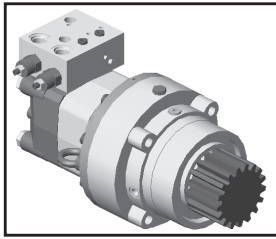
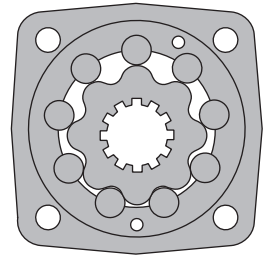


HYDRAULIC MOTOR-BRAKES TW500B350...V



APPLICATION

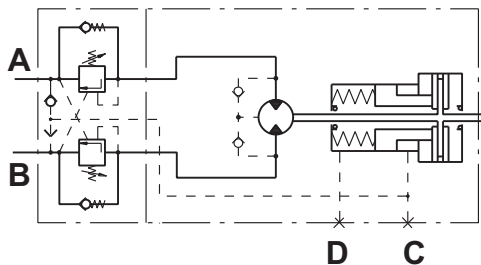
- » Wheel drives
- » Conveyors
- » Rotators
- » Positioners
- » Winches
- » Swing drives
- » Door openers



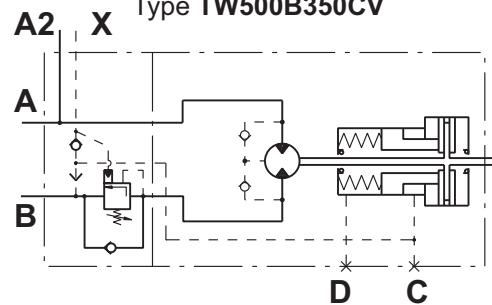
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Order code	55

Motor-Brake
Type TW500B350V



Motor-Brake
Type TW500B350CV



SPECIFICATION DATA

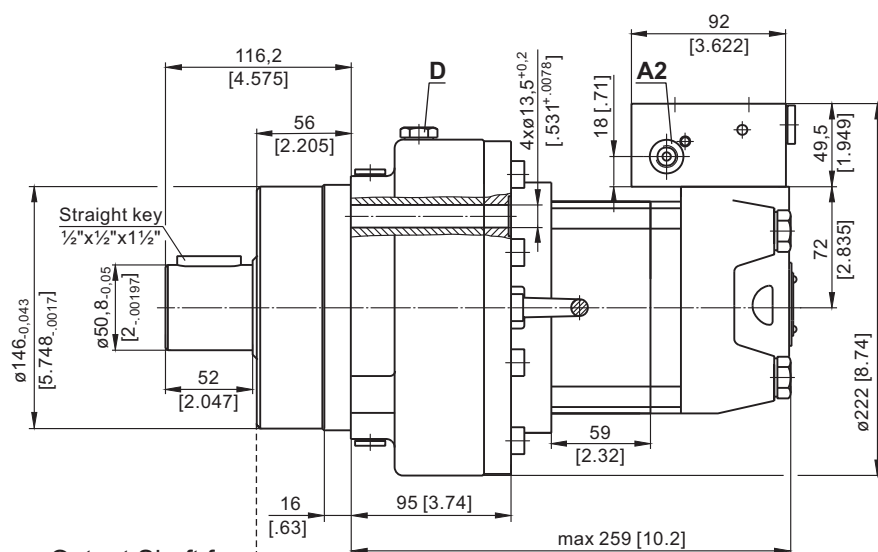
Type		TW500B350...V
Displacement, cm ³ /rev [in ³ /rev]		475 [29]
Max. Speed, RPM	Cont.	40
	Int.*	60
Max. Torque, daNm [lb-in]	Cont.	114 [10 000]
	Int.*	135 [12 000]
Max. Output, kW [HP]	Cont.	4,1 [5.4]
	Int.*	7,0 [9.39]
Max. Pressure Drop, bar [PSI]	Cont.	170 [2500]
	Int.*	200 [2900]
Max. Oil Flow, lpm [GPM]	Cont.	20 [5.3]
	Int.*	35 [9.2]
Max. Return Pressure without Drain Line or Max. Pressure in Drain Line, bar [PSI]		75 [1088]
Min. Starting Torque, daNm [lb-in]	At max. press. drop Cont.	95 [8400]
	At max. press. drop Int.*	112 [9940]
Min. Speed**, RPM		5
Static Torque for the Brake***, daNm [lb-in]		164 [14515]
Release Pressure ±10%, bar [PSI]	initial	22,5...27,5 [326...400]
	full	28...34 [406...493]
Max. Steering Pressure, bar [PSI]		245 [3553]
Max. Pressure in Drain Space for the Brake, bar [PSI]		0,5 [7]
Pilot Ratio for the Valve		4,25:1

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

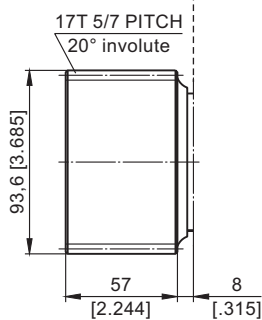
** For speeds of 5 RPM lower than given, consult factory or your regional manager.

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

DIMENSIONS and MOUNTING



Output Shaft for TW500B350V

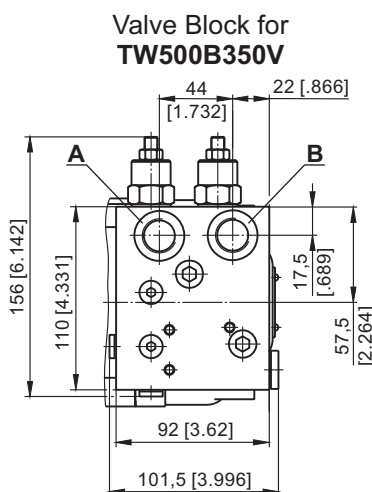


A,B : 2x7/8-14 UNF, 17,5 [.65] deep

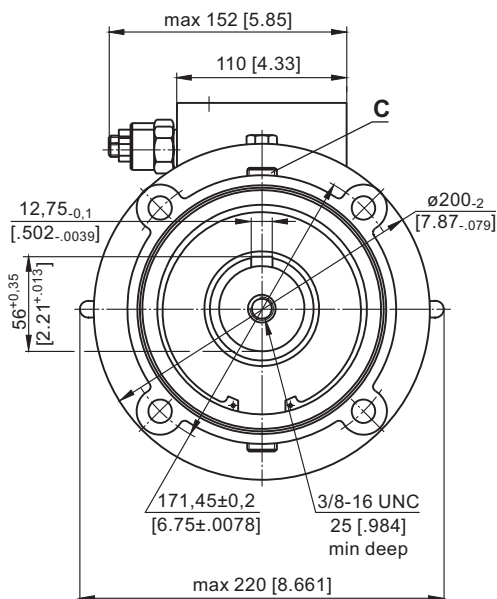
D : 7/16-20 UNF

C : G1/4

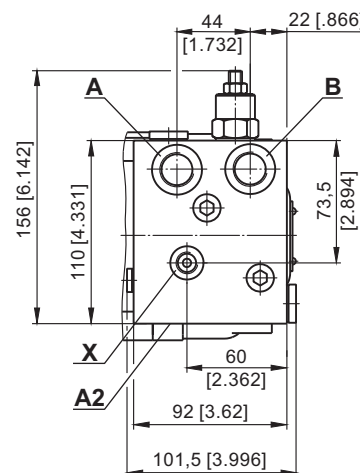
A2, X: 7/16-18 UNF, 12 [.475] deep



Valve Block for TW500B350V



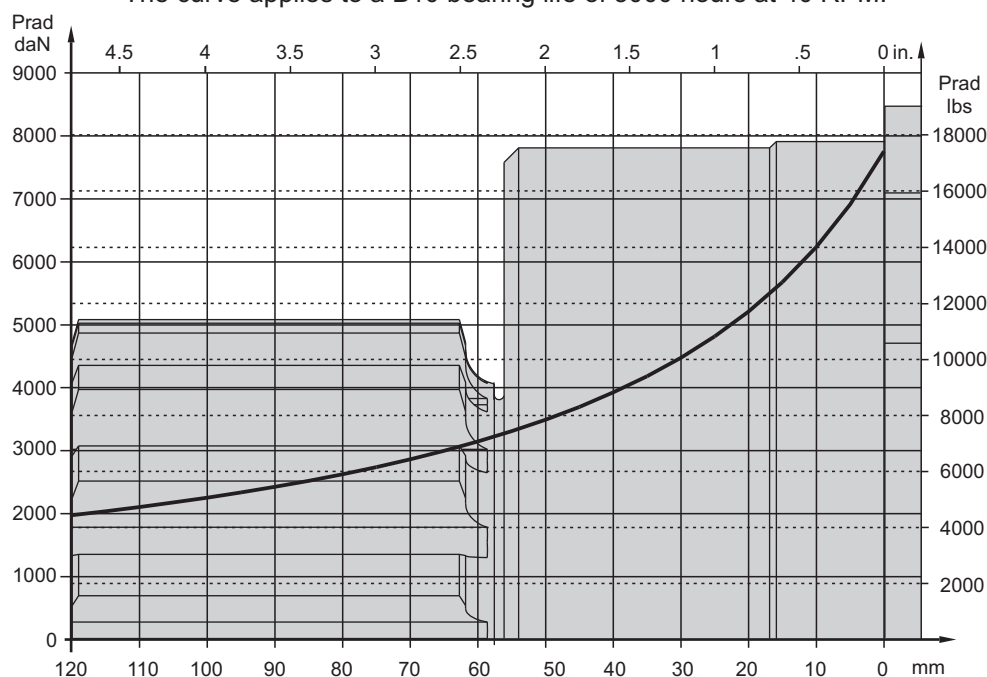
Valve Block for
TW500B350CV



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

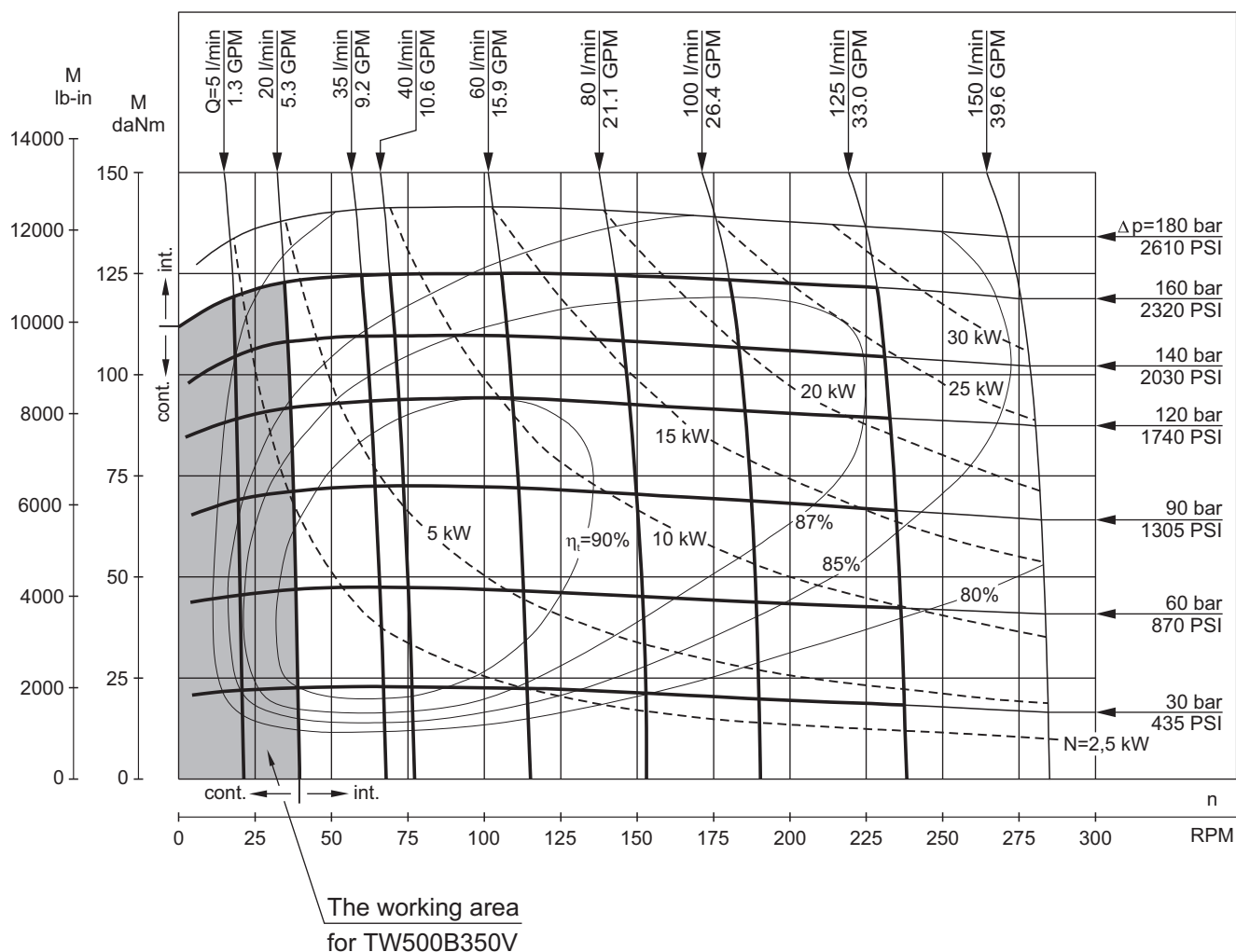
PERMISSIBLE SHAFT LOADS

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



FUNCTION DIAGRAMS

TW 500



ORDER CODE

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

Pos.1 - **Type**

T - Motor MLHT

Pos.2 - **Displacement code**

Pos.3 - **Brake**

Pos.4 - **Brake Type**

Pos.5 - **Shaft Extension**

omit - 17T 5/7 PITCH 20° involute

C - Straight key 1/2"x1/2"x1 1/2"

Pos.6 - **Valve**

Pos.7 - **Additional Options** (see page 77)

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/MR	BD/MR	MT/B	MT/BX	MTM/B	SW	TW
Low Leakage	LL	O	O	-	O	O	-	-
Low Speed Valving	LSV	O	O	-	O	O	-	-
Free Running	FR	-	O	-	-	O		-
Reinforced unit	HD	-	-	O	-	O	-	-
Reverse Rotation	R	O	O	O	O	O	-	-
Paint*	P	O	O	O	O	O	O	O
Corrosion Protected Paint*	PC	O	O	O	O	O	O	O
Special Paint**	PS	O	O	O	O	O	O	O
	PCS							
Check Valves		S	-	S***	S	-	S	S

O	Optional
-	Not applicable
S	Standard

* Colour at customer's request.

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

*** Without check valves for "HD" option.

⚠ For more information about HD option please contact with "M+S Hydraulic".

APPLICATION CALCULATION

VEHICLE DRIVE CALCULATIONS

1. Motor speed: n [RPM]

$$n = \frac{2.65 \times V_{km} \times i}{R_m} \quad n = \frac{168 \times V_{mi} \times i}{R_{in}}$$

V_{km} - vehicle speed, km/h;

V_{mi} - vehicle speed, mil/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 , daN [lbs]

The resistance force resulted in wheels contact with different surfaces:

$$RR = G \times \rho$$

G - total weight loaded on vehicle, daN [lbs];

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 [lbs]

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

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. Acceleration force: FA , daN [lbs]

Force FA necessary for acceleration from 0 to maximum speed v and time t can be calculated with a formula:

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

FA - acceleration force, daN [lbs];

t - time, [s]

5. Tractive effort: DP , daN [lbs]

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 , daN [lbs]

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 , daNm [lb-in]

Necessary torque moment for every hydraulic motor:

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

N - motor numbers;

η_m - mechanical gear efficiency (if it is available).

8. Cohesion between tire and road covering:

M_w , daNm [lb-in]

Necessary torque moment for every hydraulic motor:

$$M_w = \frac{G_w \times f \times R_m [R_{in}]}{i \times \eta_m}$$

To avoid wheel slipping, the following condition should be observed $M_w > M$

f - frictional factor;

G_w - total weight over the wheels, daN [lbs].

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

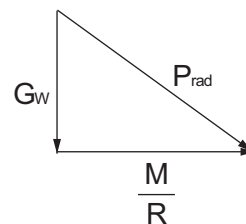
9. Radial motor loading: P_{rad} , daN [lbs]

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.

