

DC5A1Z1_0000000R0 02 2024

Product Catalog

Brevini Hydraulic Motors B5VR Series

Displacement up to 45 cc/rev, pressure up to 400 bar



Two speed axial piston motor

Engineered to deliver the highest performance in the most compact and clean housing design, B5VR series is specifically designed for high performance Mobile Elevated Work Platforms.





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Туре	Displacement cm ³ /rev [in ³ /rev]	Max peak flow I/min [U.S.gpm]	Max pressure bar [psi]	Max peak pressure bar [psi]
B5VR 038	38.2 [2.33]	134 [35.4]	350 [5075]	415 [6020]
B5VR 045	45 [2.75]	158 [41.7]	300 [4350]	350 [5075]

B5VR series is a family of two-speed swash plate design variable displacement motors for operation in both open and closed circuit. Especially designed for high performance Mobile Elevated Work Platforms it comes in one size with 2 different max displacements. It is equipped with 9 pistons to deliver outstanding efficiency and exceptionally smooth operation.

- Open and closed circuit;
- Five displacements to perfectly fit every application;
- 9 pistons for outstanding efficiency and smooth operation;
- Cartridge two bolts mounting;
- Pressure up to 400 bar [5800 psi] maximum and 420 bar [6090 psi] maximum peak;
- Null min displacement option available;
- Compact and clean design for ease of installation.



Simbology:

С	N/bar [lbf/psi]	Load
F _{ax max}	N [lbf]	Axial load
F _q	N [lbf]	Radial load
F _{q max}	N [lbf]	Maximum permissible radial load
J	kg∙m² [lbf∙ft²]	Moment of inertia
m	kg [lbs]	Weight
n _{max}	rpm	Maximum speed at $V_{g max}$
n _{0 max}	rpm	Maximum speed at $V_{g \min}$

p _{max}	bar [psi]	Maximum pressure		
\mathbf{p}_{peak}	bar [psi]	Maximum peak pressure		
P _{max}	kW [hp]	Maximum power at p _{max}		
Q _{max}	l/min [US gpm]	Maximum flow		
Q _d	l/min [US gpm]	External drain flow		
T _k	Nm/bar [lbf.ft/psi]	Torque constant		
T _{max}	Nm [lbf.ft]	Maximum torque at max. pressure		
V _g	cm³/rev [in³/rev]	Displacement		

Conversions:	To convert		Multiply by	To convert		
	From	То		From	То	
Length	mm	in	0.039	in	mm	25.4
Capacity	I	gal	0.219	gal	I	4.546
Mass	kg	lb	2.204	lb	kg	0.4536
Force	Ν	lbf	0.225	lbf	N	4.45
Torque	N∙m	lbf∙ft	0.737	lbf∙ft	N∙m	1.357
Pressure	bar	psi	14.5	psi	bar	0.06895
Flow	l/min	U.S. gpm	0.264	U.S. gpm	l/min	3.79
Power	kW	hp	1.34	hp	kW	0.746
Rotation speed	rev/min	r.p.m.	1	r.p.m.	rev/min	1
Displacement	cm ³ /rev	in ³ /rev	0.061	in ³ /rev	cm³/rev	16.387
Temperature	°C	°F	1.8x°C+32	°F	°C	(°F-32)/1.8

Nominal values calculation:

Input flow:	$Q = \frac{V_g x n}{1000} x \frac{1}{\eta_v}$
Output torque:	$M = \frac{\Delta p \times V_g \times \eta_{hm}}{62.8}$
Output power:	$W = \frac{M \times n}{9550} \times \frac{Q \times n}{6}$
Output speed:	$n = \frac{Q \times 1000 \times \eta_v}{1000 \times \eta_v}$

Vg

 $Q \times \Delta p \times \underline{\eta}_t$

600

V_g = geometrical displacement (cm³/rev) $\Delta p = drop of pressure (bar)$ n = speed (rpm) Q = flow (l/min) M = torque (Nm)W = power (kW) η_v = volumetric efficiency η_{hm} = mech-hyd. efficiency η_{t} = overall efficiency ($\eta_{t} = \eta_{v} \cdot \eta_{hm}$)



Fluid working conditions:

	Min	-40 °C	-40 °F	
Temperature range	Cont	-25 °C ÷ 85 °C	13 ºF ÷ 185 ºF	
	Max	105 °C	221 °F	
	Min	10 cSt		
Fiscosity Cont 15 – 40 c		40 cSt		
	Max	800 cSt		
Fluid contamination		20/18/15 (ISO 4406:1999)		

The table above is related to the use of mineral oil based hydraulic fluid. For different types of oil, please contact Dana. Temperature and viscosity must be within limits at the same time.

Viscosity:

- Minimum viscosity should only occur for a limited amount of time.
- Maximum viscosity should only occur at cold start, limit working speed until the system warms up.

Temperature:

- Minimum temperature should be kept for a shor period of time, limit the working conditions of the motor while the system warm up.
- Maximum temperature could damage seals, limit this condition to not cause leaks. The maximum temperature is usually recorded close to the front bearing (shaft side) and can be measured from the case drain port.

Case drain pressure:

B5VR motors can be used both in closed and open circuit applications. When used in open loop circuits, the drain port of the motor must be directly connected to the reservoir to prevent pressure spikes.

The maximum limit for case pressure is 2 bar [29 PSI].

Maintain case pressure within the limits shown in the table. The housing must always be filled with hydraulic fluid.



Case pressure limit

Maximum (continuos)	0.5 bar [7 PSI] above outlet pressure 2 bar [29 PSI] maximum pressure
Intermittent (cold start)	2 bar [29 PSI] above outlet pressure 6 bar [87PSI] maximum pressure

In case of working conditions outside those stated above, please consult Dana.



External shaft Loads:

The table is a guide to determine max. permissible loads. Values are calculated to assure at least 80% of the bearing operating life when no external load is applied. The reported values are related to loads applied in the middle of the shaft and in the less favourable direction.

Fq is the maximum value of the radial load allowed on the shaft (in the position shown in figure) for which there is a reduction in the life of the bearings by 25%. The axial load Fax is the maximum allowed without a reduction in the life of the bearings. The maximum axial load depends on the radial load and the operating pressures, and may or may not impact bearing life. For radial or axial loads that are not dependent on the operating conditions, please contact Dana.



Relation between direction of rotation and direction of flow:

The relation between the direction of rotation and the direction of flow in B5VR units is shown in the picture aside.

Minimum rotating speed:

There is no limit to minimum speed; if uniformity of rotation is required, speed must be at least 50 rpm. In case of special applications, please contact Dana.

Reversible motor



Rear ports

Side ports



Release brake reducer:

B5VR motors are equipped with a brake release port to allow the release of the brake on the gearbox directly from the motor housing.

Port size	7/16 UNF
Max allowed pressure (*)	69 bar [1000 psi]

(*) verify with the gearbox manufacturer the maximum pressure needed to release the brake.

Not all gearboxes are suitable for this option, please verify with the gearbox manufacturer that the position of the brake release port on the front flange of the motor matches the brake release port on the gearbox.

Closed loop flushing:

Oil temperature and oil cleaniliness influence the operating life of the bearings to a significant degree.

To keep those parameters under control we highly recommend to install a flushing valve on the motor to remove hot and contaminated oil from the low pressure side of the circuit. A charge pump will replace the removed flow with clean and cold oil.

The flushing valve should be chosen according to circuit specific requirements.



These general installation and commissioning specifications are intended for Dana axial piston units. Adherence to these recommendations has a decisive effect on the service life of the units. The following specifications refer to standard units with standard internal elements, used with common hydraulic fluids. Carefully read these notes before installing and commissioning the application.

Filling the casing:

The casing of axial piston pumps and motors must be pre filled with hydraulic oil before the system is started for the first time. **Caution:** starting any axial piston pump or motor with little or no oil in the casing causes immediate damage of the piston unit.



Installation position and Connections:

B5VR motors can be installed in any position in the tank. The motor housing must always remain full of hydraulic fluid to prevent any damage. Drain hoses should be as short and straight as possible. In open loop circuits, connect a dedicated drain line to ensure unrestricted flow to the tank. Connect the case drain line to the highest drain port to keep the housing full during operation and below the minimum oil level, far from tank outlet.

Drive shaft:

Take special care to ensure that the units are correctly flanged and coupled. Ensure that the shaft and flange are lined up ac-curately to prevent additional loads on the shaft bearings.

Caution: incorrectly aligned parts significantly reduce the service life of the bear-ings.

Product identification, data plate:

Each Dana B5VR products are supplied with an identification data plate. The full identification of the product is made only through the serial number. Every request of information must quote this number.





		Size		
			38	45
Max. displacement	V _g	cm³/rev [in³/rev]	38.2 [2.33]	45 [2.75]
Max. pressure	p _{max}	bar [psi]	350 [5076]	300 [4350]
Max. peak pressure	P _{peak}	bar [psi]	415 [6020]	350 [5075]
Swashplate angle	α	degree	16°	18°
Max. speed at V _{g max}	n _{max}	rpm	3600	3500
Max. peak speed at V _{g max}	n _{peak}	rpm	4000	3900
Max. speed (1) at $V_g min$	n _{o max}	rpm	4650	4500
Max. peak speed (1) at $V_g min$	n _{o peak}	rpm	5200	5050
Max. flow	Q _{max}	l/min [U.S.gpm]	134 [35.4]	158 [41.7]
Max. power at V _{g max}	P _{max}	kW [hp]	78 [104.5]	78 [104.5]
Torque costant	T _k	Nm/bar [lbf.ft/psi]	0.6 [0.030]	0.72 [0.036]
Max. torque at p max	T _{max}	Nm [lbf.ft]	213 [157.1]	215 [158.6]
Moment of inertia	J	kg·m² [lbf.ft²]	0.0020 [0.047]	0.0020 [0.047]
Weight	m	kg [lbs]	16.2 [35.7]	16.2 [35.7]

1) Including zero displacement.

For applications different from MEWP, please consult Dana

Pressure definition:



Maximum pressure (p max): is the highest recommended working pressure for the application and is not intended to be a continuous pressure.

Peak pressure (p peak): is the highest allowable working pressure under any circumstance and only reachable for very limited time. Pressure spikes must be lower than peak pressure.

For longer peak spike duration please contact Dana.



Side ports:







Ports	Туре	Thread
A-B	Main	1" 1/16 - 12
С	Brake	7/16" - 20 UNF
D	Case drain	3/4" - 16 UNF
X1	Control	9/16" - 18 UNF

Rear ports:







Ports	Туре	Thread
A-B	Main	1" 1/16 - 12
С	Brake	7/16" - 20 UNF
D	Case drain	3/4" - 16 UNF
X1	Control	9/16" - 18 UNF





All alphanumeric digits of the code must be present when ordering.

1									
Series									
B5VR	Variable displacement axial piston motor								

2								
Motor								
м	Motor							

3		
		Displacement
038	38.2 cm ³ /rev	[2.33 in ³ /rev]
045	45 cm ³ /rev	[2.75 in ³ /rev]

4			
	Max displacement limitation	Si	ze
		38	45
(*)	cm ³ /rev	31 ÷ 38.2	38 ÷ 45
()	[in ³ /rev]	[1.89 ÷ 2.33]	[2.32 ÷ 2.75]

(*) Indicate the maximum displacement in cm³/rev required. Please contact Dana to define the optimal value.

5						
	Min displacement limitation	Size				
		38	45			
(*)	cm ³ /rev [in ³ /rev]	0 ÷ 27 [0 ÷ 1.65]	0 ÷ 32 [0 ÷ 1.95]			

(*) Indicate the minimum displacement in cm³/rev required. Please contact Dana to define the optimal value.



SE

SAE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
B5VR	м	038	35	14	SE	ок	S05	FM1	S	2IN	1 00	XXXX	000	XX	XX	XX
6																
Version																

7								
Mounting flange								
ОК	2 B	olts Ø 135 mm [Ø 5.265 in]						

8	
	Shaft end
S05	Splined 13T - 16/32 DP - ANSI B92.1-1970
S30	Splined 15T - 16/32 DP - ANSI B92.1-1970

9									
	Port cover								
FM1	Rear ports								
VM1	Side ports same side								

10	
	Seal
S	Standard NBR

11								
Control								
2IN	Hydraulic two positions control							



B10 Ordering code

B5VR M 038 35 14 SE OK S05 FM1 S 2IN 100 XXXX 000 XX XX XX	1	2	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	B5VR	N	И	038	35	14	SE	ок	S05	FM1	S	2IN	1 00	xxxx	000	xx	xx	xx

12						
	Control specification	2IN				
1	Displacemet setting From Maximum Displacement to Minimum Displacement (Vgmax \rightarrow Vgmin)					
Control detail						
00	None	•				

• Available

13	
	Valve
XXXX	Feature not necessary

14	
	Valve feature
000	Feature not necessary

15											
				Flus	shing	g val	ve				
ХХ	None	е									

16			
	Serie feature		
XX	None		
TS	Prepared for speed sensor		
тw	speed sensor (Tachometer + sensor 2-channel-Hall effect PNP - 5V)		
TZ	Speed and direction sensor (Tachometer + sensor 2-channel-Hall effect)		
TD	Speed and direction sensor (Tachometer + sensor 2-channel-Hall effect TD L=29.6mm B5VR 45 cable 3 mt)		

17	
	Painting
XX	None
01	Black Painted RAL 9005
02	Blue Painted RAL 5015



Splined 13T - 16/32 DP

S05



S30





Splined 15T - 16/32 DP

Teeth	15			
Pitch	16/32			
Pressure angle	30°			
Pitch diameter	23.813 mm [0.9375 in]			
Spline standard	ANSI B 92.1 - 1970			
Accuracy class	5			
Tronomiosible torque	continuous 153 Nm [112.8 lbf.ft]			
Transmissible torque	maximum 362 Nm [267.0 lbf.ft]			



2IN Hydraulic two positions control

Transmissible torque

B5VR motor normal position is at max displacement (Vgmax). Applying a control pressure at port X1 the displacement can be set at minimum value (Vgmin).

continuous 73 Nm [53.8 lbf.ft]

maximum

226 Nm [166.7 lbf.ft]

Control type	1 (from Vgmax to Vgmin)
Minimum required pilot pressure (1)	14 bar [200 psi]
Maximum permissible pressure at port X1	69 bar [1000 psi]

1) Lower pressure can be used but this could affect the functioning of the displacement shift.







Specifications	TZ sensor	TW sensor	TD sensor			
Parameters	Speed	Speed and direction				
Supply voltage (U)	8÷30 Vdc	4.5÷16 Vdc				
No-load supply current (lo)	<15 mA	<25 mA				
Output function	Push-pull (see output stage)	PNP (see c	utput stage)			
Output current max	150 mA	see outp	out signal			
Temperature range	-40 °C ÷ +125 °C	-40 °C ÷	+110 °C			
Operating sensing distance (Sr)		0 ÷ 2 mm				
Frequency range	0 ÷ 20 kHz					
Output rising time	<10µs	>2	2µs			
Output falling time	<10µs >6µs					
Degree of protection	IP67 (sensor cable output)					
Degree of protection	IP68 / IP69K (sensing surface)					
Max. pressure on sensing surface	3 bar/10 bar (Dynamic / Static)					
Cable	Thermoplastic 140°C 4x0.35mm ²					
Cable lenght	2 meters	3 meters				
Electromagnetic compatibility (EMC)	according to EN60947-5-2					
Shock and vibration resistance	according to IEC 68-2-27 IEC 68-2-6					
Number of pulses per revolution	44 88					

Connection diagram: TZ



Connection diagram: TW-TD



Output: TW-TD



Connector



 Body:
 DT04-4P-C015

 Wedge:
 W4P

 Pin:
 1060-16-0622



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Note

Note	

Note

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Technologies Customized to **Every Part** of the Globe

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Dana is an integral partner for virtually every major vehicle and engine manufacturer worldwide. We are a leading supplier of drivetrain, sealing, and thermal technologies to the global automotive, commercial-vehicle, and off-highway markets. Founded in 1904, we employ thousands of people across six continents.





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