

Part number:

**HYDROMA**

HYDRAULICKÉ SYSTÉMY

**HIDROMA  
SYSTEMS**

UKŁADY HYDRAULICZNE

**HYDROMA**

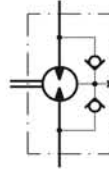
ГИДРАВЛИЧЕСКИЕ СИСТЕМЫ

## HYDRAULIC MOTORS MM



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Specification data  
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Order code



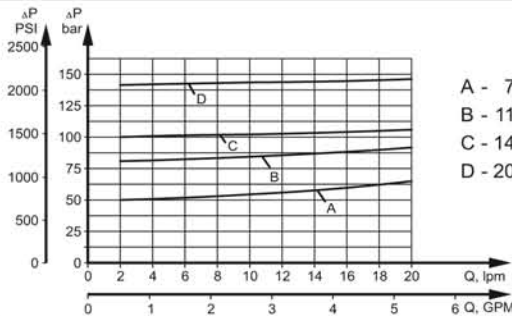
### APPLICATION

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

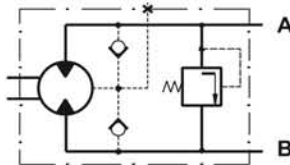
### OPTIONS

- » 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
- » Speed sensing;
- » Other special features

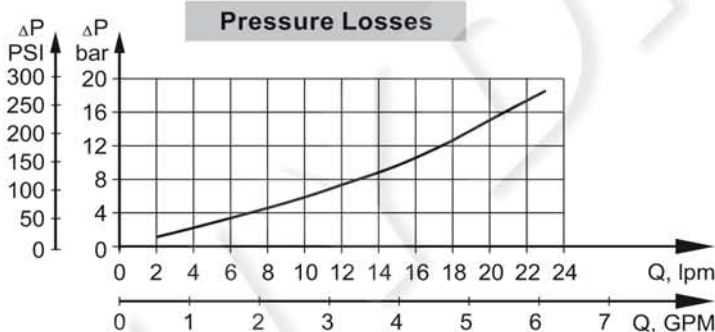
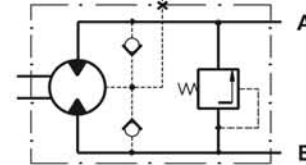
**Pressure Settings at Flow**  
Q=2 lpm [.53 GPM], 32 mm<sup>2</sup>/s [150 SUS], 50°C [122°F]



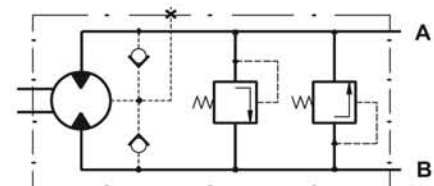
**MMP Series with Integrated Internal Crossover Relief Valve**  
A → B, Δp=100 or 50 bar [1450 or 725 PSI]



**MMP Series with Integrated Internal Crossover Relief Valve**  
B → A, Δp=100 or 50 bar [1450 or 725 PSI]



**MMD Series with Integrated Internal Crossover Relief Valves**  
A ↔ B, Δp=100 or 50 bar [1450 or 725 PSI]



### GENERAL

|                          |   |  |
|--------------------------|---|--|
| Max. Displacement,       | cm <sup>3</sup> /rev [in <sup>3</sup> /rev] | 50 [3.05]  |
| Max. Speed,              | [RPM]                                       | 2440   |
| Max. Torque,             | daNm [lb-in]                                | cont.: 4,5 [398]      int.: 5,8 [513]              |
| Max. Output,             | kW [HP]                                     | 3,2 [4.3]  |
| Max. Pressure Drop,      | bar [PSI]                                   | cont.: 105 [1500]      int.: 140 [2030]            |
| Max. Oil Flow,           | lpm [GPM]                                   | 25 [6.6]   |
| Min. Speed,              | [RPM]                                       | 20   |
| Pressure fluid           |   | Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)    |
| Temperature range,       | °C [°F]                                     | -40+140 [-40+284]                                  |
| Optimal Viscosity range, | mm <sup>2</sup> /s [SUS]                    | 20+75 [98+347]                                     |
| Filtration               |   | ISO code: 18/16/13      According to ISO 4406-1999 |

## SPECIFICATION DATA

| Type   |                           | MM 8       | MM 12.5    | MM 20       | MM 32       | MM 40       | MM 50      |
|--|---------------------------|------------|------------|-------------|-------------|-------------|------------|
| <b>Displacement, cm<sup>3</sup>/rev [in<sup>3</sup>/rev]</b>                             |                           | 8,2 [50]   | 12,5 [77]  | 19,9 [1.22] | 31,6 [1.93] | 39,8 [2.43] | 50 [3.08]  |
| <b>Max. Speed, [RPM]</b>   | Cont.                     | 1950       | 1550       | 1000        | 630         | 500         | 400        |
|  | Int.*                     | 2450       | 1940       | 1250        | 800         | 630         | 500        |
| <b>Max. Torque daNm [lb-in]</b>  | Cont.                     | 1,1 [95]   | 1,6 [140]  | 2,5 [220]   | 4,0 [350]   | 4,5 [400]   | 4,6 [410]  |
|  | Int.*                     | 1,5 [135]  | 2,3 [200]  | 3,5 [310]   | 5,7 [500]   | 7,0 [620]   | 8,8 [780]  |
|  | Peak**                    | 2,1 [187]  | 3,3 [293]  | 5,1 [453]   | 6,4 [568]   | 8,2 [725]   | 10,0 [885] |
| <b>Max. Output kW [HP]</b>   | Cont.                     | 1,8 [2.4]  | 2,4 [3.2]  | 2,4 [3.2]   | 2,4 [3.2]   | 2,2 [3.0]   | 1,8 [2.4]  |
|  | Int.*                     | 2,6 [3.5]  | 3,2 [4.3]  | 3,2 [4.3]   | 3,2 [4.3]   | 3,2 [4.3]   | 3,2 [4.3]  |
| <b>Max. Pressure Drop bar [PSI]</b>  | Cont.                     | 100 [1450] | 100 [1450] | 100 [1450]  | 100 [1450]  | 90 [1310]   | 70 [1020]  |
|  | Int.*                     | 140 [2030] | 140 [2030] | 140 [2030]  | 140 [2030]  | 140 [2030]  | 140 [2030] |
|  | Peak**                    | 200 [2900] | 200 [2900] | 200 [2900]  | 160 [2320]  | 160 [2320]  | 160 [2320] |
| <b>Max. Oil Flow lpm [GPM]</b>   | Cont.                     | 16 [4.2]   | 20 [5.3]   | 20 [5.3]    | 20 [5.3]    | 20 [5.3]    | 20 [5.3]   |
|  | Int.*                     | 20 [5.3]   | 25 [6.6]   | 25 [6.6]    | 25 [6.6]    | 25 [6.6]    | 25 [6.6]   |
| <b>Max. Inlet Pressure bar [PSI]</b>   | Cont.                     | 140 [2030] | 140 [2030] | 140 [2030]  | 140 [2030]  | 140 [2030]  | 140 [2030] |
|  | Int.*                     | 175 [2540] | 175 [2540] | 175 [2540]  | 175 [2540]  | 175 [2540]  | 175 [2540] |
|  | Peak**                    | 225 [3260] | 225 [3260] | 225 [3260]  | 225 [3260]  | 225 [3260]  | 225 [3260] |
| <b>Max. Return Pressure without Drain Line or Max. Pressure in Drain Line, bar [PSI]</b> | Cont. 0-100 RPM           | 140 [2030] | 140 [2030] | 140 [2030]  | 140 [2030]  | 140 [2030]  | 140 [2030] |
|  | Cont. 100-400 RPM         | 105 [1500] | 105 [1500] | 105 [1500]  | 105 [1500]  | 105 [1500]  | 105 [1500] |
|  | Cont. 400-800 RPM         | 50 [725]   | 50 [725]   | 50 [725]    | 50 [725]    | 50 [725]    | 50 [725]   |
|  | Cont. >800 RPM            | 20 [290]   | 20 [290]   | 20 [290]    | -           | -           | -          |
| <b>Max. Return Pressure with Drain Line bar [PSI]</b>                                    | Int.* 0-max. RPM          | 140 [2030] | 140 [2030] | 140 [2030]  | 140 [2030]  | 140 [2030]  | 140 [2030] |
|  | Cont.                     | 140 [2030] | 140 [2030] | 140 [2030]  | 140 [2030]  | 140 [2030]  | 140 [2030] |
|  | Int.*                     | 175 [2540] | 175 [2540] | 175 [2540]  | 175 [2540]  | 175 [2540]  | 175 [2540] |
| <b>Max. Starting Pressure with Unloaded Shaft, bar [PSI]</b>                             | Peak**                    | 225 [3260] | 225 [3260] | 225 [3260]  | 225 [3260]  | 225 [3260]  | 225 [3260] |
|  | Cont.                     | 4 [60]     | 4 [60]     | 4 [60]      | 4 [60]      | 4 [60]      | 4 [60]     |
| <b>Min. Starting Torque daNm [lb-in]</b>   | At max. press. drop Cont. | 0,7 [60]   | 1,2 [105]  | 2,1 [185]   | 3,4 [300]   | 3,8 [335]   | 4,1 [365]  |
|  | At max. press. drop Int.* | 1,0 [90]   | 1,7 [150]  | 2,9 [255]   | 4,8 [425]   | 6,2 [550]   | 7,9 [700]  |
| <b>Min. Speed***, [RPM]</b>  |                           | 50         | 40         | 30          | 30          | 25          | 20         |
| <b>Weight, kg [lb]</b><br><b>For "F" flange:<br/>+ 0,200 [.441]</b>                      | MM                        | 1,9 [4.2]  | 2,0 [4.41] | 2,1 [4.63]  | 2,2 [4.85]  | 2,3 [5.07]  | 2,5 [5.51] |
|  | MMF(S)                    | 2,0 [4.41] | 2,1 [4.63] | 2,2 [4.85]  | 2,3 [5.07]  | 2,4 [5.29]  | 2,6 [5.73] |
|  | MMP                       | 2,2 [4.85] | 2,3 [5.07] | 2,4 [5.29]  | 2,5 [5.51]  | 2,6 [5.73]  | 2,8 [6.17] |
|  | MMD                       | 2,6 [5.73] | 2,7 [5.95] | 2,8 [6.17]  | 2,9 [6.39]  | 3,0 [6.61]  | 3,2 [7.05] |

\* 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.

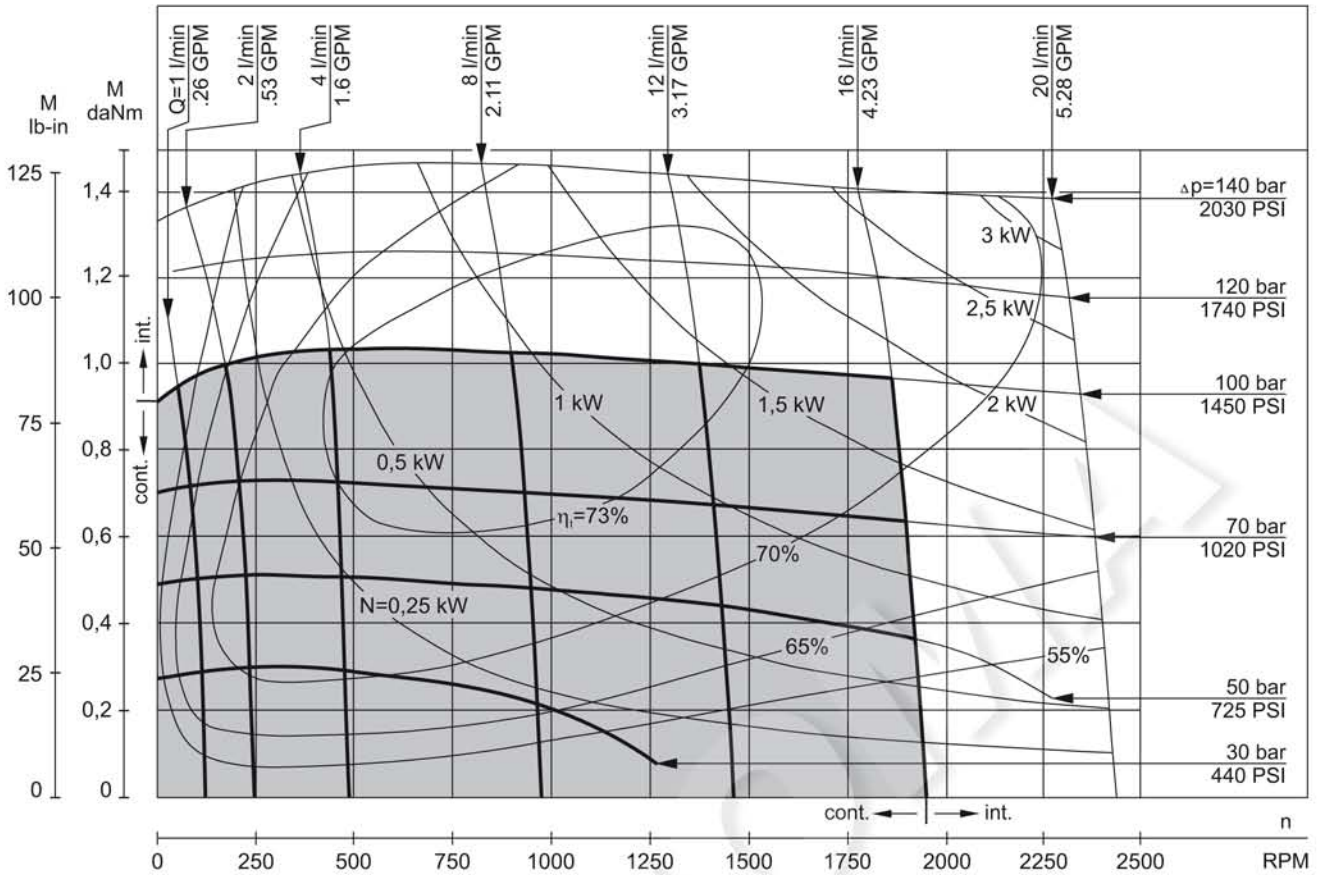
\*\*\* For speeds lower than given, consult factory or your regional manager.

- Intermittent speed and intermittent pressure must not occur simultaneously.
- Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
- 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.
- Recommended minimum oil viscosity 13 mm<sup>2</sup>/s [70 SUS] at 50°C [122°F].
- Recommended maximum system operating temperature is 82°C [180°F].
- To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

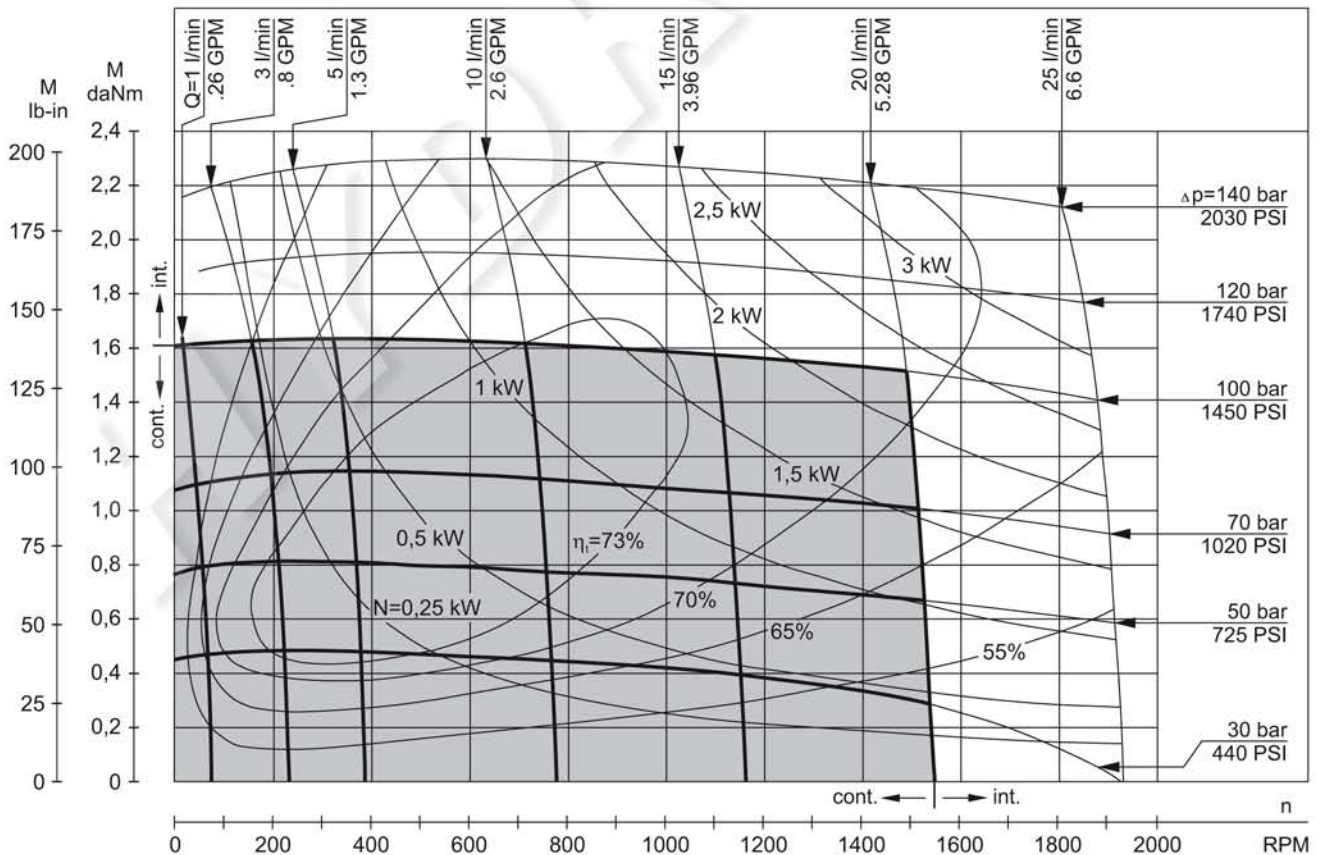


**FUNCTION DIAGRAMS**

**MM 8**



**MM 12,5**

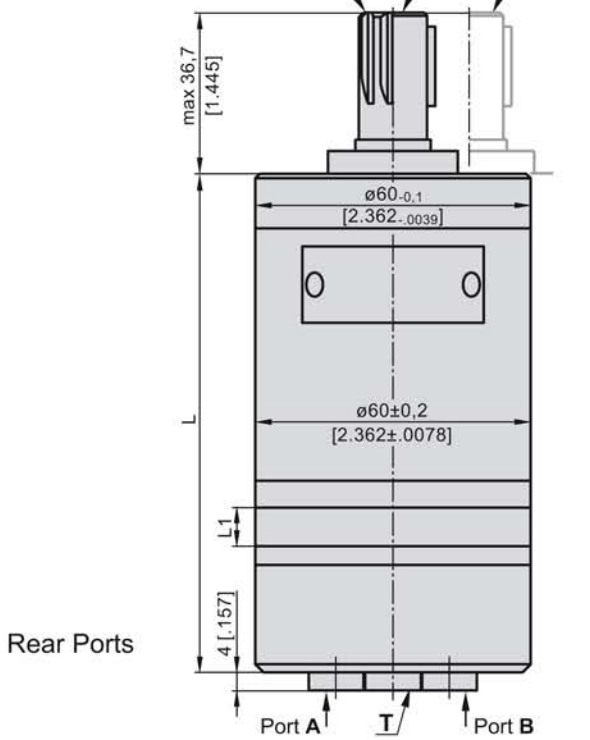


The function diagrams data is for average performance of randomly selected motors at back pressure 5÷10 bar [72.5÷145 PSI] and oil with viscosity of 32 mm<sup>2</sup>/s [150 SUS] at 50°C [122°F].

**DIMENSIONS AND MOUNTING DATA**  
**MM, MMS, MMP, MMD**

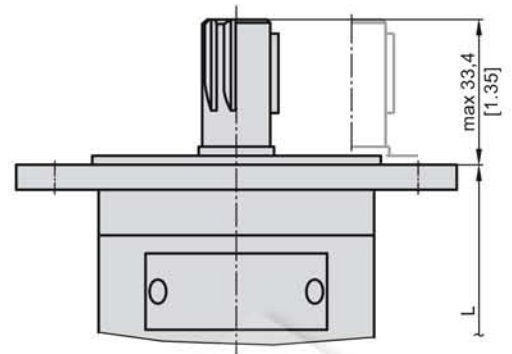
Three Bolts Mount  
SH Shaft C Shaft CK Shaft

**F** Oval Mount (2 Holes)



Shaft Dim.  
See Page 11

Flange Dim.  
See Page 10



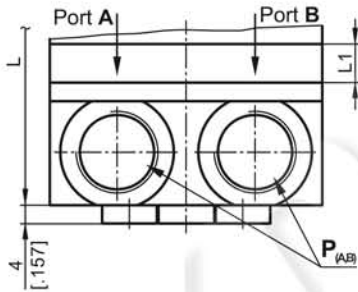
Rear Ports

**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**

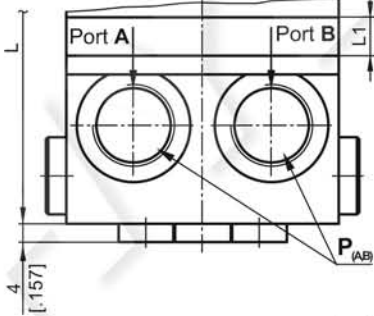
Port Dim.  
See Page 10

**S** Side Ports

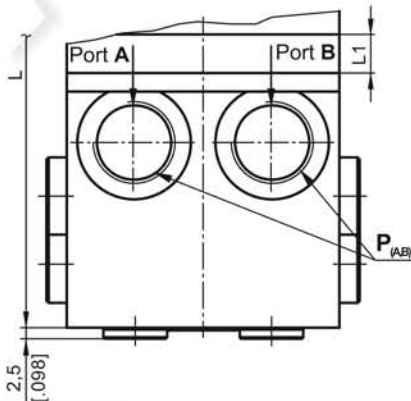


$P_{(A,B)}$ : 2xG3/8 or 2xM18x1,5 - 12 mm [.47 in] depth  
**T**: G1/8 or M10x1 - 10 mm [.39 in] depth

**P** Side Ports



**D** Side Ports



| Type    | L, mm [in]    | Type     | L, mm [in]    | L <sub>1</sub> , mm [in] |
|---------|---------------|----------|---------------|--------------------------|
| MM 8    | 105 [4.134]   | MMS 8    | 106,4 [4.189] | 3,5 [.138]               |
| MM 12,5 | 107 [4.213]   | MMS 12,5 | 108,4 [4.268] | 5,5 [.217]               |
| MM 20   | 110 [4.331]   | MMS 20   | 111,4 [4.386] | 8,5 [.335]               |
| MM 32   | 115 [4.528]   | MMS 32   | 116,4 [4.583] | 13,5 [.531]              |
| MM 40   | 118,5 [4.665] | MMS 40   | 119,9 [4.720] | 17 [.669]                |
| MM 50   | 122,5 [4.823] | MMS 50   | 123,9 [4.878] | 21 [.827]                |

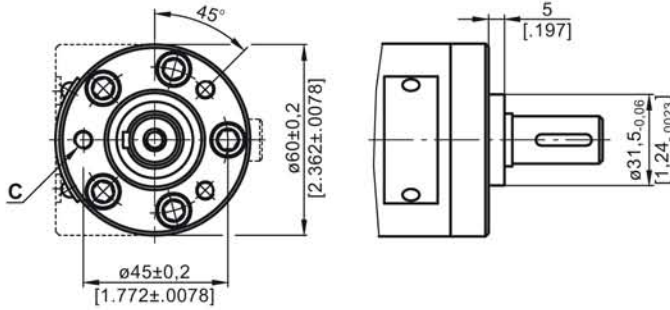
| Type     | L, mm [in]    | Type     | L, mm [in]    | L <sub>1</sub> , mm [in] |
|----------|---------------|----------|---------------|--------------------------|
| MMP 8    | 116 [4.567]   | MMD 8    | 135,1 [5.319] | 3,5 [.138]               |
| MMP 12,5 | 118 [4.646]   | MMD 12,5 | 137,1 [5.398] | 5,5 [.217]               |
| MMP 20   | 121 [4.764]   | MMD 20   | 140,1 [5.516] | 8,5 [.335]               |
| MMP 32   | 126 [4.961]   | MMD 32   | 145,1 [5.713] | 13,5 [.531]              |
| MMP 40   | 129,5 [5.098] | MMD 40   | 148,6 [5.850] | 17 [.669]                |
| MMP 50   | 133,5 [5.256] | MMD 50   | 152,6 [6.008] | 21 [.827]                |

For "F" Flange +3,5 mm

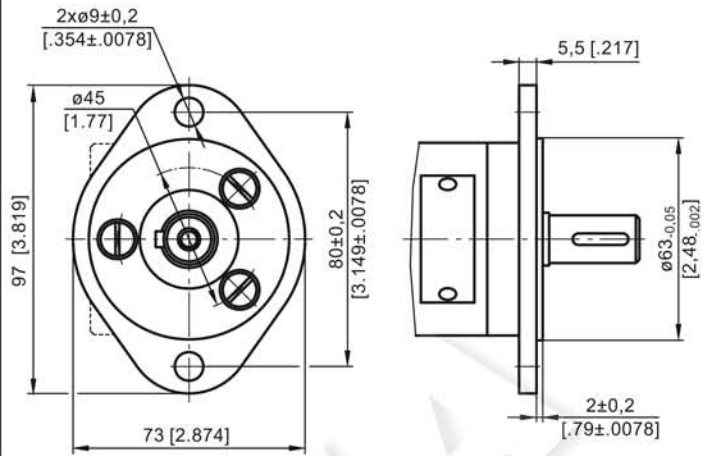


**MOUNTING**

**Three Bolts Mount**

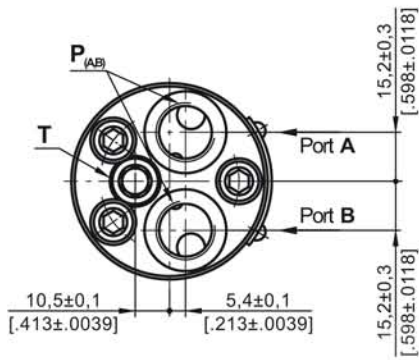


**F Oval Mount (2 Holes)**

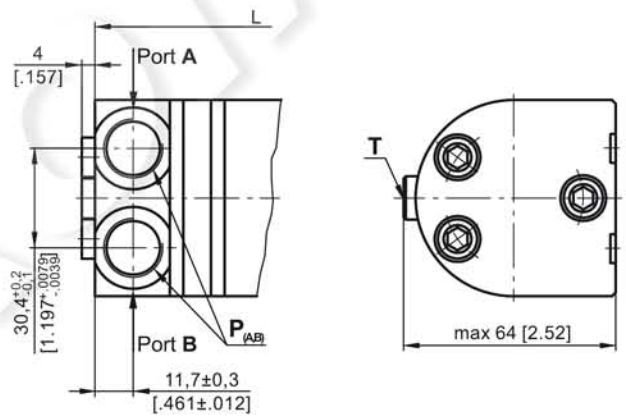


**PORTS**

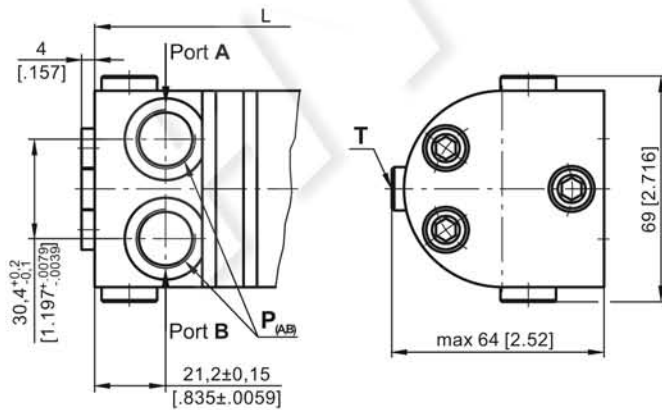
**Rear Ports**



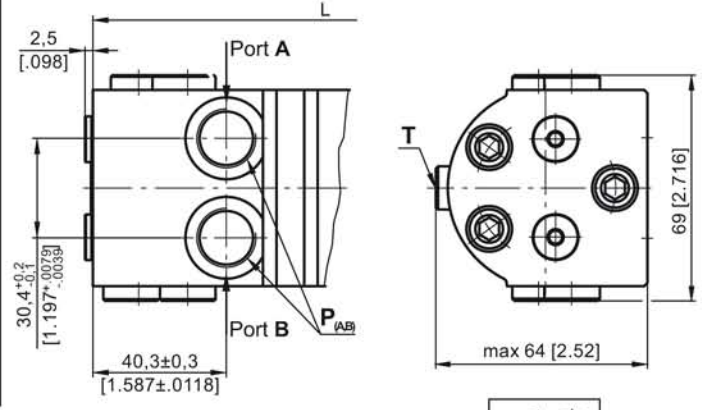
**S Side Ports**



**P Side Ports with Single Crossover Relief Valve**



**D Side Ports with Dual Crossover Relief Valve**



**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**

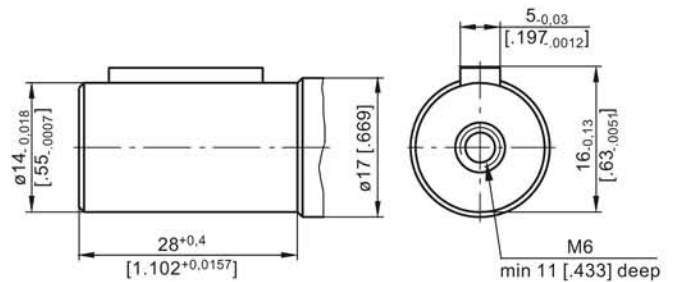
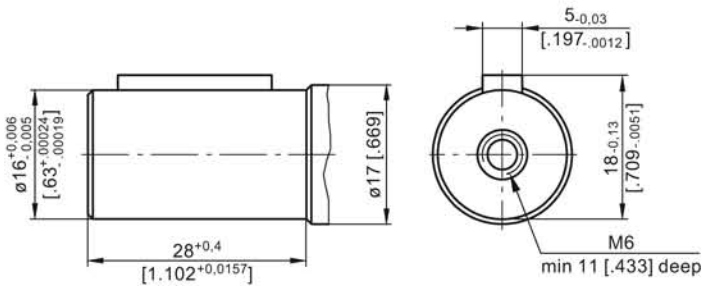
**C** : 3xM6 - 12 mm [.47 in] depth  
**P<sub>(A,B)</sub>** : 2xG3/8 or 2xM18x1,5 - 12 mm [.47 in] depth  
**T** : G1/8 or M10x1 - 10 mm [.39 in] depth



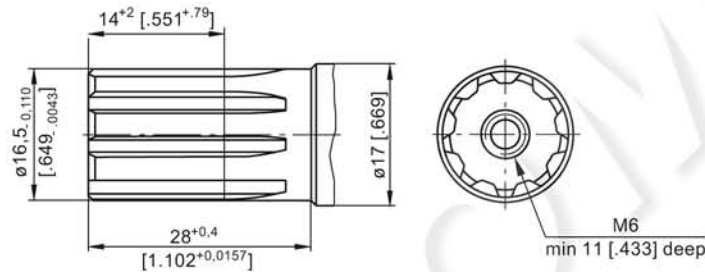
**SHAFT EXTENSIONS**

**C** -  $\phi 16$  straight, Parallel key 5x5x16 DIN 6885  
Max. Torque 3,9 daNm [345 lb-in]

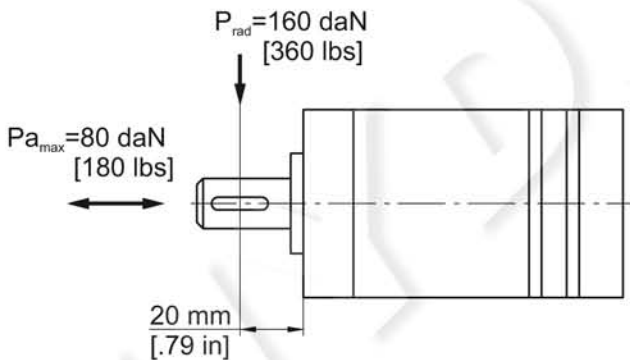
**CK** -  $\phi 14$  straight, Parallel key 5x5x16 DIN 6885  
Max. Torque 3 daNm [265 lb-in]



**SH** -  $\phi 16,5$  Splined, B17x14 DIN 5482  
Max. Torque 4,4 daNm [390 lb-in]



**PERMISSIBLE SHAFT LOAD**



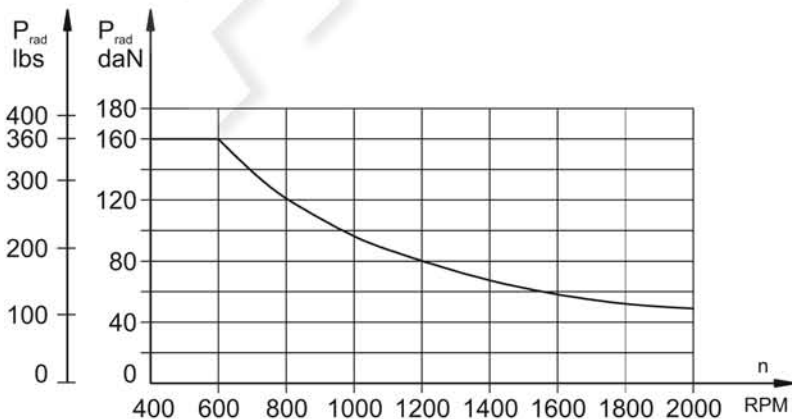
The permissible radial shaft load [Prad] is calculated from the distance [L] between the point of load application and the mounting surface:

$$P_{rad} = \frac{600}{n} \times \frac{13040}{61,5+L}, \text{ [daN]}$$

[L in mm; L ≤ 80 mm]

$$P_{rad} = \frac{600}{n} \times \frac{1155}{2.42 + L}, \text{ [lbs]}$$

[L in inch; L ≤ 3.15 in]



The drawing shows the permissible radial load when L=20 mm [0.79 in].

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

**ORDER CODE**

|            |   |   |   |   |   |   |   |   |   |    |
|------------|---|---|---|---|---|---|---|---|---|----|
|            | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| <b>M M</b> |   |   |   |   |   |   |   |   |   |    |

**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 valve
- 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 cm<sup>3</sup>/rev [ .5 in<sup>3</sup>/rev]
- 12.5** - 12,9 cm<sup>3</sup>/rev [ .79 in<sup>3</sup>/rev]
- 20** - 20,0 cm<sup>3</sup>/rev [1.22 in<sup>3</sup>/rev]
- 32** - 31,8 cm<sup>3</sup>/rev [1.93 in<sup>3</sup>/rev]
- 40** - 40,0 cm<sup>3</sup>/rev [2.44 in<sup>3</sup>/rev]
- 50** - 50,0 cm<sup>3</sup>/rev [3.05 in<sup>3</sup>/rev]

**Pos. 5 - Shaft Extensions\***

- C** - ø16 straight, Parallel key A5x5x16 DIN6885
- VC** - ø16 straight, Parallel key A5x5x16 DIN6885 with corrosion resistant bushing
- CK** - ø14 straight, Parallel key 5x5x16 DIN6885
- SH** - ø16,5 splined, B17x14 DIN 5482

**Pos. 6 - Ports**

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

**Pos. 7 - Line to control\*\***

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

**Pos. 8 - Valve Rated Pressure\*\*\***

- /50** - Δp= 50 bar [ 725 PSI]
- /80** - Δp= 80 bar [1160 PSI]
- /100** - Δp=100 bar [1450 PSI]
- /140** - Δp=140 bar [2030 PSI]

**Pos. 9 - Special Features**

**Pos.10 - Design Series**

- omit - Factory specified

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

\*\* For P option useful only.

\*\*\* For P and D option useful only.

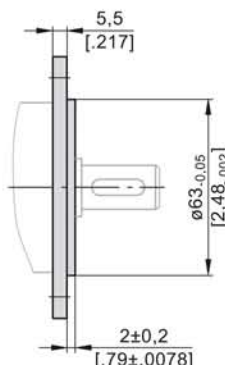
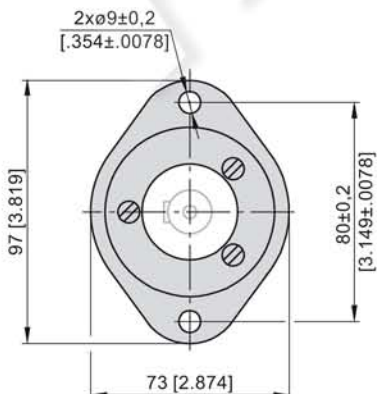
**⚠ MMP and MMD** are available with new crossover relief valves with improved characteristics. The valves are set in a wide pressure range: from 50 bar [725 PSI] to 140 bar [2030 PSI]. For more information about MMP and MMD please contact with "M+S Hydraulic".

The Valve pressure setting must be at flow rate of 2 lpm [.53 GPM].

The hydraulic motors are mangano - phosphatized as standard.

**F - FLANGE (2 Holes)**

Order No for Flange:48443 014 00



**F Flange** is mounted to the motor with 3 screws - M6x14. Tightening Torque: 5-6 Nm [44-53 lb-in].

# MOTOR SPECIAL FEATURES

| Special Feature Description | Order Code | Motor type |       |       |        |       |     |     |        |    |    |       |    |       |       |        |
|-----------------------------|------------|------------|-------|-------|--------|-------|-----|-----|--------|----|----|-------|----|-------|-------|--------|
|                             |            | MM         | MP    | MPW   | MP(W)N | MR    | MRN | MRB | SP, SR | PL | RL | PK(Q) | RK | RW    | MH    | HW     |
| Speed Sensor*               | RS         | O          | O     | -     | -      | O     | -   | -   | -      | -  | -  | -     | -  | -     | O     | O***** |
| Tacho connection            | T          | -          | -     | -     | -      | O     | O   | -   | -      | -  | -  | -     | -  | -     | O     | -      |
| Low Leakage                 | LL         | O          | -     | -     | -      | O     | O   | -   | -      | -  | O  | -     | O  | O     | O     | O      |
| Low Speed Valving           | LSV        | -          | -     | -     | -      | O     | -   | -   | -      | -  | -  | -     | -  | -     | O     | O      |
| Free Running                | FR         | O          | O     | O     | O      | O     | O   | -   | -      | O  | O  | O     | O  | O     | O     | O      |
| Reverse Rotation            | R          | O          | O     | O     | O      | O     | O   | O   | O      | O  | O  | O     | O  | O     | O     | O      |
| Paint**                     | P          | O          | O     | O     | O      | O     | O   | O   | O      | O  | O  | O     | O  | O     | O     | O      |
| Corrosion Protected Paint** | PC         | O          | O     | O     | O      | O     | O   | O   | O      | O  | O  | O     | O  | O     | O     | O      |
| Special Paint***            | PS         | O          | O     | O     | O      | O     | O   | O   | -      | O  | O  | O     | O  | O     | O     | O      |
|                             | PCS        | O          | O     | O     | O      | O     | O   | O   | -      | O  | O  | O     | O  | O     | O     | O      |
| Check Valves                |            | S          | S**** | S**** | S      | S**** | S   | S   | S      | S  | S  | S     | S  | S**** | S**** | S      |

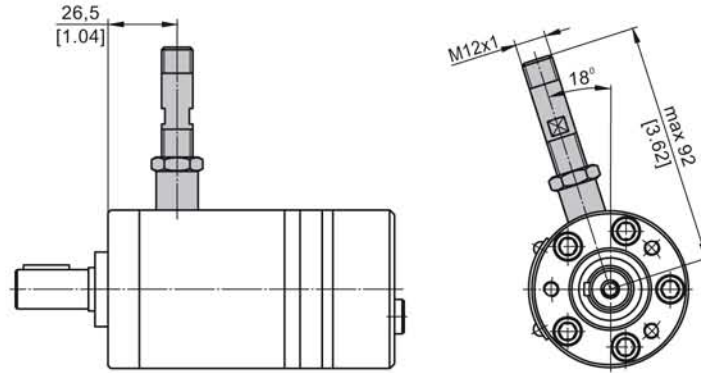
|          |                |
|----------|----------------|
| <b>O</b> | Optional       |
| <b>-</b> | Not applicable |
| <b>S</b> | Standard       |

- \* For sensor ordering see pages 9 + 10
- \*\* Colour at customer's request.
- \*\*\* Non painted feeding surfaces, colour at customer's request.
- \*\*\*\* Without check valves for "U" shaft seal versions.
- \*\*\*\*\* RS option is not available at HW...R (with relief valves).

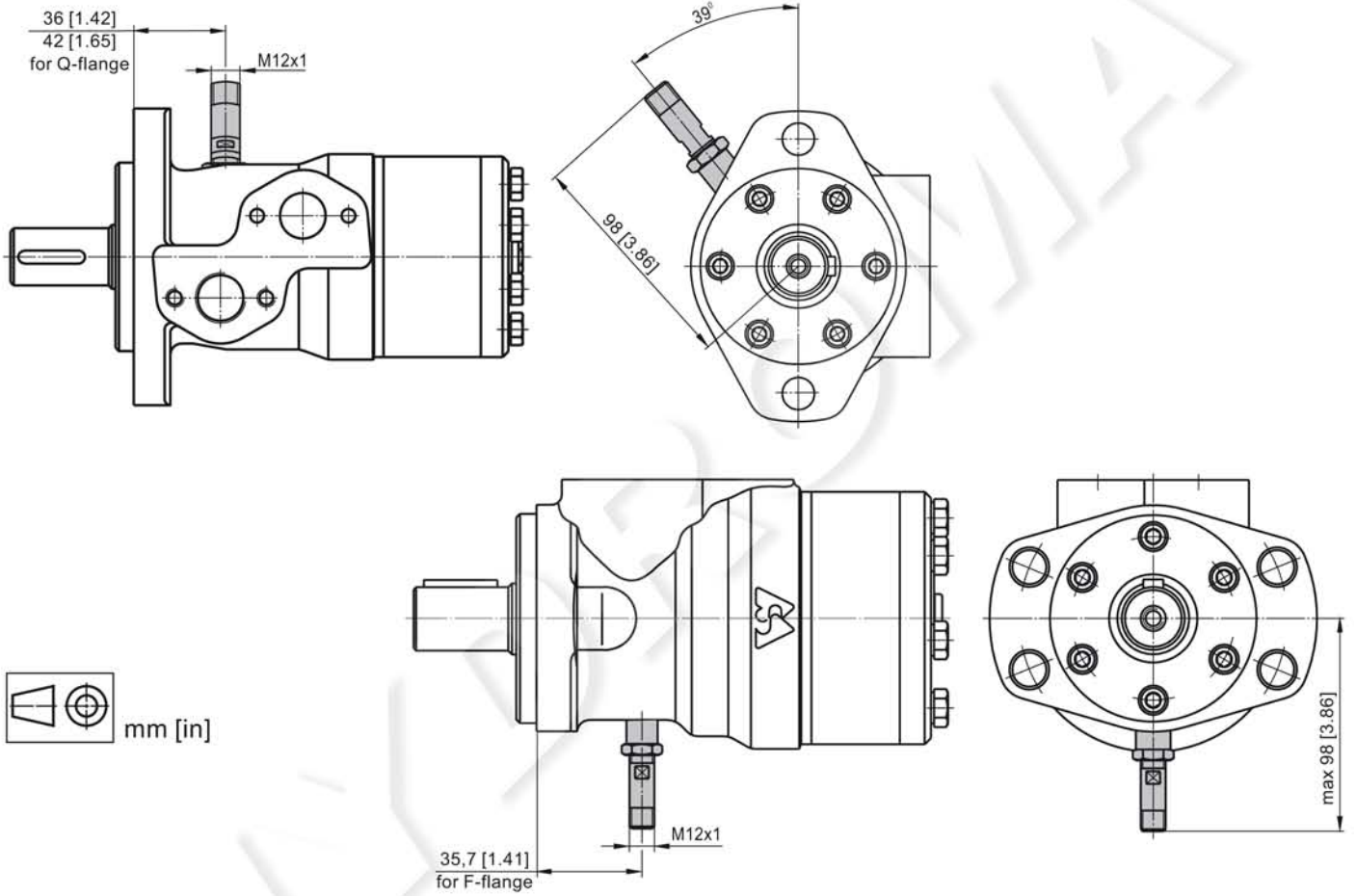


# MOTORS WITH SPEED SENSOR

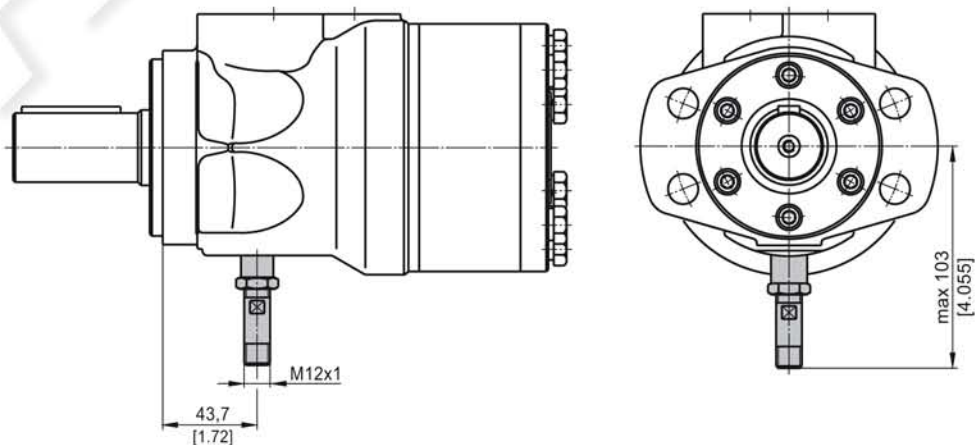
## MM...RS



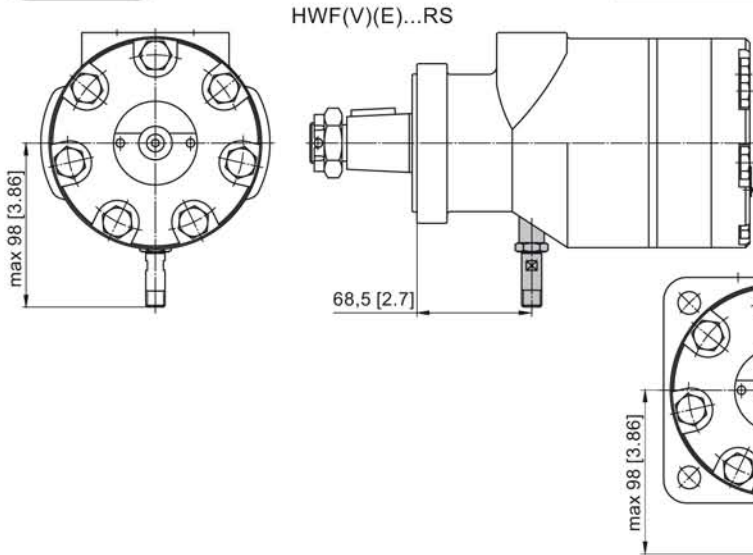
## MP...RS and MR...RS



## MH...RS

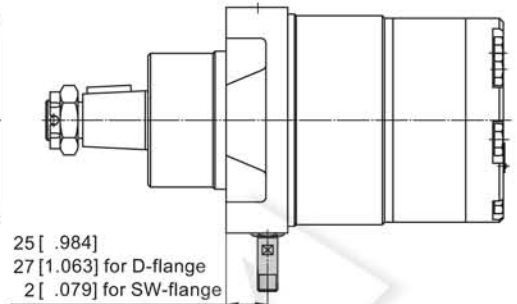


**HW...RS**



RS option is not available at HW...R (with relief valves).

**HW(S)(D)(SW)(V)(E)...RS**

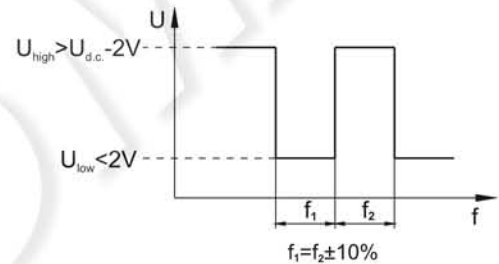


**TECHNICAL DATA OF THE SPEED SENSOR**

**Technical data**

|                               |                             |
|-------------------------------|-----------------------------|
| <b>Frequency range</b>        | 0...15 000 Hz               |
| <b>Output</b>                 | Universal PUSH PULL         |
| <b>Power supply</b>           | 10-30 VDC                   |
| <b>Current input</b>          | <20 mA (@24 VDC)            |
| <b>Maximum output current</b> | 500 mA                      |
| <b>Ambient Temperature</b>    | -40...+125°C [-40...+257°F] |
| <b>Protection</b>             | IP 67                       |
| <b>Plug connector</b>         | M12-Series                  |
| <b>Mounting principle</b>     | ISO 6149                    |

**Output signal**

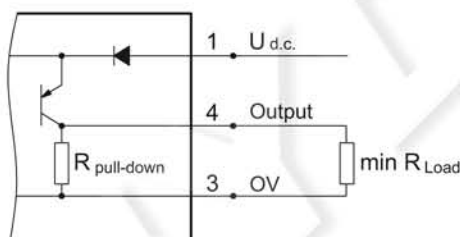


Load max.:  $i_{high} = i_{low} < 50\text{mA}$

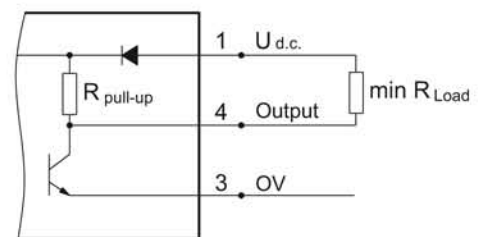
| Motor type            | MM | MP | MR | MH | HW |
|-----------------------|----|----|----|----|----|
| Pulses per revolution | 30 | 36 | 36 | 42 | 12 |

**Wiring diagrams**

**PNP**



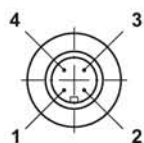
**NPN**



$$R_{Load} [k\Omega] = U_{d.c.} [V] / i_{max} [mA]$$

**Stick type**

**Order Code for Speed Sensor**



| Terminal No. | Connection    | Cable Output |
|--------------|---------------|--------------|
| 1            | $U_{d.c.}$    | Brown        |
| 2            | No connection | White        |
| 3            | 0V            | Blue         |
| 4            | Output signal | Black        |

| Sensor Code   | Electric connection                      |
|---------------|--|
| <b>RS</b>     | Connector BINDER 713 series              |
| <b>RSL2,5</b> | Cable output 3x0,25; 2,5 m [98 in] long  |
| <b>RSL3,5</b> | Cable output 3x0,25; 3,5 m [138 in] long |
| <b>RSL5</b>   | Cable output 3x0,25; 5 m [196 in] long   |
| <b>RSL10</b>  | Cable output 3x0,25; 10 m [394 in] long  |

**NOTE:** \* - The speed sensor is not fitted at the factory, but is supplied in a plastic bag with the motor. For installation see enclosed instructions.