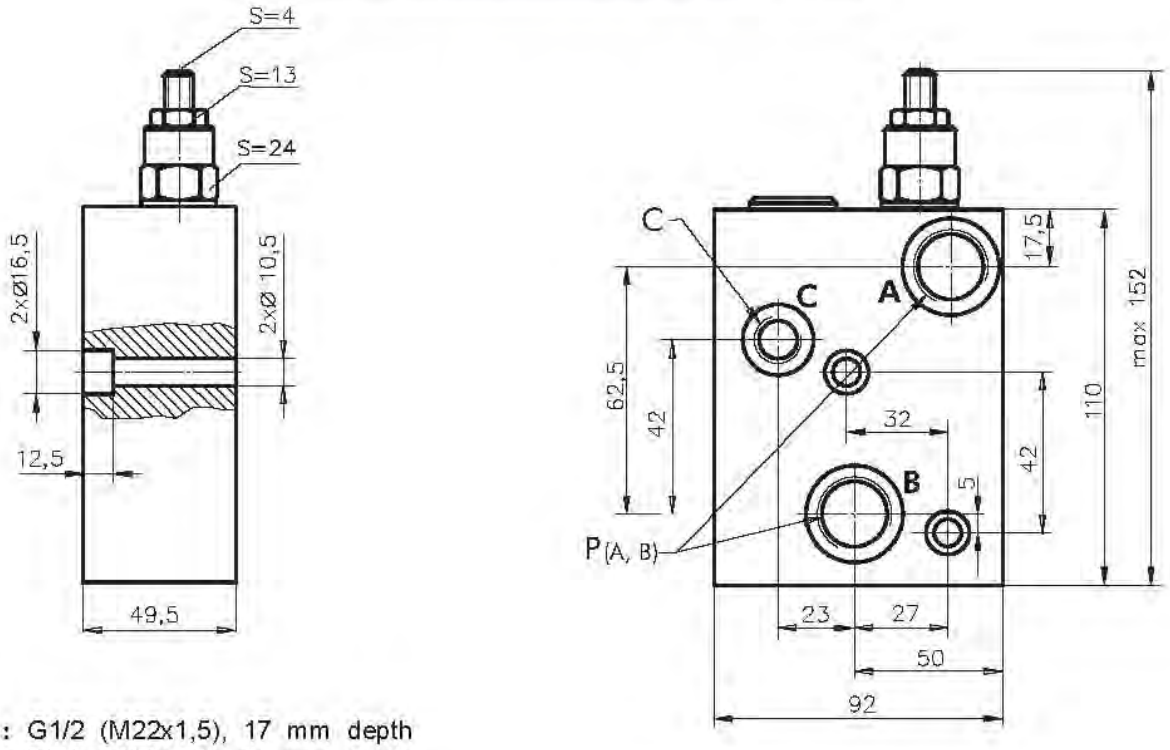


P(A,B) : G1/2 (M22x1,5), 17 mm depth
C : G1/4 (M14x1,5), 14 mm depth

Note : VAKR Blocks are installed directly on OP and OR Motors with four bolts M8x50 - 8.8 DIN 912.
Tightening torque $2^{+0.5}$ daNm.

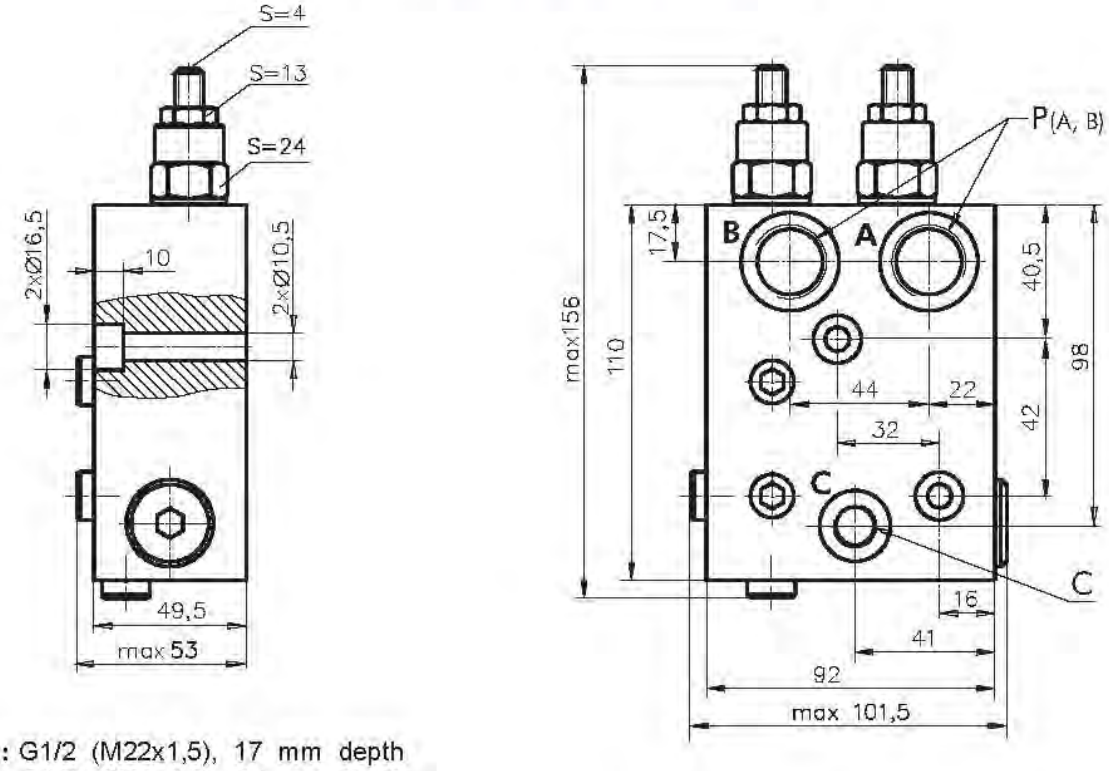
VALVES FOR OS HYDRAULIC MOTORS

SINGLE VALVE VAKS1 ... - Series 2



P(A, B) : G1/2 (M22x1,5), 17 mm depth
C : G1/4 (M14x1,5), 14 mm depth

DUAL VALVE VAKS2... - Series 2

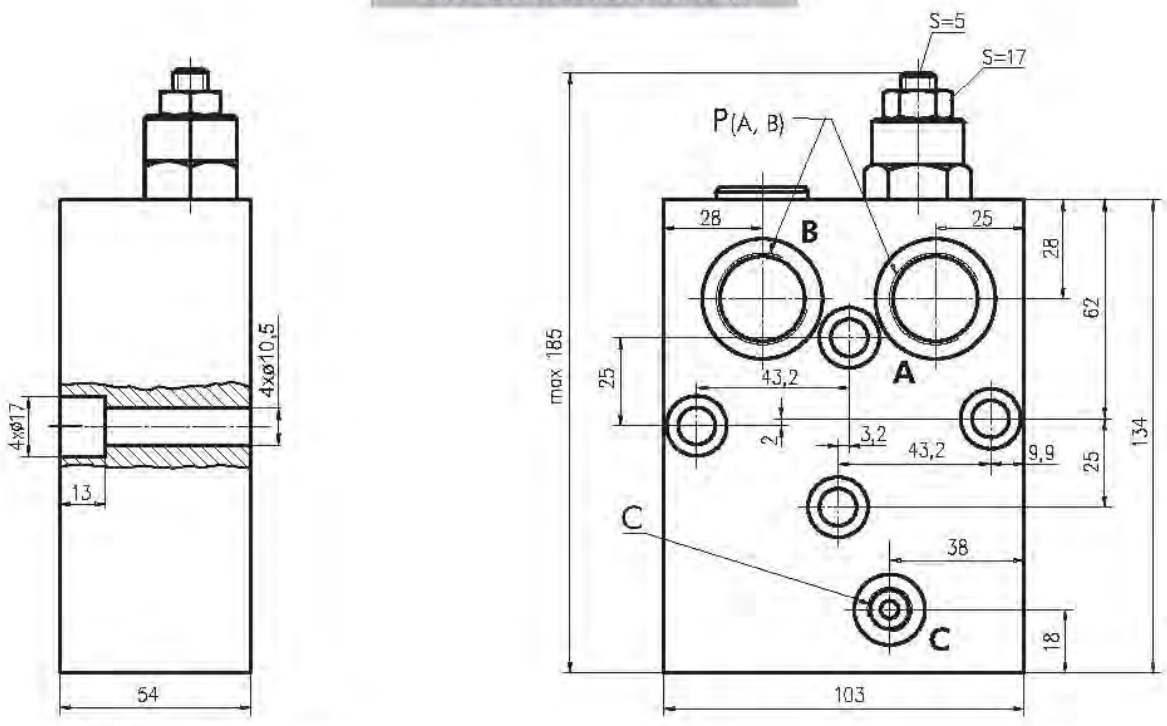


P(A, B) : G1/2 (M22x1,5), 17 mm depth
C : G1/4 (M14x1,5), 14 mm depth

Note : VAKS Blocks are installed directly on OS Motors with two bolts M10x50 - 8.8 DIN 912.
Tightening torque $4,5^{+0,5}$ daNm.

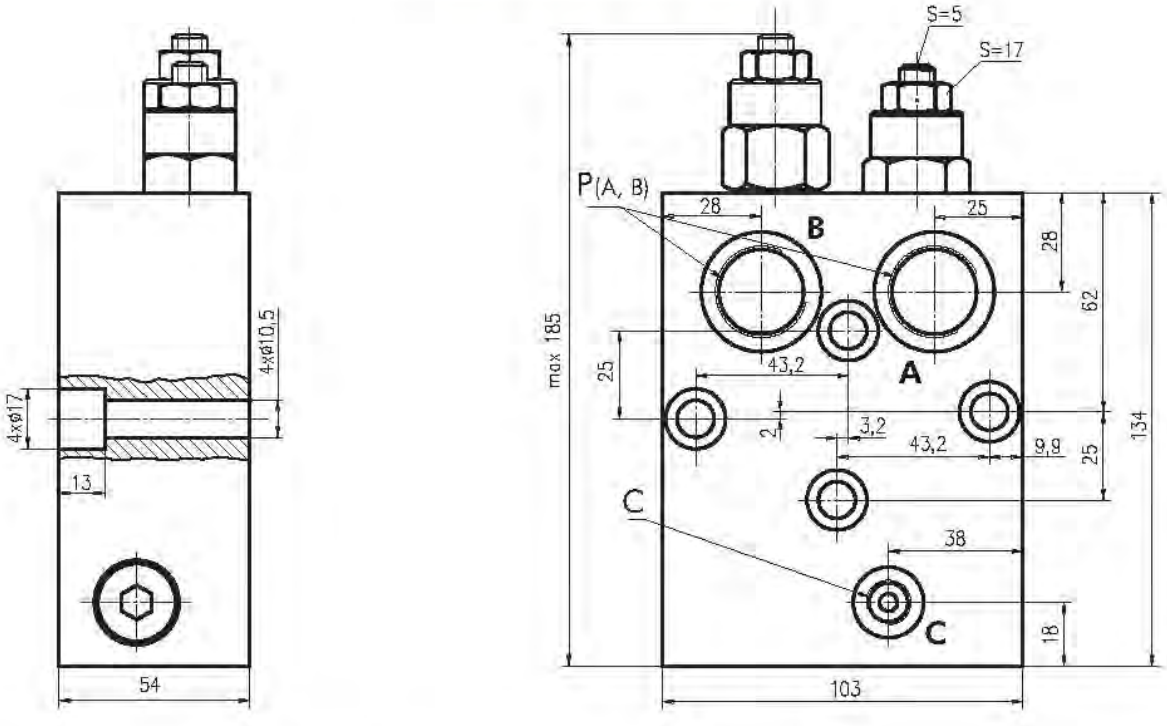
VALVES FOR OT HYDRAULIC MOTORS

SINGLE VALVE VAKT1 ...



$P_{(A, B)}$: G3/4 (M27x2), 17 mm depth
C : G1/4 (M14x1,5), 14 mm depth

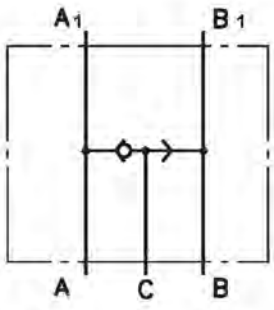
DUAL VALVE VAKT2 ...



$P_{(A, B)}$: G3/4 (M27x2), 17 mm depth
C : G1/4 (M14x1,5), 14 mm depth

Note :VAKT Blocks are installed directly on OT Motors with four bolts M10x55 - 8.8 DIN 912. Tightening torque $4,5^{+0,5}$ daNm.

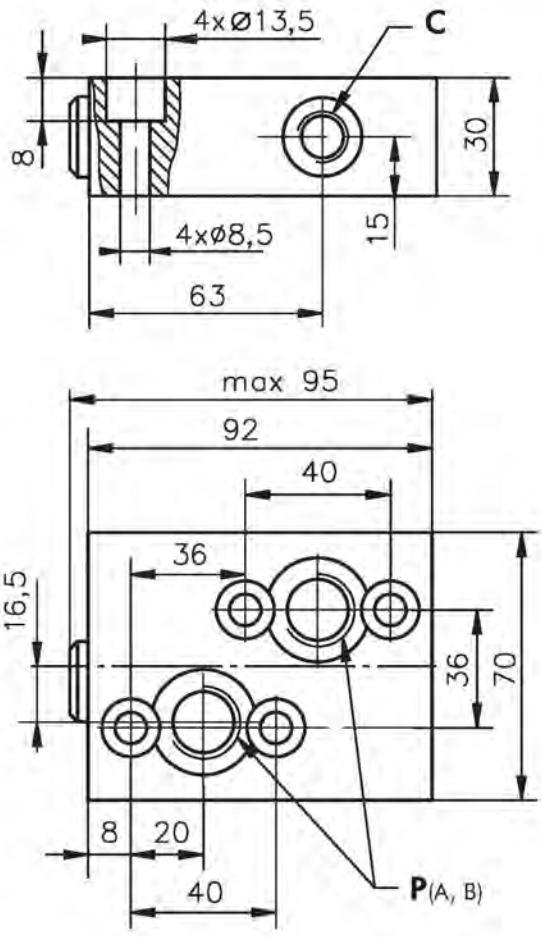
SWITCH VALVES



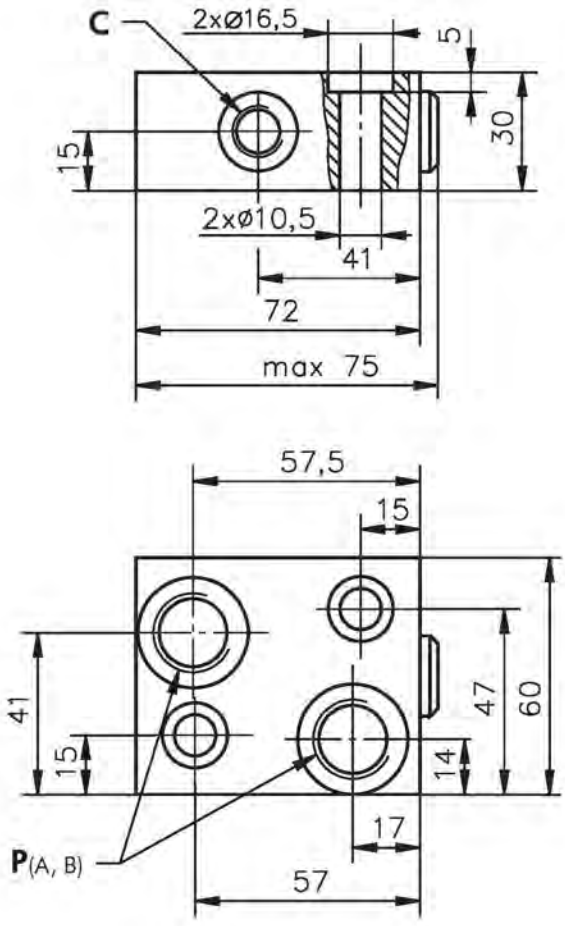
SPECIFICATION DATA

Parameters	Type	
	VAAR1	VAAS1
Flow Rate, l/min	60	
Rated Pressure , bar	250	
Weight , kg	0,850	0,670

VALVE FOR OP, OR HYDRAULIC MOTORS VAAR1



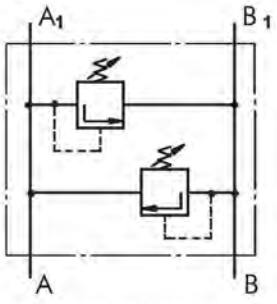
VALVE FOR OS HYDRAULIC MOTORS VAAS1



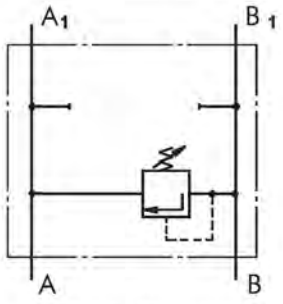
P(A, B): G1/2 (M22x1,5), 17 mm depth
C : G1/4 (M14x1,5), 14 mm depth

Note : VAAR1 Blocks are installed directly on OP and OR Motors with four bolts M8x40 - 8.8 DIN 912. Tightening torque 2 $^{+0.5}$ daNm.
VAAS1 Blocks are installed directly on OS Motors with two bolts M10x40 - 8.8 DIN 912. Tightening torque 4,5 $^{+0.5}$ daNm.

CROSSOVER RELIEF VALVES



Dual Crossover
Relief Valve



Single Crossover
Relief Valve

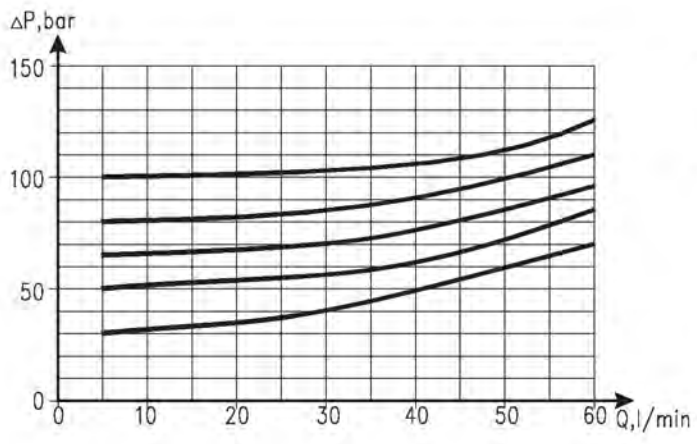
CONTENTS

Valves for OP and OR type VABR1(2) Valves-07
Valves for OS type VABS1(2) Valves-08
Valves for OT type VABT1(2) Valves-09
Order code..... Valves-10

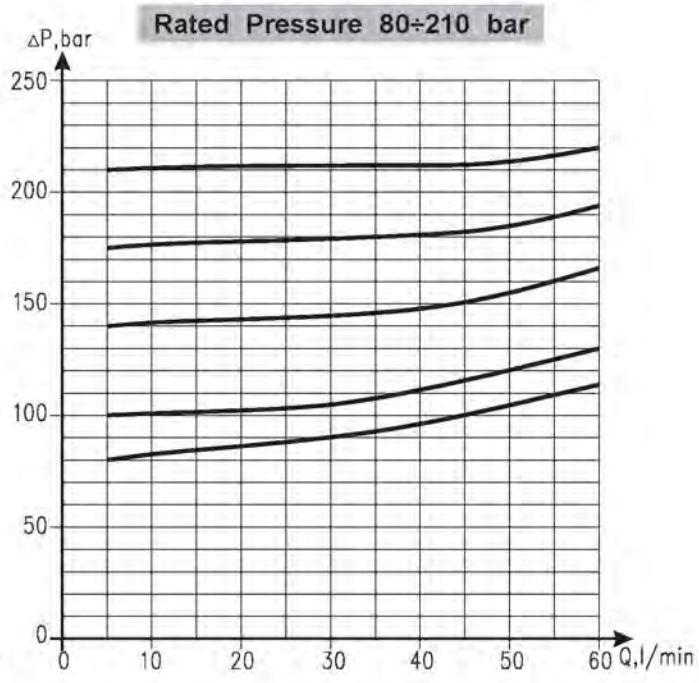
SPECIFICATION DATA

Parameters	Type					
	VABR1(X)	VABS1(X)	VABR2(X)	VABS2(X)	VABT1	VABT2
Flow Rate, l/min	60				120	
Rated Pressure , bar	30 to 100; 80 to 210				80 to 210	
Weight , kg	1,32	1,58	1,44	1,70	5,10	5,54

Rated Pressure 30÷100 bar

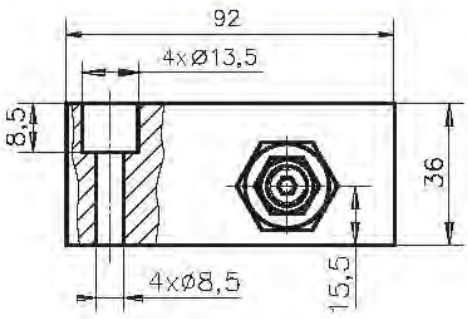


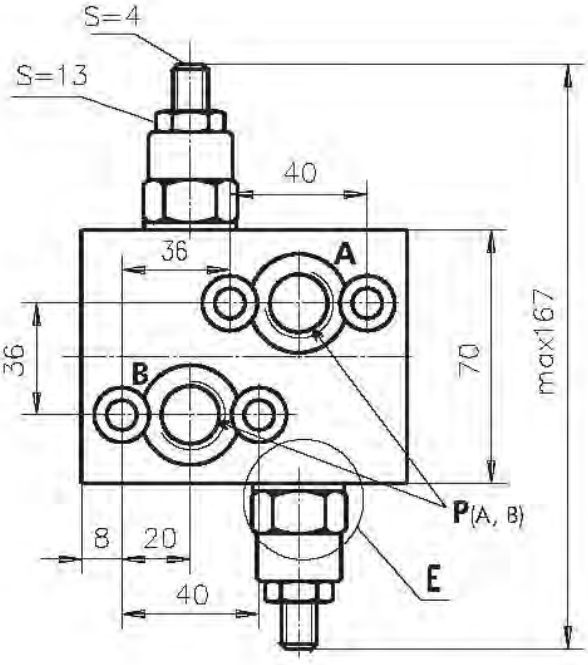
Rated Pressure 80÷210 bar



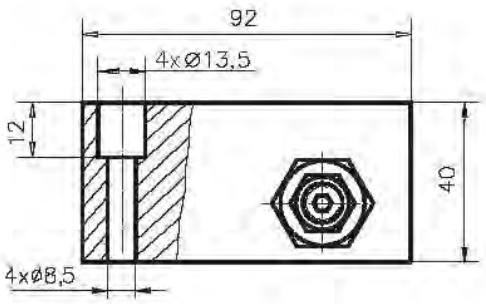
VALVES FOR OP, OR HYDRAULIC MOTORS

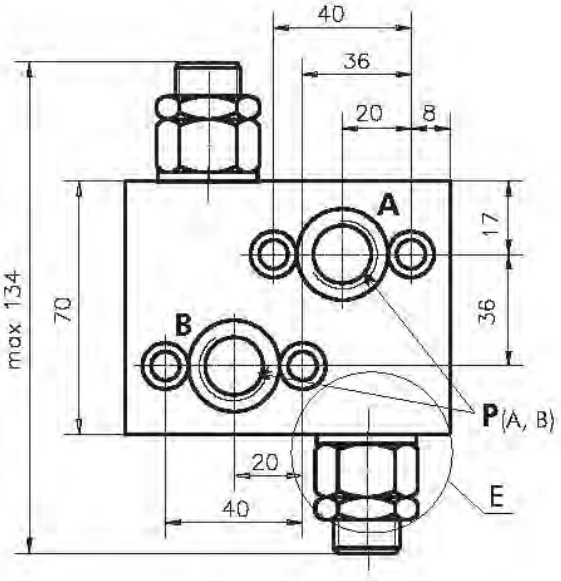
DUAL VALVE VABR2



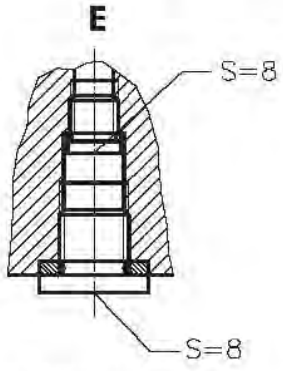


DUAL VALVE VABR2X



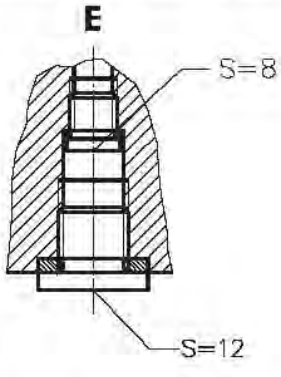


SINGLE VALVES VABR1



$P_{(A, B)}$: G1/2 (M22x1,5), 15 mm depth

SINGLE VALVES VABR1X

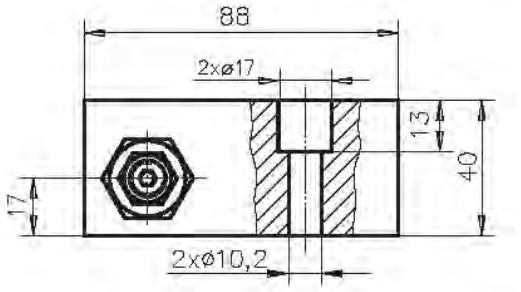


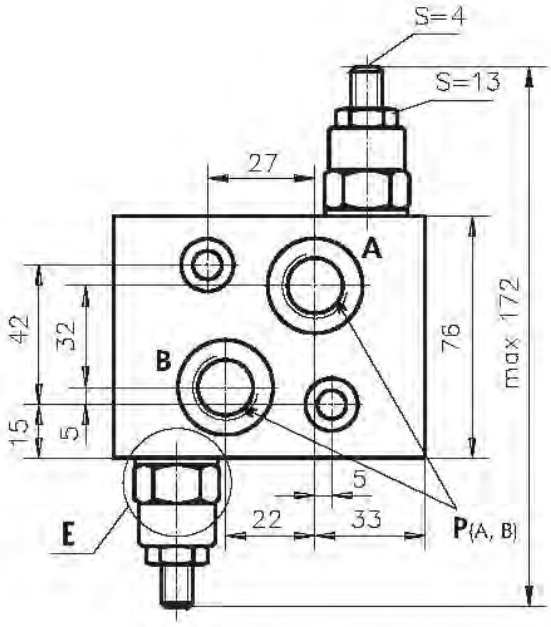
$P_{(A,B)}$: G1/2 (M22x1,5), 17 mm depth

Note:-VABR2(X) (VABR1(X)) Blocks are installed directly on OP and OR Motors with four bolts M8x40-8.8 DIN 912. Tightening torque $2^{+0.5}$ daNm.

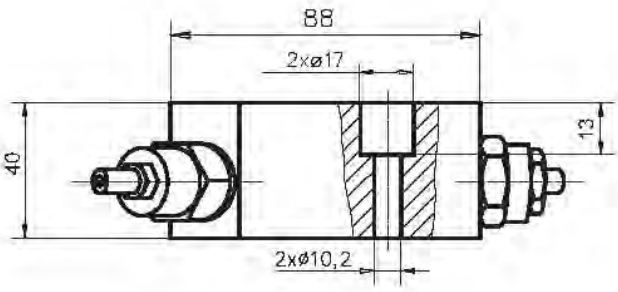
VALVES FOR OS HYDRAULIC MOTORS

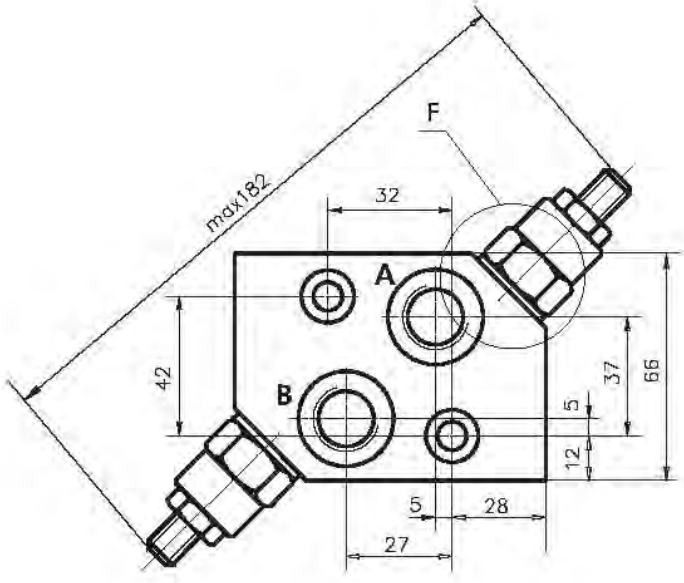
DUAL VALVE VABS2



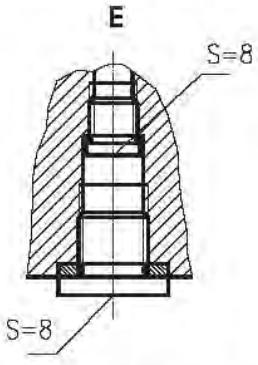


DUAL VALVE VABS2X



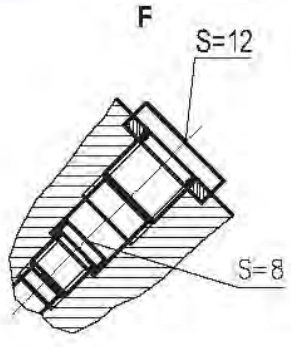


SINGLE VALVES VABS1



$P_{(A, B)}$: G1/2 (M22x1,5), 15 mm depth

SINGLE VALVES VABS1X

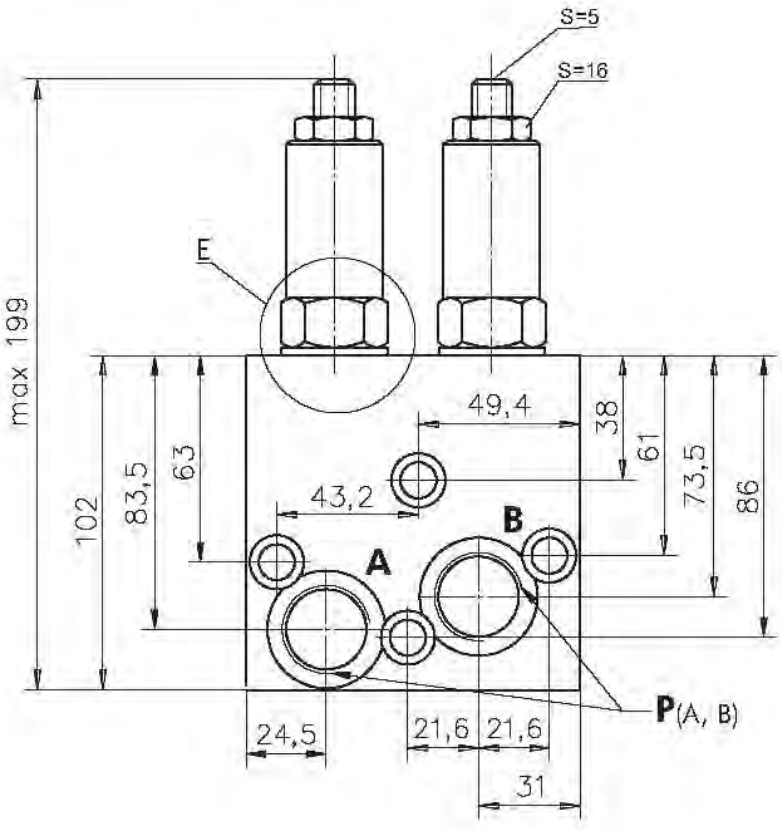


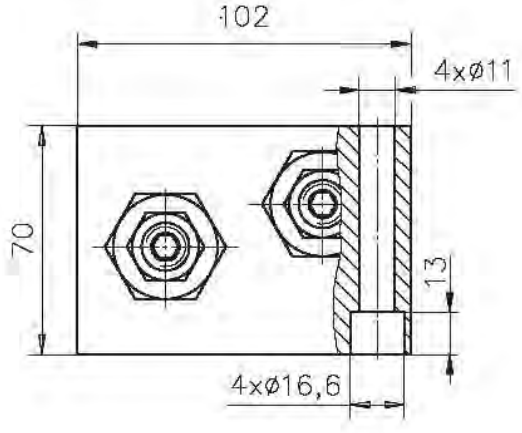
$P_{(A,B)}$: G1/2 (M22x1,5), 17 mm depth

Note:-VABS2(X) (VABS1(X)) Blocks are installed directly on OS Motors with two bolts M10x40-8.8 DIN 912.
Tightening torque $4,5^{+0,5}$ daNm.

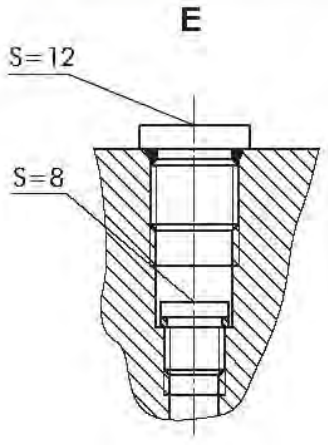
VALVE FOR OT HYDRAULIC MOTORS

DUAL VALVE VABT2





SINGLE VALVE VABT1



P (A,B) :G3/4 (M27x2), 20 mm depth

Note :VABT1 (VABT2) Blocks are installed directly on OT Motors with four bolts M10x70 - 8.8 DIN 912. Tightening torque $4,5^{+0,5}$ daNm.

ORDER CODE - OVERCENTER VALVES WITH BRAKE CONTROL

	1	2	3	4	5	6	7	8
VA			-		/		/				

Pos.1 - Valve Type

K	- with overcenter valve (s)
A	- Switch valve

Pos.2 - Housing Type

R	- Valve block for OP and OR Motors
S	- Valve block for OS Motors
T*	- Valve block for OT Motors

Pos.3 - Rated Pressure, bar

250

Pos.4 - Pilot Ratio*

1	-4,25 : 1

Pos.5 - Number of Valves*

2	-Two Valves
1	-One Valve

Pos.6 - Ports

omit - BSPP (ISO 228)

M	- Metric (ISO 262)

Pos.7 - Option (Paint)**

omit - no Paint

P	- Painted
PC	- Corrosion Protected Paint

Pos.8 - Design Series

omit - Factory specified

NOTES:
* Useful for K overcenter valve type only.
** The color is by customer's request.

ORDER CODE - CROSSOVER RELIEF VALVES

	1	2	3	4	5	6	7
VA					/			

Pos.1 - Number of Valves

2	- Two Valves
1	- One Valves

Pos.2 - Housing Type

R	- Valve block for OP and OR Motors
S	- Valve block for OS Motors
T	- Valve block for OT Motors

Pos.3 - Housing Design code

omit - Model 1

H*	- Model 2

Pos.4 - Max. pressure range, bar

100	- 30÷100 [bar]
210	- 80÷210 [bar]

Pos.5 - Ports

omit - BSPP (ISO 228)

M	- Metric (ISO 262)

Pos.6 - Option (Paint)**

omit - no Paint

P	- Painted
PC	- Corrosion Protected Paint

Pos.7 - Design Series

omit - Factory specified

NOTES:
* Useful for types **R** and **S** only.
** The color is by customer's request.

The Valve Blocks are mangano-phosphatized as standard.