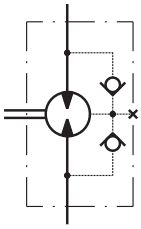
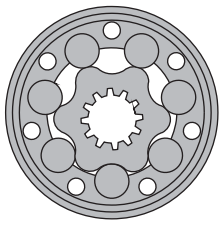
# HYDRAULIC MOTORS RL

## APPLICATION

» Conveyors
» Feeding mechanism of robots and manipulators
» Metal working machines
» Textile machines
» Agricultural machines
» Food industries
» Mining machinery etc.





## CONTENTS


Specification data ..... 55
Dimensions and mounting .... 56
Shaft extensions ..... 57
Permissible shaft loads ..... 58
Order code ..... 58


## OPTIONS

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

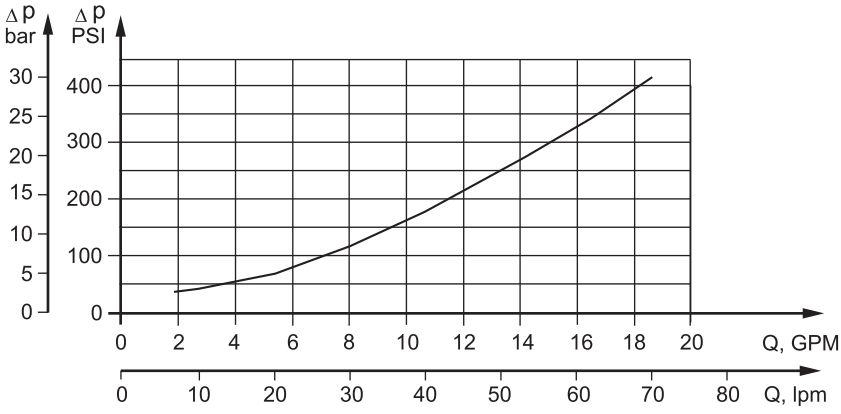
## GENERAL

| | |
|---|---|
| **Max. Displacement,** $cm^3$/rev. [$in^3$/rev.] | 397 [24.4] |
| **Max. Speed,** [RPM] | 970 |
| **Max. Torque,** daNm [lb-in] | cont.: 61 [5400] int.: 69 [6100] |
| **Max. Output,** kW [HP] | 16 [21.5] |
| **Max. Pressure Drop,** bar [PSI] | cont.:175 [2540] int.: 200 [2900] |
| **Max. Oil Flow,** lpm [GPM] | 75 [20] |
| **Min. Speed,** [RPM] | 10 |
| **Permissible Shaft Loads,** daN [lbs] | $P_a$=500 [1124] |
| **Pressure fluid** | Mineral based- HLP(DIN 51524) or HM(ISO 6743/4) |
| **Temperature range,** $^oC$ [$^oF$] | -40÷140 [-40÷284] |
| **Optimal Viscosity range,** $mm^2$/s [SUS] | 20÷75 [98÷347] |
| **Filtration** | ISO code 20/16 (Min. recommended fluid filtration of 25 microns) |

### Oil flow in drain line

| Pressure drop bar [PSI] | Viscosity $mm^2$/s [SUS] | Oil flow in drain line lpm [GPM ] |
|---|---|---|
| 100 [1450 ] | 20 [98] | 2,5 [.660 ] |
| | 35 [164 ] | 1,8 [.476 ] |
| 140 [2030 ] | 20 [98] | 3,5 [.925 ] |
| | 35 [164] | 2,8 [.740 ] |

### Pressure Losses



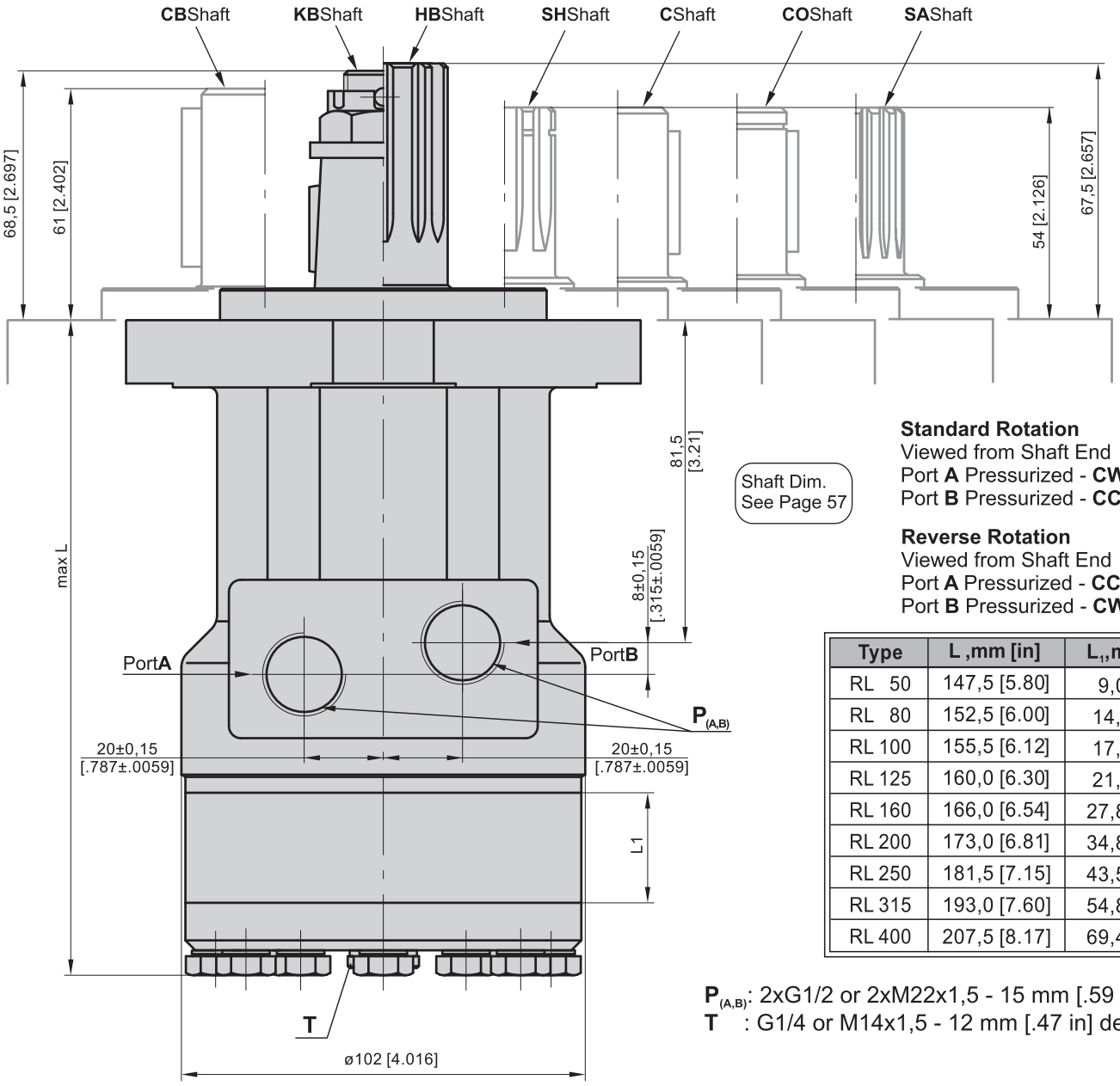
## SPECIFICATION DATA

| Type | | RL 50 | RL 80 | RL 100 | RL 125 | RL 160 | RL 200 | RL 250 | RL 315 | RL 400 |
|---|---|---|---|---|---|---|---|---|---|---|
| Displacement, cm³/rev [in³/rev] | | 51,5 [3.14] | 80,3 [4.90] | 99,8 [6.09] | 125,7 [7.67] | 159,6 [9.74] | 199,8[12.19] | 250,1[15.26] | 315,7[19.26] | 397 [24.4] |
| Max. Speed, | Cont. | 775 | 750 | 600 | 475 | 375 | 300 | 240 | 190 | 150 |
| [RPM] | Int.* | 970 | 940 | 750 | 600 | 470 | 375 | 300 | 240 | 190 |
| Max. Torque, | Cont. | 10 [885] | 19,5 [1725] | 24 [2125] | 30 [2655] | 38 [3360] | 45 [4000] | 54 [4780] | 55 [4870] | 61 [5400] |
| daNm [lb-in] | Int.* | 13 [1150] | 22 [1947] | 28 [2480] | 34 [3010] | 43 [3805] | 50 [4425] | 61 [5400] | 69 [6100] | 69 [6100] |
| | Peak** | 17 [1505] | 27 [2390] | 32 [2832] | 37 [3275] | 46 [4070] | 56 [4960] | 71 [6280] | 84 [77430] | 87 [7700] |
| Max. Output | Cont. | 7 [9.5] | 12,5 [17] | 13 [17.4] | 12,5 [16.8] | 12,5 [16.8] | 11 [14.8] | 10 [13.4] | 9 [12] | 7,5 [10] |
| kW [HP] | Int.* | 8,5 [11.9] | 15 [20.1] | 15 [20.1] | 14,5 [19] | 14 [18.8] | 13 [17.4] | 12 [16.1] | 10 [13.4] | 9 [12] |
| Max. Pressure Drop | Cont. | 140 [2030] | 175 [2540] | 175 [2540] | 175 [2540] | 175 [2540] | 175 [2540] | 175 [2540] | 135 [1960] | 110 [1600] |
| bar [PSI] | Int.* | 175 [2540] | 200 [2900] | 200 [2900] | 200 [2900] | 200 [2900] | 200 [2900] | 200 [2900] | 175 [2540] | 140 [2030] |
| | Peak** | 225 [3260] | 225 [3260] | 225 [3260] | 225 [3260] | 225 [3260] | 225 [3260] | 225 [3260] | 210 [3045] | 175 [2540] |
| Max. Oil Flow | Cont. | 40 [11] | 60 [16] | 60 [16] | 60 [16] | 60 [16] | 60 [16] | 60 [16] | 60 [16] | 60 [16] |
| lpm [GPM] | Int.* | 50 [13] | 75 [20] | 75 [20] | 75 [20] | 75 [20] | 75 [20] | 75 [20] | 75 [20] | 75 [20] |
| Max. Inlet Pressure | Cont. | 175 [2540] | 175 [2540] | 175 [2540] | 175 [2540] | 175 [2540] | 175 [2540] | 175 [2540] | 175 [2540] | 175 [2540] |
| bar [PSI] | Int.* | 200 [2900] | 200 [2900] | 200 [2900] | 200 [2900] | 200 [2900] | 200 [2900] | 200 [2900] | 200 [2900] | 200 [2900] |
| | Peak** | 225 [3260] | 225 [3260] | 225 [3260] | 225 [3260] | 225 [3260] | 225 [3260] | 225 [3260] | 225 [3260] | 225 [3260] |
| Max. Return Pres- | Cont. 0-100 RPM | 100 [1450] | 100 [1450] | 100 [1450] | 100 [1450] | 100 [1450] | 100 [1450] | 100 [1450] | 100 [1450] | 100 [1450] |
| sure without Drain | Cont. 100-300 RPM | 50 [725] | 50 [725] | 50 [725] | 50 [725] | 50 [725] | 50 [725] | 50 [725] | 50 [725] | 50 [725] |
| Line or Max. Pres- | Cont. 300-600 RPM | 25 [365] | 25 [365] | 25 [365] | 25 [365] | 25 [365] | 25 [365] | 25 [365] | 25 [365] | 25 [365] |
| sure in Drain Line, | Cont. >600 RPM | 15 [220] | 15 [220] | 15 [220] | 15 [220] | 15 [220] | 15 [220] | 15 [220] | 15 [220] | 15 [220] |
| bar [PSI] | Int.* 0-max. RPM | 100 [1450] | 100 [1450] | 100 [1450] | 100 [1450] | 100 [1450] | 100 [1450] | 100 [1450] | 100 [1450] | 100 [1450] |
| Max. Return Pres- | Cont. | 140 [2030] | 175 [2540] | 175 [2540] | 175 [2540] | 175 [2540] | 175 [2540] | 175 [2540] | 175 [2540] | 175 [2540] |
| sure with Drain Line | Int.* | 175 [2540] | 200 [2900] | 200 [2900] | 200 [2900] | 200 [2900] | 200 [2900] | 200 [2900] | 200 [2900] | 200 [2900] |
| bar [PSI] | Peak** | 225 [3260] | 225 [3260] | 225 [3260] | 225 [3260] | 225 [3260] | 225 [3260] | 225 [3260] | 225 [3260] | 225 [3260] |
| Max. Starting Pressure with Unloaded Shaft, bar [PSI] | | 10 [145] | 10 [145] | 10 [145] | 9 [130] | 7 [102] | 5 [73] | 5 [73] | 5 [73] | 5 [73] |
| Min. Starting Torque daNm [lb-in] | | 8 [710] | 15 [1330] | 20 [1770] | 25 [2215] | 32 [2835] | 37 [3275] | 45 [3983] | 45 [3983] | 49 [4335] |
| Min. Speed***, [RPM] | | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Weight, kg [lb] | | 7,7 [17] | 7,8 [17.2] | 8,1 [17.8] | 8,2 [18] | 8,4 [18.5] | 8,9 [19.6] | 9,3 [20.5] | 10,0 [22] | 10,7 [23.6] |

* 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 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 13 mm²/s [70 SUS] at 50°C [122°F].
5. Recommended maximum system operating temperature is 82°C [180°F].
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




Shaft Dim. See Page 57

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

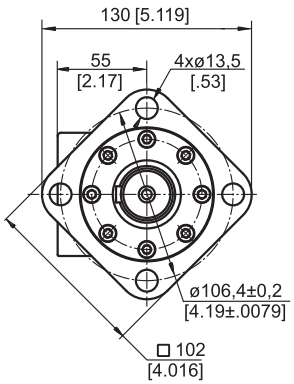
**Reverse Rotation**
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

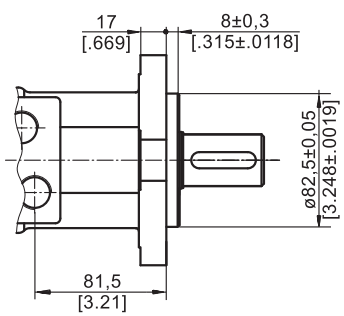
| Type | L ,mm [in] | $L_1$,mm [in] |
|---|---|---|
| RL 50 | 147,5 [5.80] | 9,0 [.35] |
| RL 80 | 152,5 [6.00] | 14,0 [.55] |
| RL 100 | 155,5 [6.12] | 17,4 [.69] |
| RL 125 | 160,0 [6.30] | 21,8 [.86] |
| RL 160 | 166,0 [6.54] | 27,8 [1.09] |
| RL 200 | 173,0 [6.81] | 34,8 [1.37] |
| RL 250 | 181,5 [7.15] | 43,5 [1.71] |
| RL 315 | 193,0 [7.60] | 54,8 [2.16] |
| RL 400 | 207,5 [8.17] | 69,4 [2.73] |

$P_{(A,B)}$: 2xG1/2 or 2xM22x1,5 - 15 mm [.59 in] depth
T : G1/4 or M14x1,5 - 12 mm [.47 in] depth

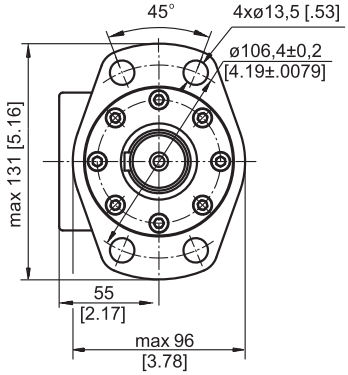
## MOUNTING

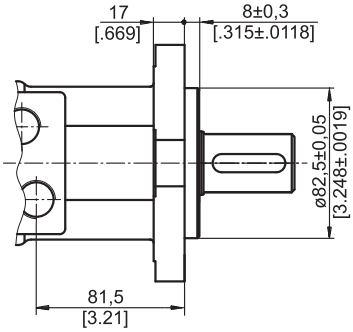
Square Mount (4 Holes)




**F** Oval Mount (4 Holes)

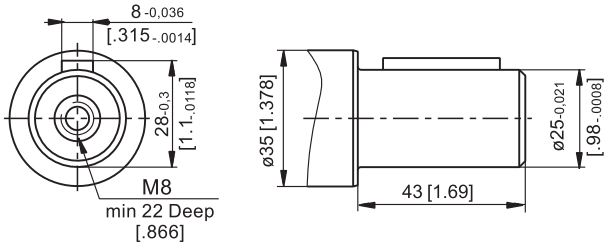


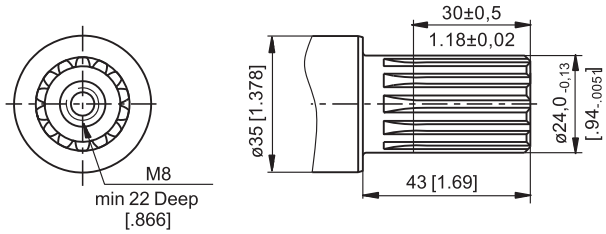

mm [in]

# SHAFT EXTENSIONS

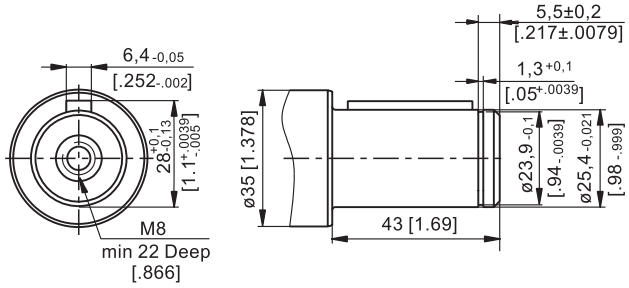
## C - ø25 straight, Parallel key A8x7x35 DIN 6885
Max. Torque 34 daNm [3010 lb-in]



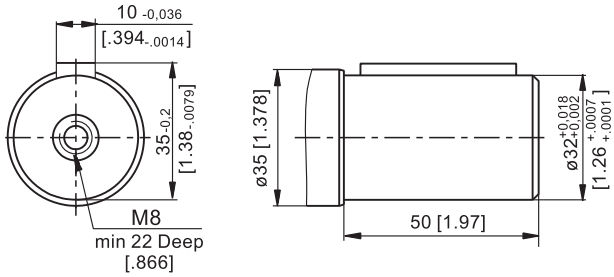

## SA - splined B25x22 DIN 5482
Max. Torque 40 daNm [3540 lb-in]



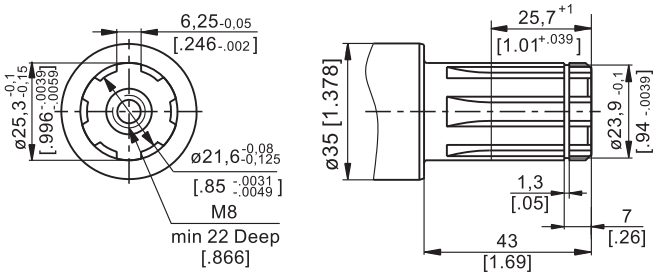

## CO - ø1" straight, Parallel key ¼"x¼"x1¼" BS46
Max. Torque 34 daNm [3010 lb-in]



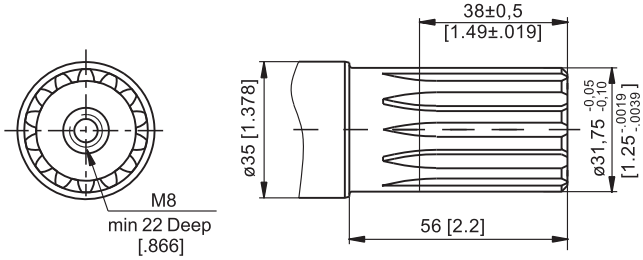

## CB - ø32 straight, Parallel key A10x8x40 DIN 6885
Max. Torque 77 daNm [6815 lb-in]



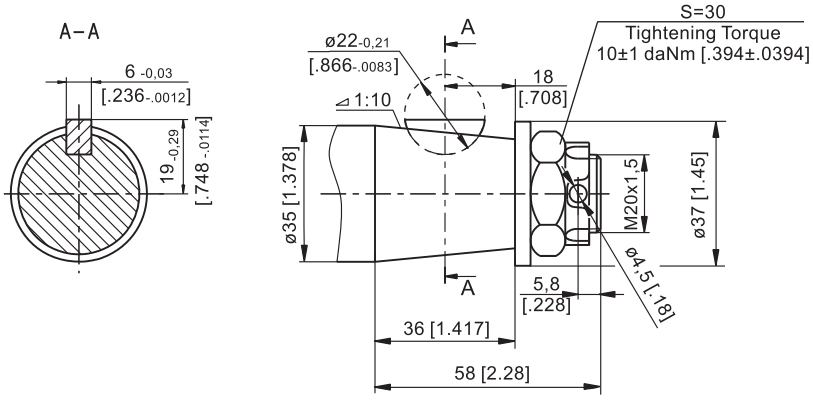

## SH - splined, BS 2059 (SAE 6B)
Max. Torque 40 daNm [3540 lb-in]




## HB - ø1¼" splined 14T, DP12/24 ANSI B92.1-1976
Max. Torque 95 daNm [8410 lb-in]



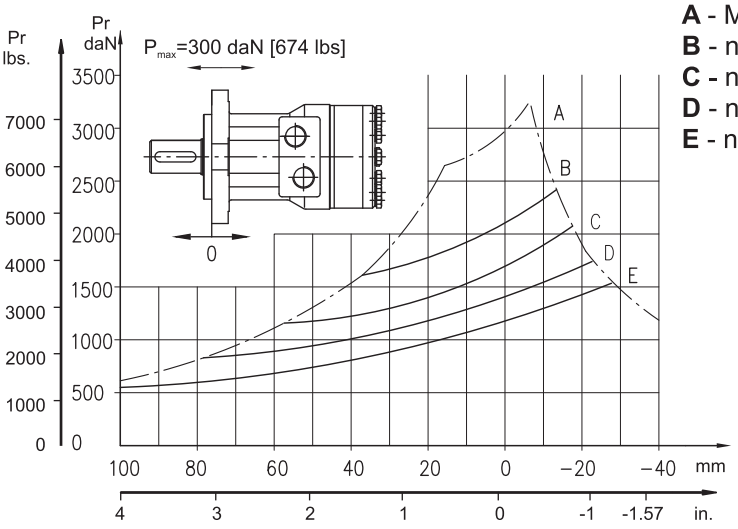

## KB - tapered 1:10, Woodruff key 6x9 DIN6888
Max. Torque 95 daNm [8410 lb-in]




mm [in]

## Permissible Shaft Loads PL and RL

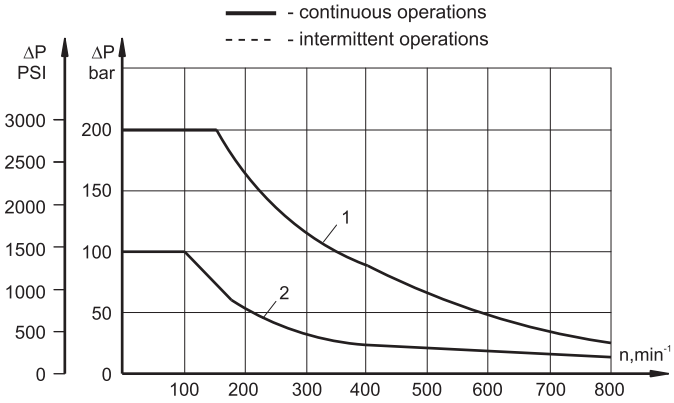
*The curves apply to a B10 bearings life of 2000 hrs*




**A** - Max. radial shaft load.
**B** - n=50 $min^{-1}$
**C** - n=100 $min^{-1}$
**D** - n=200 $min^{-1}$
**E** - n=400 $min^{-1}$

## MAX. PERMISSIBLE SHAFT SEAL PRESSURE

*Max return pressure without drain line or max. pressure in drain line*




## ORDER CODE

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **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 [3.14 $in^3$/rev] |
| **80** | - 80,3 $cm^3$/rev [4.90 $in^3$/rev] |
| **100** | - 99,8 $cm^3$/rev [6.09 $in^3$/rev] |
| **125** | - 125,7 $cm^3$/rev [7.67 $in^3$/rev] |
| **160** | - 159,6 $cm^3$/rev [9.74 $in^3$/rev] |
| **200** | - 199,8 $cm^3$/rev [12.19 $in^3$/rev] |
| **250** | - 250,1 $cm^3$/rev [15.26 $in^3$/rev] |
| **315** | - 315,7 $cm^3$/rev [19.26 $in^3$/rev] |
| **400** | - 397,0 $cm^3$/rev [24.40 $in^3$/rev] |

**Pos.3 - Shaft Extensions****

| | |
|---|---|
| **C** | - ø25 straight, Parallel key A8x7x35 DIN6885 |
| **CO** | - ø1" straight, Parallel key $^1/_4$"x$^1/_4$"x1$^1/_4$" BS46 |
| **SH** | - ø25,3 splined, BS 2059 (SAE 6B) |
| **SA** | - ø24 splined, B 25x22 DIN 5482 |
| **CB** | - ø32 straight, Parallel key A10x8x40 DIN6885 |
| **HB** | - ø1$^1/_4$" splined 14T ANSI B92.1-1976 |
| **KB** | - ø35 tapered 1:10, Woodruff key 6x9 DIN6888 |

**Pos.4 - Shaft Seal Version**

omit - Standad shaft seal
**U** - High pressure shaft seal

**Pos.4 - Ports**

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

**Pos.5 - Special Features** (see page 99)

**Pos.6 - Design Series**

omit - Factory specified

**NOTES:**

* For the Function Diagrams data please look at "M+S Hydraulic" Catalogue for MR motors, pages 35÷39.
** The permissible output torque for shafts must not be exceeded!
The hydraulic motors are mangano-phosphatized as standard.