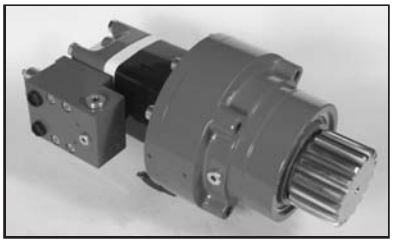
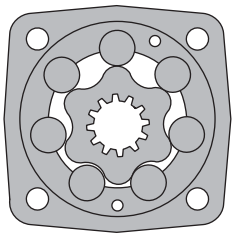
HYDRAULIC MOTOR-BRAKES SW500B350V



APPLICATION

» Wheel drives
» Conveyors
» Rotators
» Positioners
» Winches
» Swing drives
» Door openers



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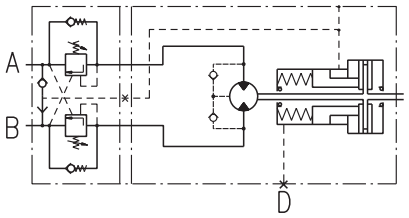


SPECIFICATION DATA

Type		SW500B350V
Displacement, in³/rev [cm³/rev]		29 [475,3]
Max. Speed,	Cont.	16
RPM	Int.*	25
Max. Torque,	Cont.	7260 [82]
lb-in [daNm]	Int.*	8420 [95]
Max. Output,	Cont.	1.3 [0,9]
HP [kW]	Int.*	3.3 [2,4]
Max. Pressure Drop,	Cont.	1800 [125]
PSI [bar]	Int.*	2100 [145]
Max. Oil Flow,	Cont.	2 [8]
GPM [lpm]	Int.*	3 [12]
Max. Return Pressure without Drain Line or Max. Pressure in Drain Line, PSI [bar]		1450 [100]
Min. Starting Torque,	At max. press. drop Cont.	6400 [72]
lb-in [daNm]	At max. press. drop Int.*	6650 [75]
Min. Speed, RPM**		5
Static Torque for the Brake*, lb-in [daNm]**		14 515 [164]
Release Pressure ±10%,	initial	363...406 [25...28]
PSI [bar]	full	449.6 [31]
Max. Steering Pressure, PSI [bar]		3553 [245]
Max. Pressure in Drain Space for the Brake, PSI [bar]		7 [0,5]
Pilot Ratio for the Valve		4,25:1

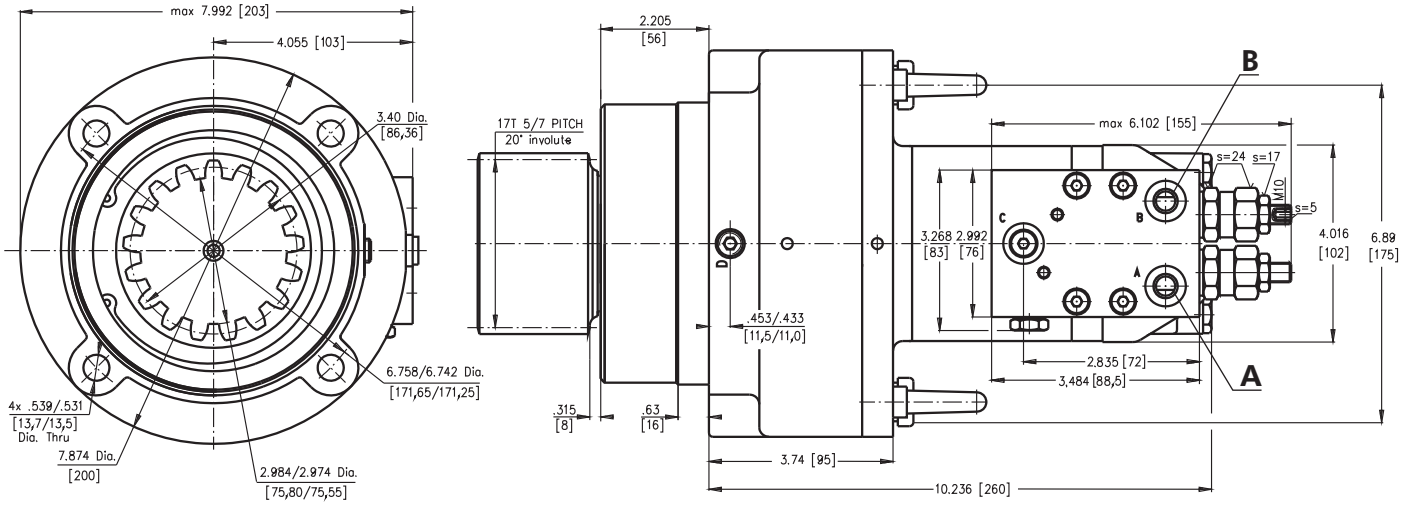
* Intermittent operation: the permissible values may occur for max. 10% of every minute.

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

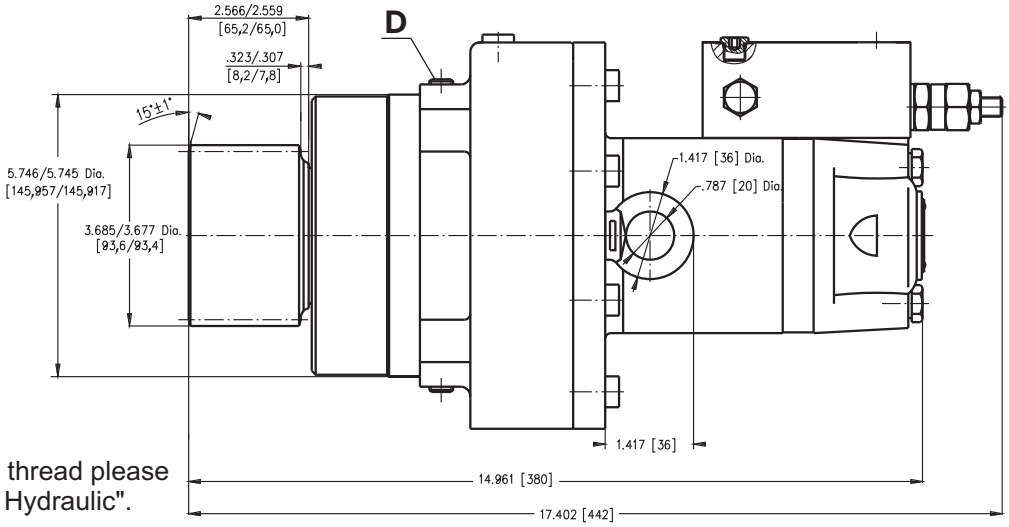
*** Static torque is obtained at working pressure - 0 PSI [0 bar].

Space is filled with 7.63±1.22 in³ [125±20 cm³] mineral oil HLP (DIN 51524) or HM (ISO 6743/4).

DIMENSIONS AND MOUNTING



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

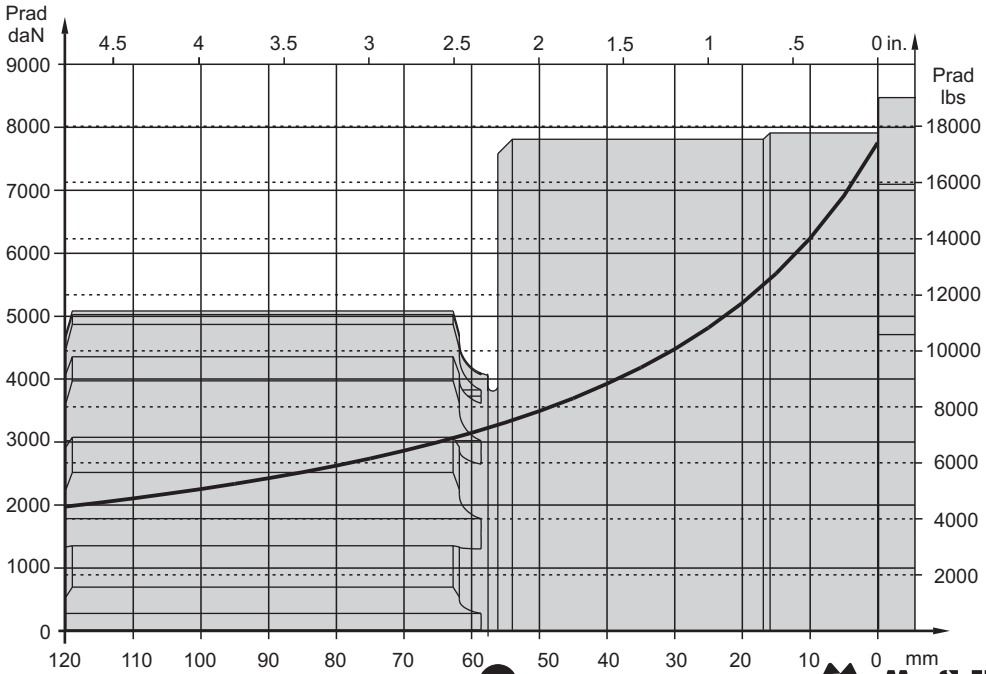


in [mm]

Note: For different port's thread please contact with "M+S Hydraulic".

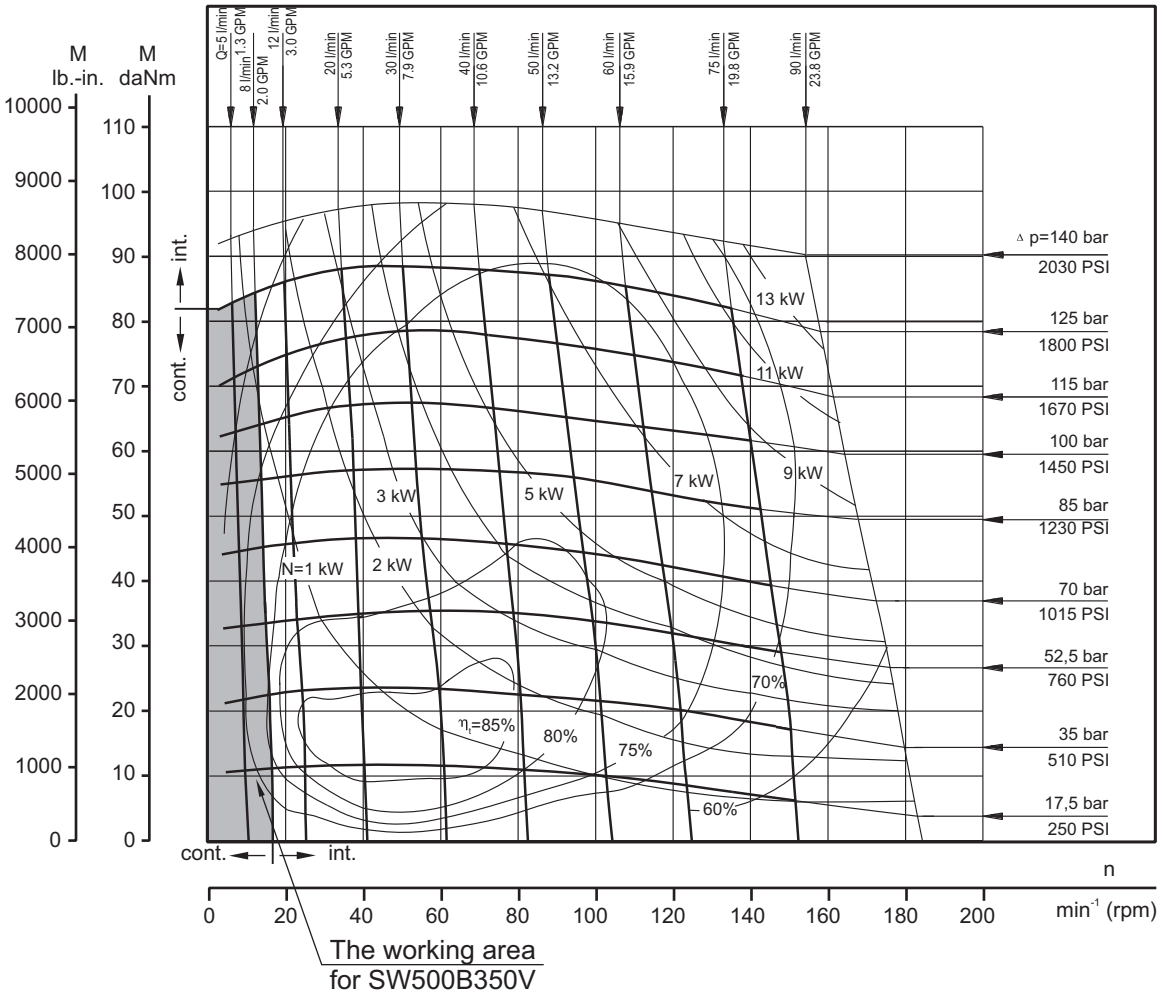
PERMISSIBLE SHAFT LOADS

The curve applies to a B10 bearing life of 3000 hours at 40 RPM.



FUNCTION DIAGRAMS

SW 500



ORDER CODE

1		2	3	4	5	6	7	8
S	**W**	**500**	**B**	**350**		**V**		

Pos.1 - Type

S - Motor MLHS

Pos.2 - Displacement code

Pos.3 - Brake

Pos.4 - Brake Type

Pos.5 - Shaft Extension

omit - 17T PITCH splined

Pos.6 - Valve

Pos.7 - Additional Options (see page 55)

Pos.8 - Design Series

omit - Factory specified

The motor-brakes are mangano-phosphatized as standard.

MOTOR-BRAKE ADDITIONAL OPTIONS

Additional Options Description	Order Code	Motor type			
		B/HR	RWB	SW	TW
Low Leakage	LL	O	O	-	-
Low Speed Valving	LSV	O	O	-	-
Free Running	FR	-	-		-
Reverse Rotation	R	O	O	-	-
Paint*	P	O	O	O	O
Corrosion Protected Paint*	PC	O	O	O	O
Special Paint**	PS	O	O	O	O
	PCS				
Check Valves		-	O	S	S

O	Optional
-	Not applicable
S	Standard

* Colour at customer's request.
** Non painted feeding surfaces, colour at customer's request.

APPLICATION CALCULATION

VEHICLE DRIVE CALCULATIONS

1.Motor speed: n, RPM

$$n = \frac{168 \times v_{mi} \times i}{R_{in}} \qquad n = \frac{2{,}65 \times v_{km} \times i}{R_m}$$

v_{km}- vehicle speed, km/h;
v_{mi}- vehicle speed, mile/h;
R_m- wheel rolling radius, m;
R_{in}- wheel rolling radius, in;
i- gear ratio between motor and wheels.
If no gearbox, use i=1.

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

$$RR = G \times \rho$$

G- total weight loaded on vehicle, lbs [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, lbs [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%	0º 35'	12%	6º 5'
2%	1º 9'	15%	8º 31'
5%	2º 51'	20%	11º 19'
6%	3º 26'	25%	14º 3'
8%	4º 35'	32%	18º
10%	5º 43'	60%	31º

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

$$FA = \frac{v_{mi} \times G}{22 \times t}, \text{[lbs]}; \qquad FA = \frac{v_{km} \times G}{36 \times t}, \text{[daN]}$$

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

5.Tractive effort: DP, lbs [daN]
Tractive effort DP is the additional force of trailer. This value will be established as follows:
-acc.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, lbs [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 moment: M, lb-in [daNm]
Necessary torque moment for every hydraulic motor:

$$M = \frac{TE \times R_{in}[R_m]}{N \times i \times \eta_M}$$

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

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

$$M_W = \frac{G_W \times f \times R_{in}[R_m]}{i \times \eta_M}$$

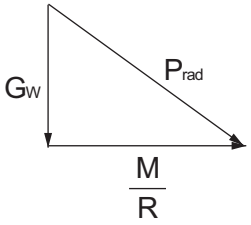
To avoid wheel slipping, the following condition should be observed $M_W > M$
f - frictional factor;
G_W- total weight over the wheels, lbs [daN].

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} , lbs [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.



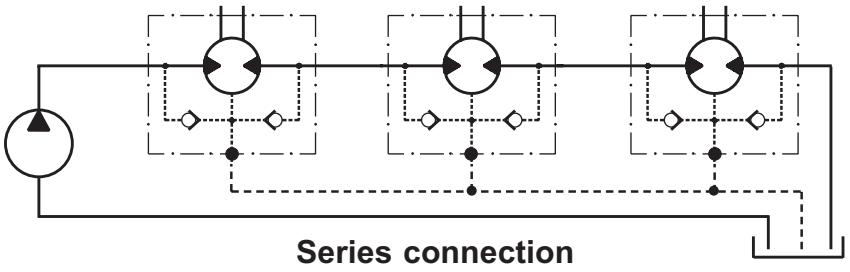
$$P_{rad}=\sqrt{G_w^2+\left(\frac{M}{R}\right)^2}$$

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

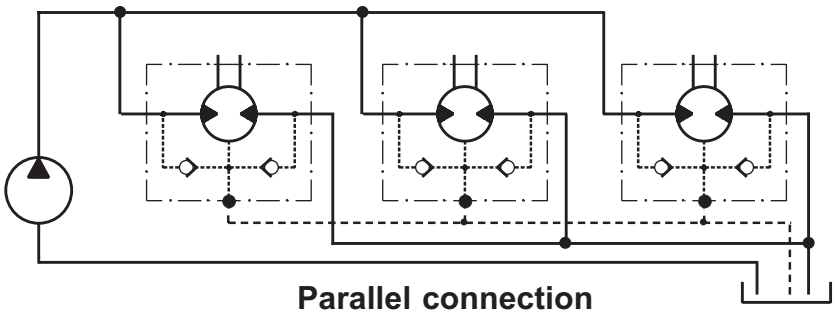
In accordance with calculated loadings the suitable motor from the catalogue is selected.

DRAINAGE SPACE AND DRAINAGE PRESSURE

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



Series connection



Parallel connection