



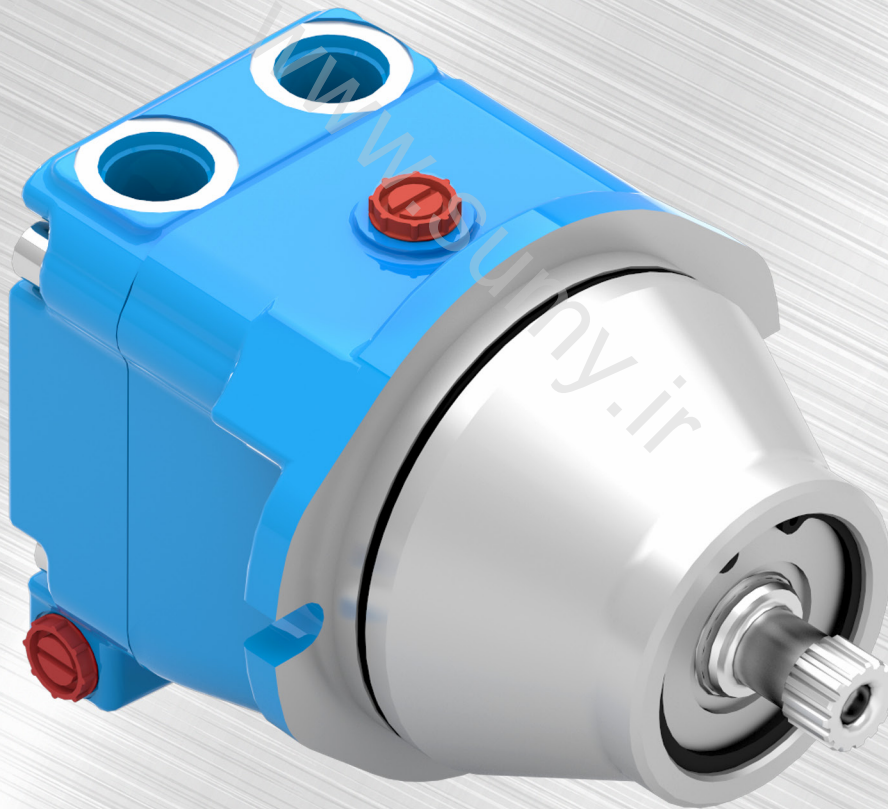
BREVINI[®]
Motion Systems

DC5A1Z1_000000R0
02 2024

Product Catalog

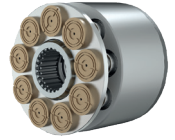
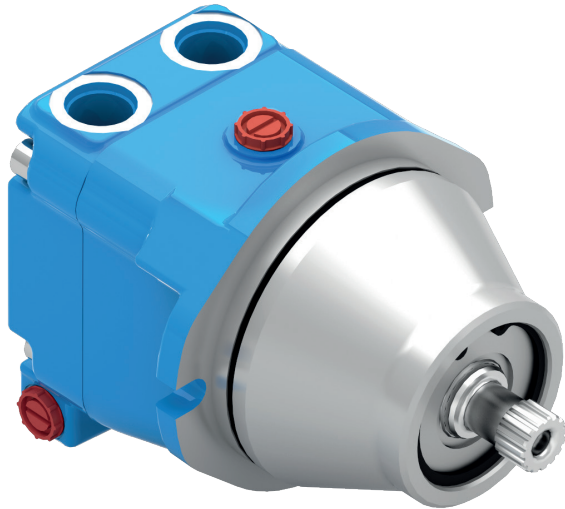
Brevini Hydraulic Motors **B5VR Series**

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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Type	Displacement cm ³ /rev [in ³ /rev]	Max peak flow l/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:

C	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·m ² [lbf·ft ²]	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
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	cm ³ /rev [in ³ /rev]	Displacement

Conversions:

	To convert		Multiply by	To convert		Multiply by
	From	To		From	To	
Length	mm	in	0.039	in	mm	25.4
Capacity	l	gal	0.219	gal	l	4.546
Mass	kg	lb	2.204	lb	kg	0.4536
Force	N	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	cm ³ /rev	16.387
Temperature	°C	°F	1.8×°C+32	°F	°C	(°F-32)/1.8

Nominal values calculation:

Input flow:
$$Q = \frac{V_g \times n}{1000} \times \frac{1}{\eta_v}$$

V_g = geometrical displacement (cm³/rev)

Δp = 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 (η_t = η_v · η_{hm})

Output torque:
$$M = \frac{\Delta p \times V_g \times \eta_{hm}}{62.8}$$

Output power:
$$W = \frac{M \times n}{9550} \times \frac{Q \times \Delta p \times \eta_t}{600}$$

Output speed:
$$n = \frac{Q \times 1000 \times \eta_v}{V_g}$$

Fluid working conditions:

Temperature range	Min	-40 °C	-40 °F
	Cont	-25 °C ÷ 85 °C	13 °F ÷ 185 °F
	Max	105 °C	221 °F
Viscosity	Min	10 cSt	
	Cont	15 – 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:

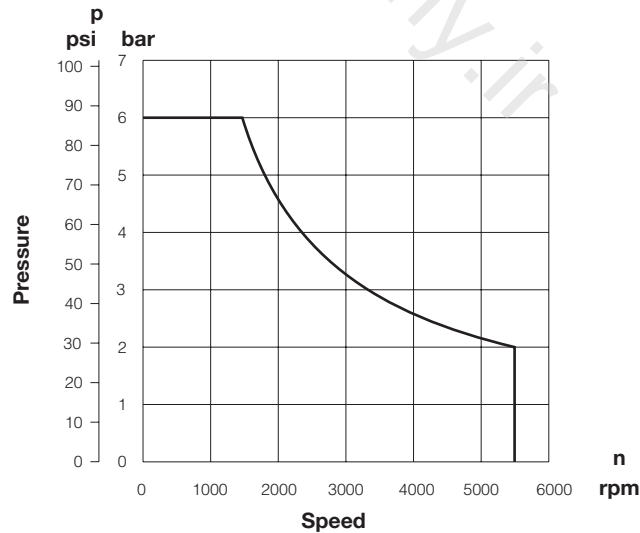
- Minimum temperature should be kept for a short period of time, limit the working conditions of the motor while the system warms up.
- Maximum temperature could damage seals, limit this condition to not cause leaks. The maximum temperature is usually recorded close to the front bearing (shaft side) 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

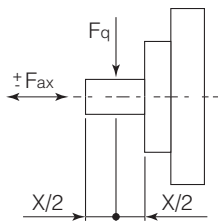
Maximum (continuous)	0.5 bar [7 PSI] above outlet pressure 2 bar [29 PSI] maximum pressure
Intermittent (cold start)	2 bar [29 PSI] above outlet pressure 6 bar [87 PSI] maximum pressure

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.

F_q 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 F_{ax} 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.



		Size		
			38	45
Radial load	$F_{q \max}$	N [lbf]	283 [63.62]	283 [63.62]
Axial pulling load	$F_{ax \max}$	N [lbf]	1100 [247.29]	1100 [247.29]
Axial pushing load	$F_{ax \max}$	N [lbf]	1100 [247.29]	1100 [247.29]

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.

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.

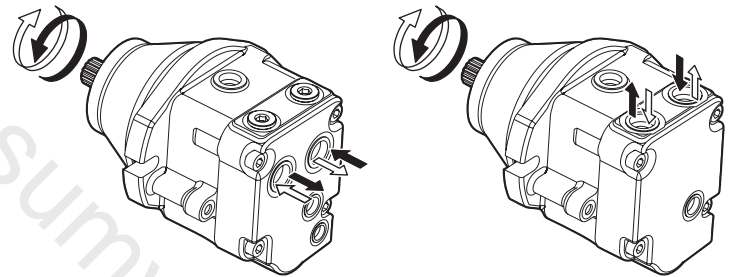
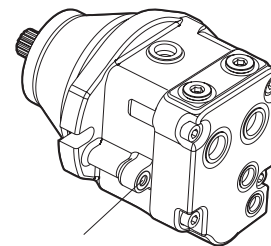
Not all gearboxes are suitable for this option, please verify with the gearbox manufacturer that the position of the brake release port on the front flange of the motor matches the brake release port on the gearbox.

Closed loop flushing:

Oil temperature and oil cleanliness 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.

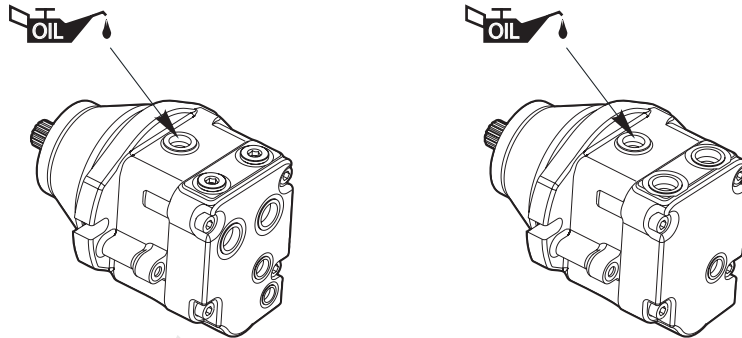
The flushing valve should be chosen according to circuit specific requirements.

Reversible motor**Rear ports****Side ports****Brake release port**

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.

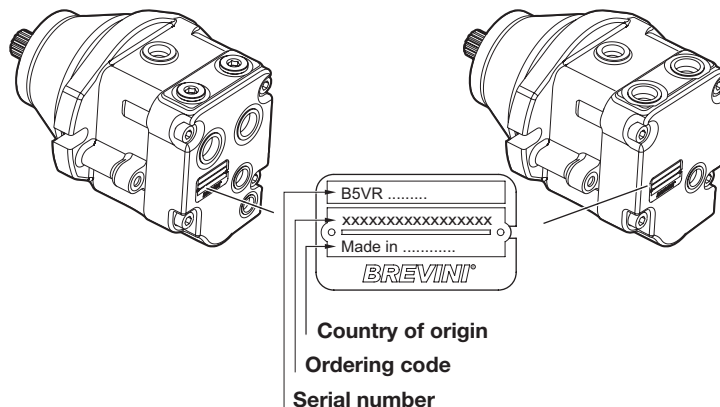
Drive shaft:

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

Caution: incorrectly aligned parts significantly reduce the service life of the bearings.

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.

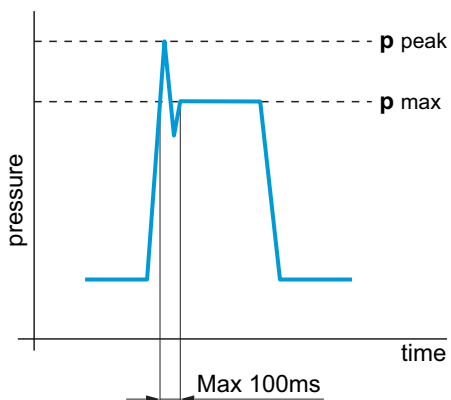


			Size	
			38	45
Max. displacement	V_g	cm ³ /rev [in ³ /rev]	38.2 [2.33]	45 [2.75]
Max. pressure	p_{max}	bar [psi]	350 [5076]	300 [4350]
Max. peak pressure	p_{peak}	bar [psi]	415 [6020]	350 [5075]
Swashplate angle	α	degree	16°	18°
Max. speed at $V_{g\ max}$	n_{max}	rpm	3600	3500
Max. peak speed at $V_{g\ max}$	n_{peak}	rpm	4000	3900
Max. speed (1) at $V_{g\ min}$	$n_{0\ max}$	rpm	4650	4500
Max. peak speed (1) at $V_{g\ min}$	$n_{0\ peak}$	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 constant	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·m ² [lbf.ft ²]	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:

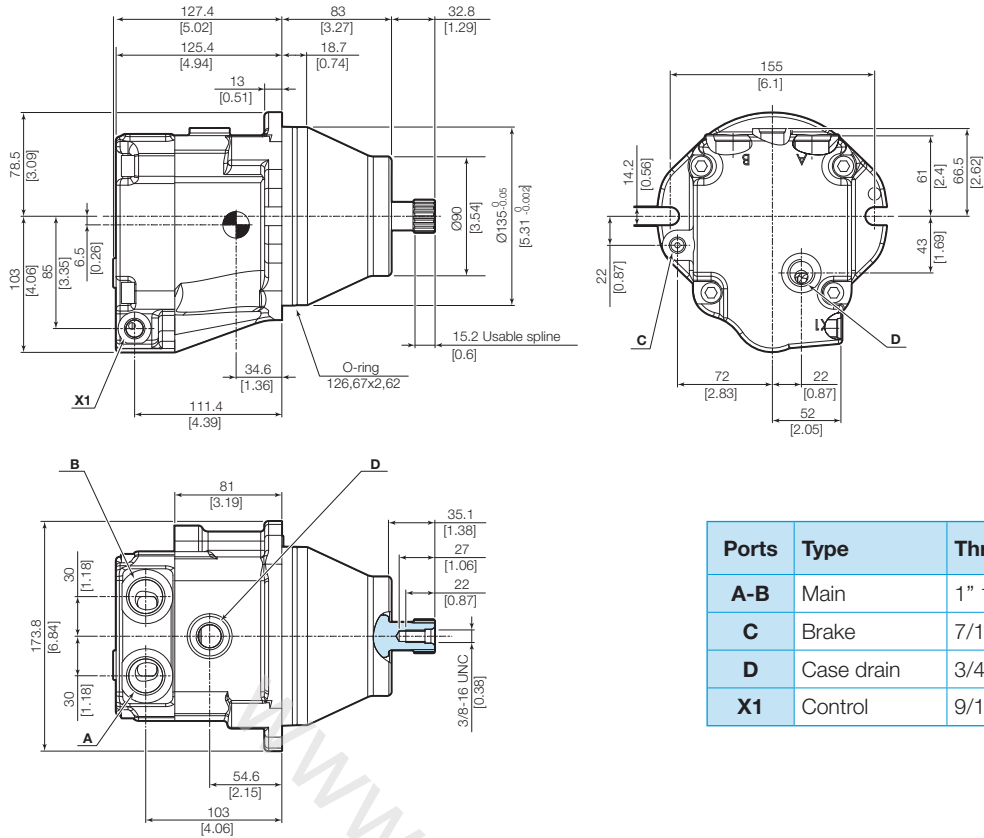


Maximum pressure (p max): is the highest recommended working pressure for the application and is not intended to be a continuous pressure.

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.

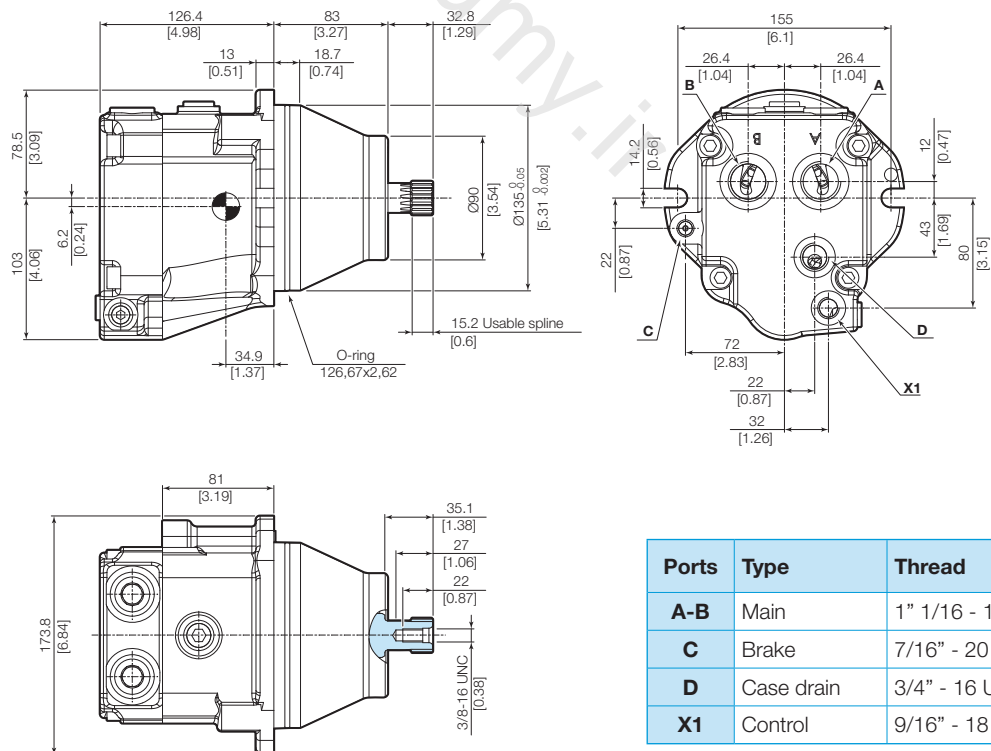
For longer peak spike duration please contact Dana.

Side ports:



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

Rear ports:



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

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Series	Motor	Displacement	Max displacement limitation	Min displacement limitation	Version	Mount flange	Shaft end	Port cover	Seal	Control	Control specification	Valve	Valve feature	Flushing valve	Serie feature	Painting
B5VR	M	038	36	14	SE	OK	S05	FM1	S	2IN	1 00	XXXX	000	XX	XX	XX

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

1	
Series	
B5VR	Variable displacement axial piston motor

2	
Motor	
M	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		Size	
Max displacement limitation		38	45
(*)	cm ³ /rev [in ³ /rev]	31 ÷ 38.2 [1.89 ÷ 2.33]	38 ÷ 45 [2.32 ÷ 2.75]

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

5		Size	
Min displacement limitation		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.

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

6	
Version	
SE	SAE

7	
Mounting flange	
OK	2 Bolts 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

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

12

Control specification		2IN
1	Displacement setting From Maximum Displacement to Minimum Displacement (V_{gmax} → V_{gmin})	•
Control detail		2IN
00	None	•

• Available

13

Valve	
XXXX	Feature not necessary

14

Valve feature	
000	Feature not necessary

15

Flushing valve	
XX	None

16

Serie feature	
XX	None
TS	Prepared for speed sensor
TW	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)

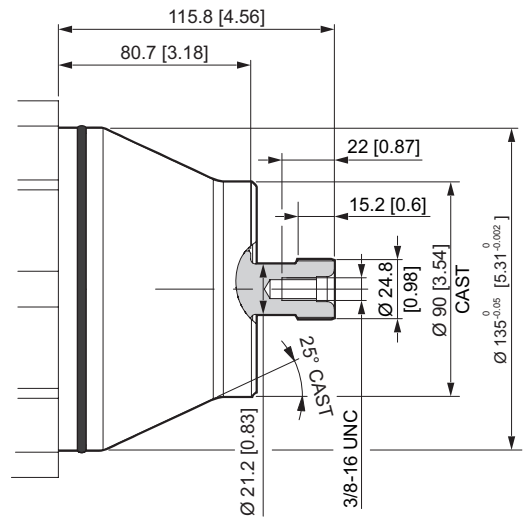
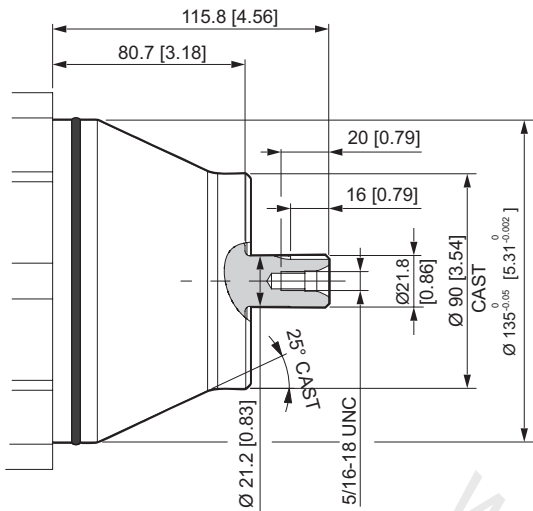
17

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

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S05 Splined 13T - 16/32 DP

S30 Splined 15T - 16/32 DP



Teeth	13
Pitch	16/32
Pressure angle	30°
Pitch diameter	20.6375 mm [0.8125 in]
Spline standard	ANSI B 92.1 - 1970
Accuracy class	5
Transmissible torque	continuous 73 Nm [53.8 lbf.ft]
	maximum 226 Nm [166.7 lbf.ft]

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
Transmissible torque	continuous 153 Nm [112.8 lbf.ft]
	maximum 362 Nm [267.0 lbf.ft]

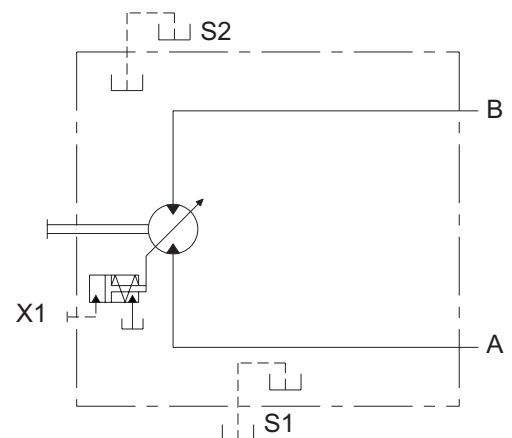
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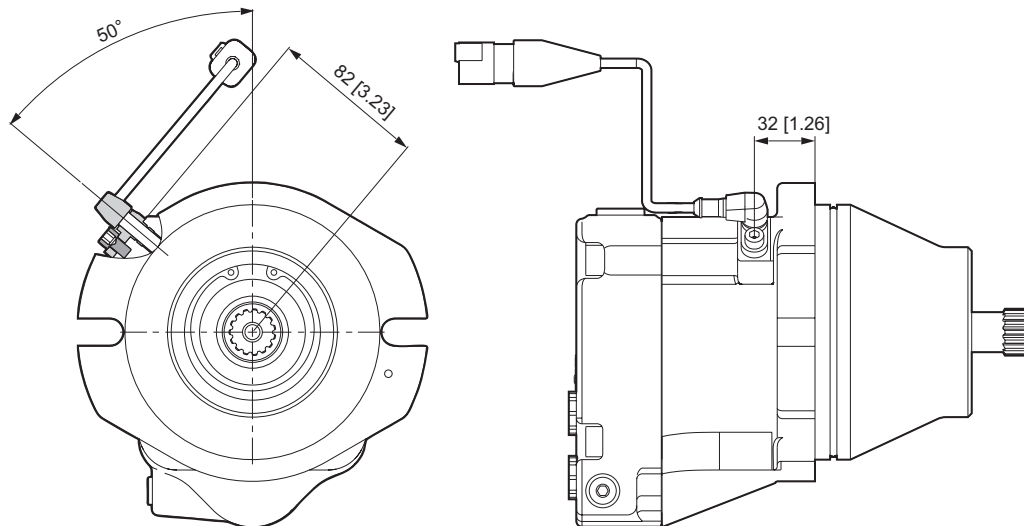
2IN Hydraulic two positions control

B5VR motor normal position is at max displacement (V_{gmax}). Applying a control pressure at port X1 the displacement can be set at minimum value (V_{gmin}).

Control type	1 (from V_{gmax} to V_{gmin})
Minimum required pilot pressure (1)	14 bar [200 psi]
Maximum permissible pressure at port X1	69 bar [1000 psi]

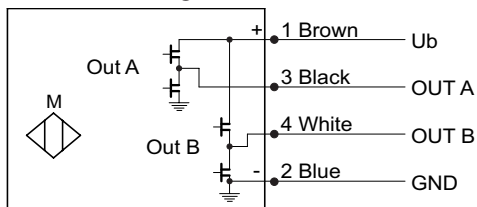
1) Lower pressure can be used but this could affect the functioning of the displacement shift.



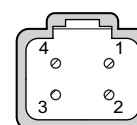


Specifications	TZ sensor	TW sensor	TD sensor
Parameters	Speed	Speed and direction	
Supply voltage (U)	8÷30 Vdc	4.5÷16 Vdc	
No-load supply current (I ₀)	<15 mA	<25 mA	
Output function	Push-pull (see output stage)	PNP (see output stage)	
Output current max	150 mA	see output signal	
Temperature range	-40 °C ÷ +125 °C	-40 °C ÷ +110 °C	
Operating sensing distance (Sr)	0 ÷ 2 mm		
Frequency range	0 ÷ 20 kHz		
Output rising time	<10µs	>2µs	
Output falling time	<10µs	>6µs	
Degree of protection	IP67 (sensor cable output) IP68 / IP69K (sensing surface)		
Max. pressure on sensing surface	3 bar/10 bar (Dynamic / Static)		
Cable	Thermoplastic 140°C 4x0.35mm ²		
Cable length	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	

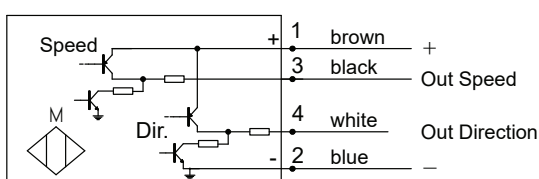
Connection diagram: TZ



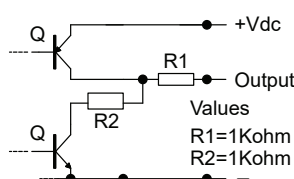
Connector



Connection diagram: TW-TD



Output: TW-TD



Body: DT04-4P-C015
Wedge: W4P
Pin: 1060-16-0622

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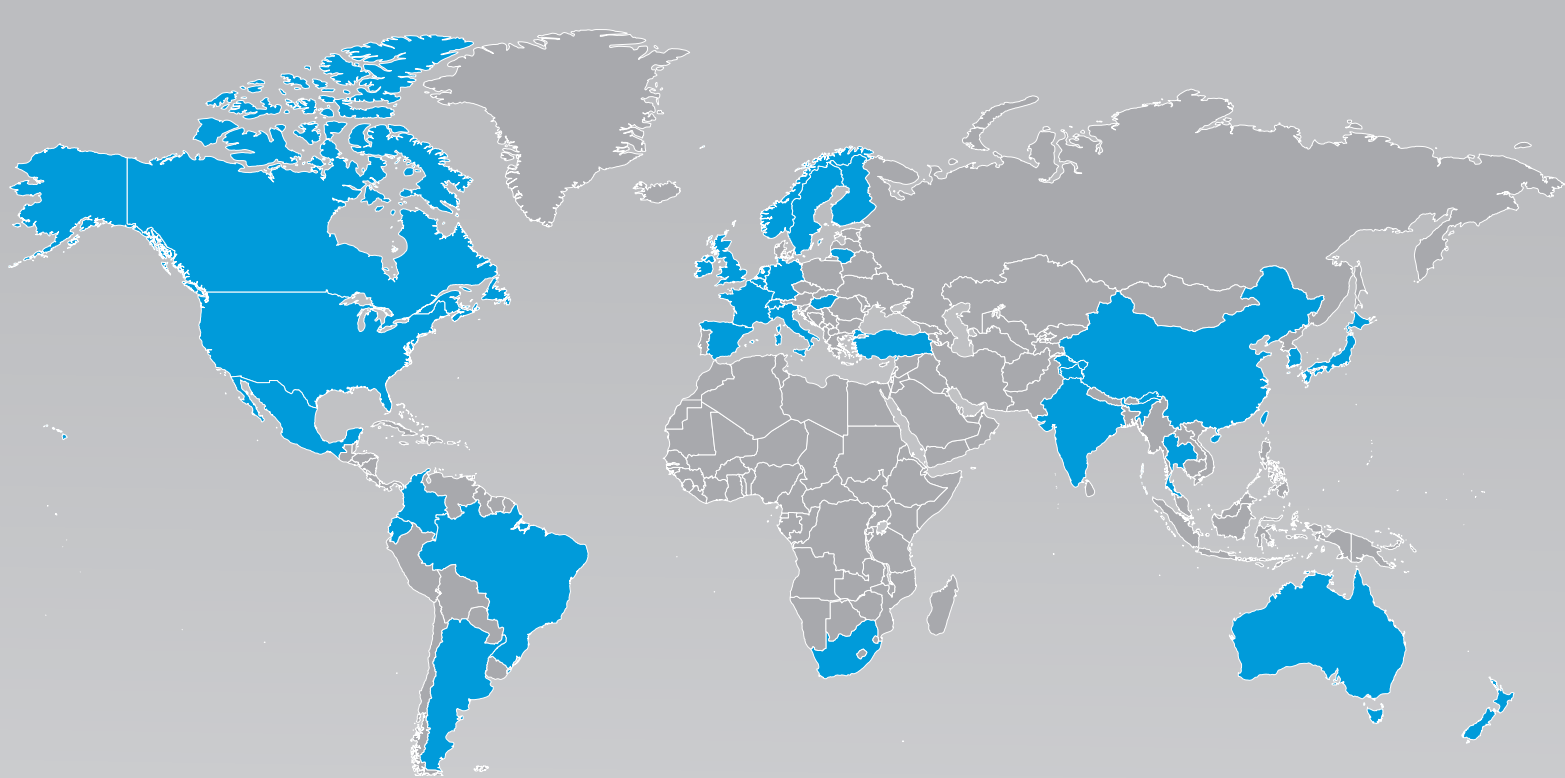
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Dana is an integral partner for virtually every major vehicle and engine manufacturer worldwide. We are a leading supplier of drivetrain, sealing, and thermal technologies to the global automotive, commercial-vehicle, and off-highway markets. Founded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



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Dana delivers fully optimized Spicer® drivetrain and Brevini® motion systems to customers in construction, agriculture, material-handling, mining, and industrial markets. We bring our global expertise to the local level with technologies customized to individual requirements through a network of strategically located technology centers, manufacturing locations, and distribution facilities.

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Capacity ratings, features, and specifications vary depending upon the model and type of service. Application approvals must be obtained from Dana; contact your representative for application approval. We reserve the right to change or modify our product specifications, configurations, or dimensions at any time without notice.



BREVINI®

Motion Systems