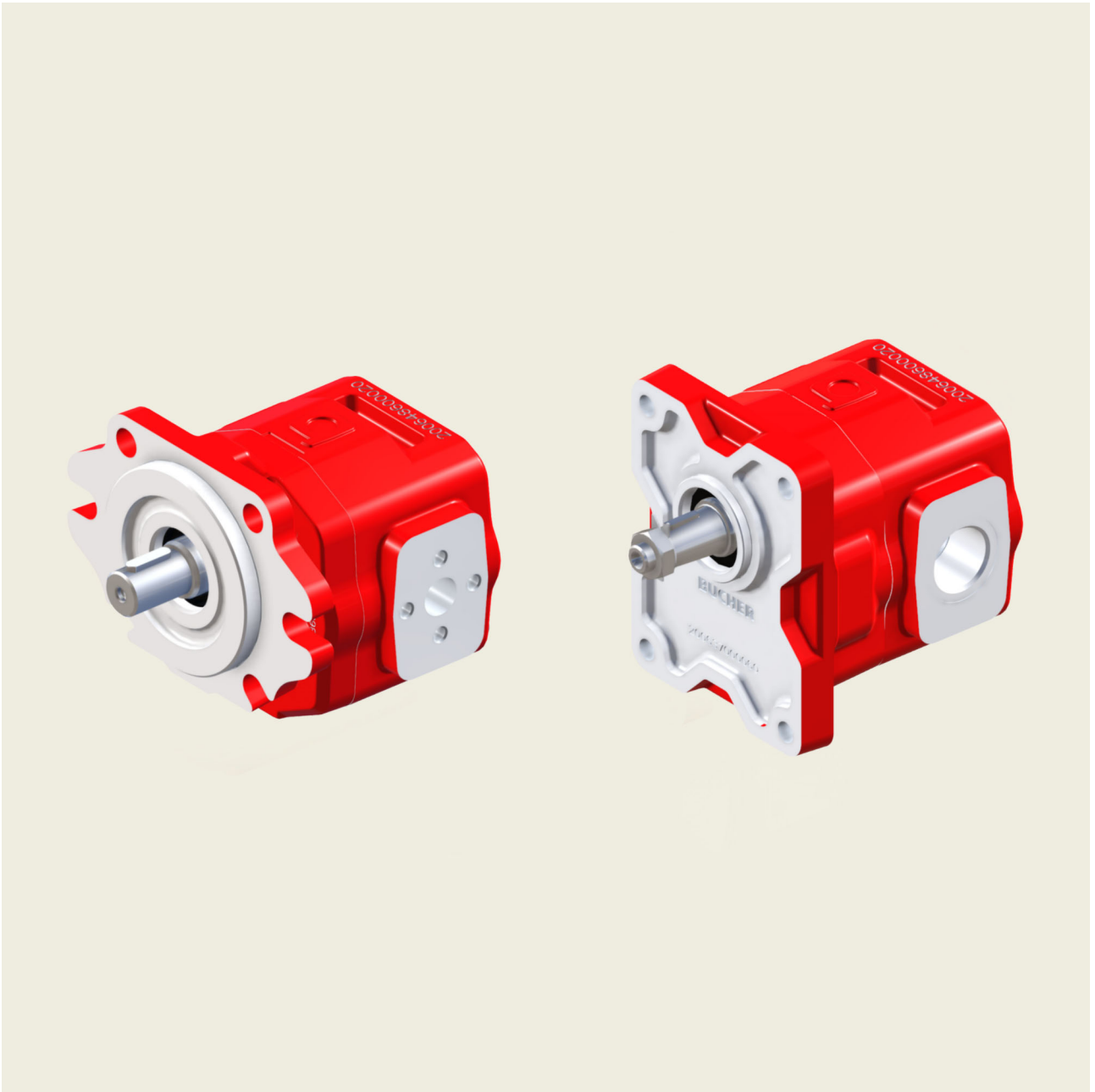
BUCHER hydraulics

APM/APMR250HP Cast Iron Gear Motors

Unidirectional and Reversible



BUCHER
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1 General information

The product range of Bucher Hydraulics SpA includes single motors APM212 - APM212HP - APM250HP (corresponding with the common group denominations: 2-2.5) .

Bucher Hydraulics SpA has supplied a wide range of external gear motors to industrial and mobile applications since many years.

Bucher's external gear motors are widely used in modern hydraulic system to obtain high performances, long life service, low purchase and maintenance costs.

Now, Bucher is introducing a new Gear motors family, **APM250HP / APMR250HP (group 2.5)**, developed for hedge and brush cutters, stump grinders, wood chippers, grape and combine harversters applications.

Bucher designed this new motor APMR250HP with sleeve bearings mounted in the cast iron body and covers.

APM250HP/APMR250HP is the result of a focused design, studied also with the aid of a software internally developed and used for the calculations of the most important mechanical paramenters of the gears and to optimize all the performances with a consequent noise and vibration reduction.

Bucher Hydraulics has so achieved this state of the art by constantly improving its design, control and manufacturing techniques aligned with the latest technological developments, while simultaneously enhancing its Quality System ensuring that every single product offers the same high standards.

Main applications and benefits

- Long life expectancy
- High efficiencies
- Noise & vibration reduction
- Strong interface
- Shaft load reduction
- High pressure limits
- Reduced number of components
- Reduced overall dimension

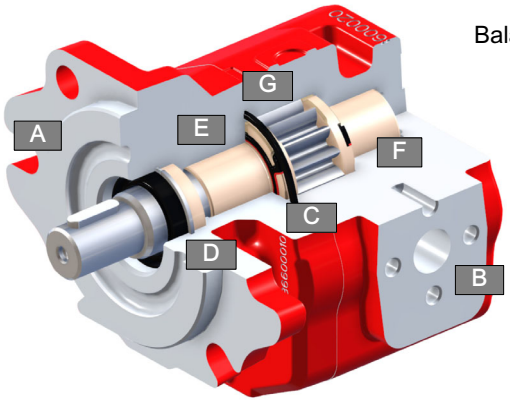
1.1 External gear motors components and construction / benefits

A
Cast iron front cover: two different flanges are available (SAE-B, EU).

B
Cast iron main motor body: wide range of displacements obtainable with two different raw cast with back cover integrated in only one piece. Rear ports on request.

C
HNBR seal material instead of NBR.

D
Viton and HNBR shaft seals.



E
Pressure-balance plate manufactured in bimetallic steel-bronze. Balancing area and intermediate notches optimised.

F
Large-diameter sleeve bearings, fitted both in front cover and body.

G
Large number of teeth, tooth profile optimised, larger shaft diameter.

BENEFITS

A B	Flexibility/smaller number of components
A B D	Reduced risk of external leakage
A B E	High efficiencies/pressure limits
A B E	Long life expectancy
C D	Wider temperature range
E G	Lower pressure ripple
E G	Noise/vibration reduction
E F G	Higher load capacity and transmissible torque
E F G	Low friction and high mechanical efficiency starting torque
E F G	Higher max. pressure limit

The front mounting flange and the body/back cover are made of high-strength cast iron to gives thermal stability, resistance to contamination and the strength necessary for persistently high levels of performance and life, needed in demanding heavy duty applications.
Body/back cover integrated, bigger shafts diameter, bigger sleeve bearing dimension and bimetallic trust plate have been optimized to provide heavy duty, high pressure limits, high efficiencies and long life expectancy.
Noise and vibration reduction due to the high number of teeth.

The sleeve bearings are located in the front mounting flange and in the body/back cover.

1.2 Technical data

Features			
Displacements		15.2 - 54 cm^3/rev	
Maximum continuous pressure		300 bar (depending on displacement and type)	
Fluid temperature range		-15 / +90 °C (Extreme condition temperature range: -20 +110 °C)*	
Recommended fluids		hydraulic mineral oil-based	
Viscosity range:	Recommended	20-120 mm^2/s (cSt)	
	Permitted (not continuous)	up to 700 mm^2/s (cSt)	
	Permitted for starting	2000 mm^2/s (cSt)	
Contamination class:			
	working pressure > 210 bar	19/17/14 ISO 4406	8 NAS1638
	working pressure < 210 bar	20/18/15 ISO 4406	9 NAS 1638
Standard seals material		Viton and HNBR standard	

* Extreme working limits values can not be combined

Type APM (Unidirectional)	Displacement		Pressure P1 (continuous)		Pressure P3 (peak)		Min speed	Max speed
	cm^3/rev	Cu.In.P.R.	bar	P.S.I.	bar	P.S.I.	rpm	rpm
15	15.2	.928	300	4300	320	4600	500	3500
19	19.1	1.166	300	4300	320	4600	500	3500
23	23	1.403	300	4300	320	4600	500	3500
26	26.4	1.611	300	4300	320	4600	500	3500
29	29.3	1.788	300	4300	320	4600	500	3500
33	33.2	2.026	300	4300	320	4600	500	3500
36	36.1	2.203	300	4300	320	4600	500	3500
40	40.5	2.471	275	4000	290	4200	500	3500
45	45.3	2.764	245	3500	260	3700	500	3500
50	50.2	3.063	220	3200	235	3400	500	3000
54	54	3.295	205	3000	220	3200	500	3000

IMPORTANT!: The pressure values are referred to unidirectional motors. Please consult Bucher Hydraulics if even one of the operating limits indicated in the table (temperature, pressure, rpm) is exceeded, as well as in the case of two or more maximum values at the same time, or for applications with particularly heavy-duty cycles

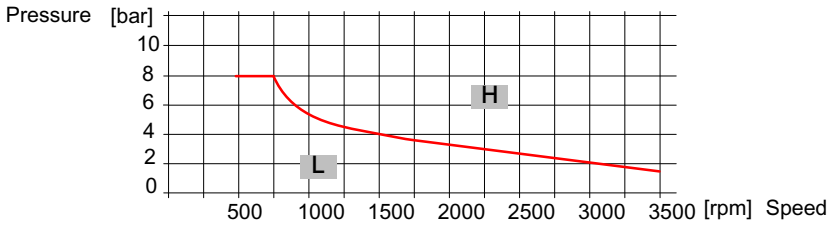
Type APMR (Bidirectional, Unidirectional + external drain)	Displacement		Pressure P1 (continuous)		Pressure P3 (peak)		Min speed	Max speed
	cm^3/rev	Cu.In.P.R.	bar	P.S.I.	bar	P.S.I.	rpm	rpm
15	15.2	.928	270	3900	300	4350	500	3500
19	19.1	1.166	270	3900	300	4350	500	3500
23	23	1.403	270	3900	300	4350	500	3500
26	26.4	1.611	250	3600	270	3900	500	3500
29	29.3	1.788	250	3600	270	3900	500	3500
33	33.2	2.026	250	3600	270	3900	500	3500
36	36.1	2.203	250	3600	270	3900	500	3500
40	40.5	2.471	240	3480	260	3770	500	3500
45	45.3	2.764	210	3050	230	3300	500	3500
50	50.2	3.063	190	2750	210	3050	500	3000
54	54	3.295	180	2610	200	2900	500	3000

IMPORTANT!: The pressure values are referred to bidirectional motors. Please consult Bucher Hydraulics if even one of the operating limits indicated in the table (temperature, pressure, rpm) is exceeded, as well as in the case of two or more maximum values at the same time, or for applications with particularly heavy-duty cycles

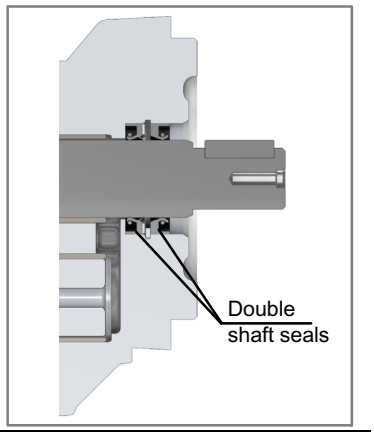
Limit indications:

Shaft seal: Maximum pressure admitted

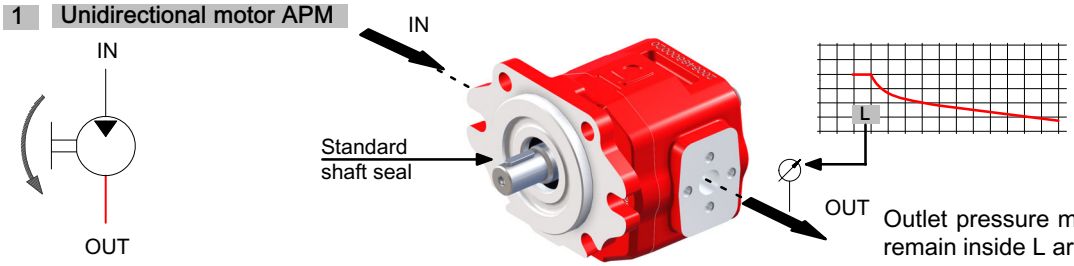
IMPORTANT! The pressure on the outlet line has to be checked in order to choice the right motor configuration. Different solutions are available depending on pressure value recorded.
See examples from 1 to 4



These limits have to be respected in the worst working conditions



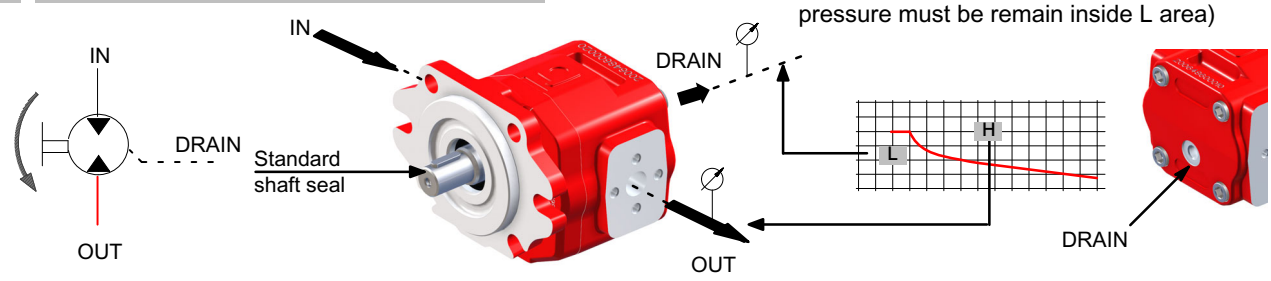
1 Unidirectional motor APM



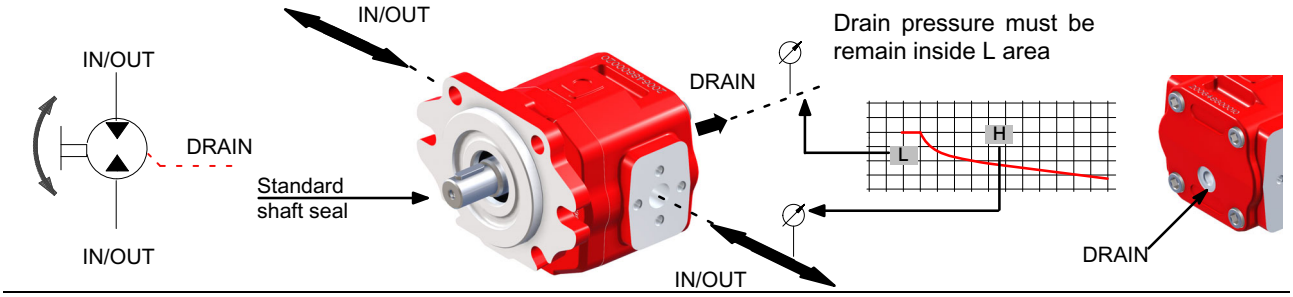
Outlet pressure must be remain inside L area

2 Unidirectional motor APMR with extrnal drain

Unidirectional motor with drain line (drain pressure must be remain inside L area)

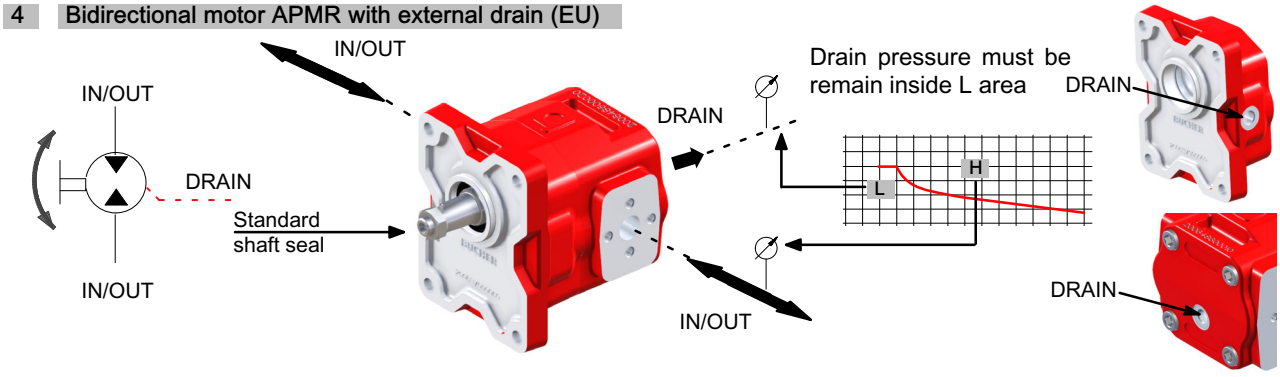


3 Bidirectional motor APMR with external drain (SAE-B)



Drain pressure must be remain inside L area

4 Bidirectional motor APMR with external drain (EU)



Drain pressure must be remain inside L area

1.3 Identifying the rotation direction

The rotation direction of a gear motor is identified by looking at the motor from the front and with the drive gear turned upwards (see figures below).

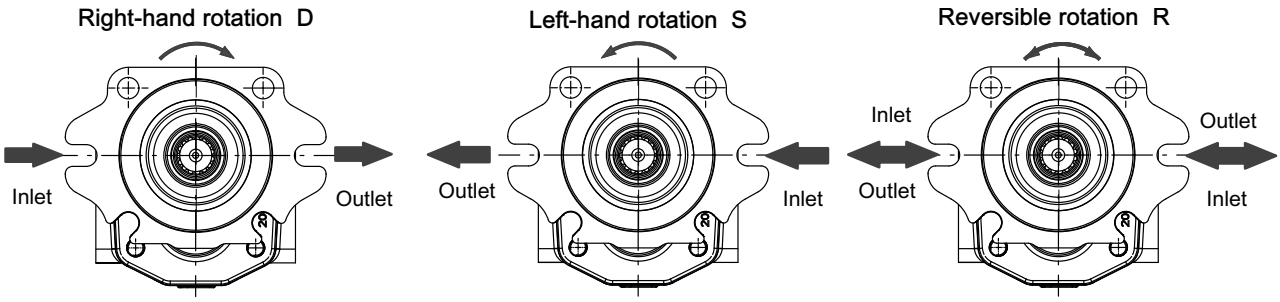
Motors with clockwise rotation (D) have a drive gear which turns clockwise, with the inlet port on the left and the outlet port on the right.

Motors with counterclockwise rotation (S) have a drive gear which turns counterclockwise, with the inlet port on the right and the outlet port on the left.

The figure also shows the pressure flow inside the motors as the oil is transferred from the inlet port to the outlet port.

As regards reversible motors (R), the ports are alternatively for inlet and outlet.

Motors with a unidirectional rotation (D or S) have the denomination APM. Motors with reversible rotation have the denomination APMR.



1.4 Outlet

1.4.1 Unidirectional motors

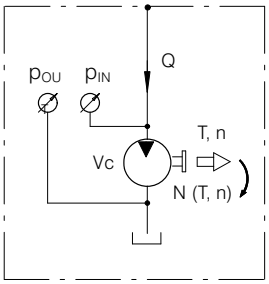
As a matter of principle, unidirectional motors correspond to counter rotating motors.

The balancing seals are not symmetric and, consequently, two different pressure sides: inlet High-pressure and outlet Low-pressure side, which must not be exchanged each other, are defined.

The maximum outlet Low-pressure value is limited by the shaft seal and its support , see limit indications, page 6

To keep P out below the suggested value, the following must be avoided:
- long distance between motor and tank
- long stretches of piping
- special features such as: bends; reductions in diameter; quick couplings; etc.

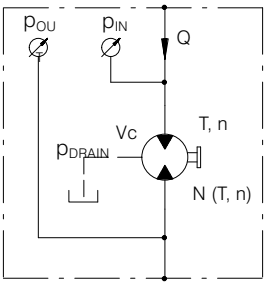
Having filtration on the return it is also advisable to choose a filter of a suitable size to minimise any pressure drop and to take measures to prevent gradual clogging over time.



1.4.2 Reversible motors

Reversible rotating motors have symmetric balancing seals and both ports, inlet and outlet, can be, alternatively, operate as inlet High-pressure and outlet Low-pressure.

Sealed area is connected to the back side of the oil retaining shaft seal and its pressure must be limited connecting it to the tank, through a drain threaded port placed on the motor rear cover with SAE-B flange, and it also can be machined on lateral side with European flange. The drain hose must be chosen in order to avoid that the pressure at the drain port does not exceed the maximum admitted pressure, see limit indications, page 6.



1.5 General installation precaution

In addition to the recommendations regarding fluids, filtration, coupling, etc., Bucher Hydraulics suggest the following indications:

- For unidirectional motors check always the rotation direction of the motor's take off shaft; it must be compatible with the rotation direction of the motor itself.
- Be particularly careful in cleaning and make sure, when connecting the high and low pressure piping, that no chips, rag threads, teflon tape, etc. get into the motor circulation system.
- Check the tightness of the high and low pressure fittings, the correct positioning of the O-Ring, and make sure there is no dirt between the flange and the motor body. The pipes themselves should be below oil tank level to prevent the formation of foam.
- Do not subject the motors to operating conditions different from those indicated on section 1.2 ; for extreme operations, always contact our Technical Department.
- Ambient temperature range: -20 / +50 °C
- In the event of motor painting, do not use solvents or paints that are incompatible with the material of the seals. Do not bake paint with excessively high temperatures.

Example of several hydraulic circuits are available on demand (please consult Bucher Hydraulics).

1.5.1 Hydraulic fluid

The main function of the fluid used in hydraulic systems is to transfer energy but it performs also other important functions: protect the components from corrosion, lubricate the motor moving parts, remove particles and heat from the system.

In order to ensure proper operation and long life of the system it is important to choose the correct hydraulic fluid with proper additives.
Bucher Hydraulics recommends to use a mineral based oil responding to ISO 6743/4 requirements, only.

The system should be operated only with hydraulic oil containing anti-foaming and antioxidant additives. Before using other types of fluid, please contact our Sales Dept, since they can cause serious damage to the directional valve components and jeopardize the correct function of the system.
Never use fluids different from those indicated in section 1.2 and do not use fluids incompatible with the motor seals (i.e. HNBR)

1.5.2 Filtration

In order to ensure proper operation and long life of the motor components it is extremely important to provide a proper and effective filtration of the hydraulic fluid.
It is advisable to follow filter manufacturers instruction and recommendations.
The fineness of the filter should be selected in order to guarantee that a contamination levels indicated on section 1.2.
When the high reliability of the system is an important requirement, a pressure filter must be used. In these cases it is also advisable to use a pressure filter with by-pass and indicator.
The size of the return filters must suit the maximum return flow whereas the size of the pressure filters must suit the maximum motor flow.
It is advisable to fit filters with pressure gauge or dirt indicator in order to make it possible to verify the filter condition.
Particular attention has to be paid to the cleaning of the machine hydraulic circuit and its components before the first run-in, since the presence of foreign materials could cause damages even if a proper filtration is provided.
In order to obtain the best performance of the system we recommend to strictly follow the conditions advised here above, failing which warranty shall be void.

1.6 Directives and standards

- Atex:

Attention: The equipment and protective systems of this catalogue ARE NOT intended for use in potentially explosive atmospheres. Ref:
Directive 99/92/EC and Directive 2014/34/UE

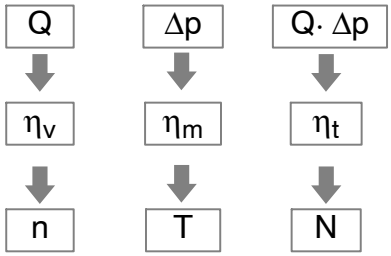
- ISO 9001:2015 / ISO 14001:2015

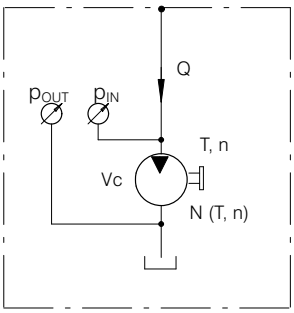
Bucher Hydraulics S.p.A. is certified for research, development and production of directional control valves, power units, gear motors and motors, electro motors, cartridge valves and integrated manifolds for hydraulic applications.

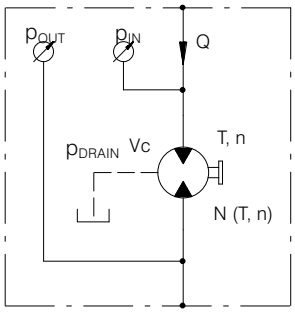
1.7 Gear motor formulas

The following parameters are defined:
Vc = (cm^3/r) motor displacement;
n = (r/min) no. of rpm of the outlet shaft;
Q = (l/min) flow rate;
Δp = (bar) P_{IN}-P_{OUT}, operating Δp pressure;
T = (Nm) outlet torque;
N = (kW) outlet power;
η_v = (%) volumetric efficiency;
η_m = (%) mechanical efficiency;
η_t = (%) total efficiency ($\eta_t = \eta_v \cdot \eta_m$)

1.7.1 Parameter relationships







$$Q = \frac{Vc \cdot n}{10 \cdot \eta_v} \qquad \Delta p = \frac{T}{1.592 \cdot Vc \cdot \eta_m} \cdot 10^4$$

$$Vc = \frac{10 \cdot Q}{n} \cdot \eta_v \qquad Vc = \frac{T}{1.592 \cdot \Delta p \cdot \eta_m} \cdot 10^4$$

$$n = \frac{10 \cdot Q}{Vc} \cdot \eta_v \qquad T = 1.592 \cdot Vc \cdot \Delta p \cdot \eta_m \cdot 10^{-4} \qquad N = \frac{Q \cdot \Delta p}{6 \cdot 10^4} \cdot \eta_t$$

Example

APM250HP/15 Vc= 15 cm^3/r Q_{IN}= 30 l/min Δp=230 bar ηv= 90% ηm= 90%

$$n = \frac{10 \cdot 30}{15} \cdot 90 = 1800 \text{ r/min.}$$

$$N = \frac{30 \cdot 230 \cdot 81}{6 \cdot 10^4} = 9.32 \text{ kW}$$

$\eta t = 0.90 \cdot 0.90 = 0.81 = 81\%$

$T = 1.592 \cdot 15 \cdot 230 \cdot 90 \cdot 10^{-4} = 49.43$ Nm

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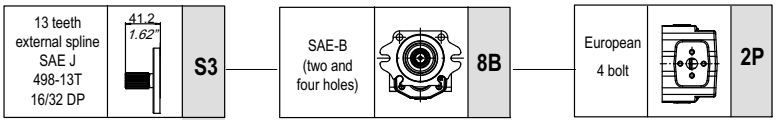
2 Overview standard motor configurations

This motor configuration example is considered as “standard”:

13 teeth	S38B2P	S38B2S	S38B8G	S38B8S

Example

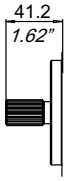
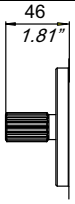
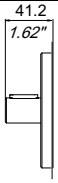
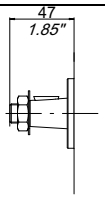


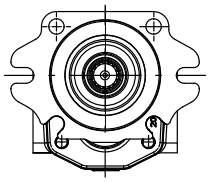
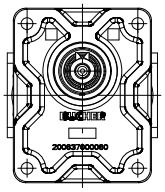
S38B2P

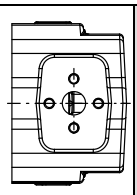
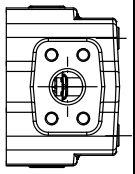
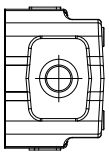
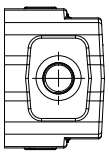
In the next pages: front flange, body/rear cover, and seals materials are listed for each motor series. For ordering purposes, it is enough to outline the complete motor description (for example: APM250HP/15 D S38B2P).

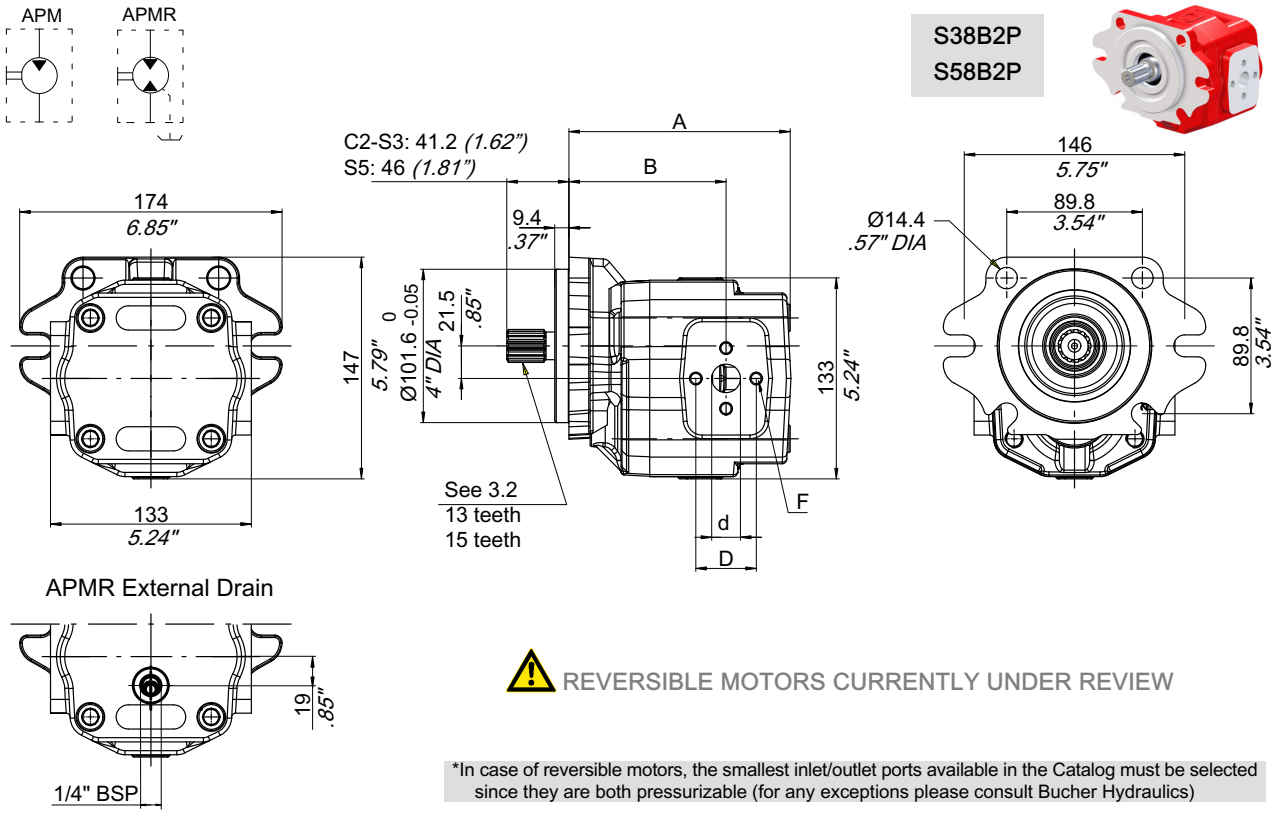
In case of a different configuration request (or a combination of different features, such as port threads, front flange materials, etc.), the description configurator shown in section 3.1 can be easily used.

2.1 Standard components configuration

Drive shaft		
13 teeth external spline SAE J 498-13T 16/32 DP T_{max}= 270 Nm		S3
15 teeth external spline SAE J 498-15T 16/32 DP T_{max}= 460 Nm		S5
Straight keyed Ø 22.225 mm T_{max}= 185 Nm		C2
Tapered 1:8 T_{max}= 250 Nm		C8

Cast iron flange		
SAE-B (two and four holes) (Ø101.6 mm - 4” inches)		8B
European rectangular (Ø50.8 mm - 2” inches)		1P

Cast iron body/back cover Port type		
European 4 bolts flanged		2P
SAE FLANGED PORTS J518 (3000 PSI series)		2S
BSPP threaded ports		8G
SAE threaded ports UNF		8S

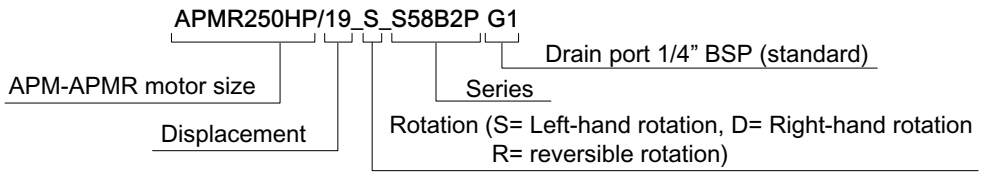


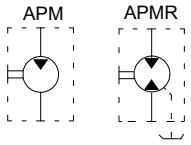
REVERSIBLE MOTORS CURRENTLY UNDER REVIEW

*In case of reversible motors, the smallest inlet/outlet ports available in the Catalog must be selected since they are both pressurizable (for any exceptions please consult Bucher Hydraulics)

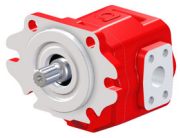
Type	A		B		Outlet*					Inlet*				
					d		D		F	d		D		F
	mm	*inches*	mm	*inches*	mm	*inches*	mm	inches	mm	mm	*inches*	mm	*inches*	mm
15	128	*5.04*	85.5	*3.37*										
19	132	*5.20*	89.5	*3.52*										
23	136	*5.35*	93.5	*3.68*										
26	139.5	*5.49*	97	*3.82*	19	*.75*	40	*1.57*	M8x1.25					
29	142.5	*5.61*	100	*3.94*										
33	146.5	*5.77*	104	*4.09*						19	*.75*	40	*1.57*	M8x1.25
36	149.5	*5.89*	102	*4.02*										
40	154	*6.06*	106.5	*4.19*										
45	159	*6.25*	111.5	*4.39*	25	*.98*	51	*2.01*	M10x1.5					
50	164	*6.46*	116.5	*4.59*										
54	168	*6.61*	120.5	*4.74*										

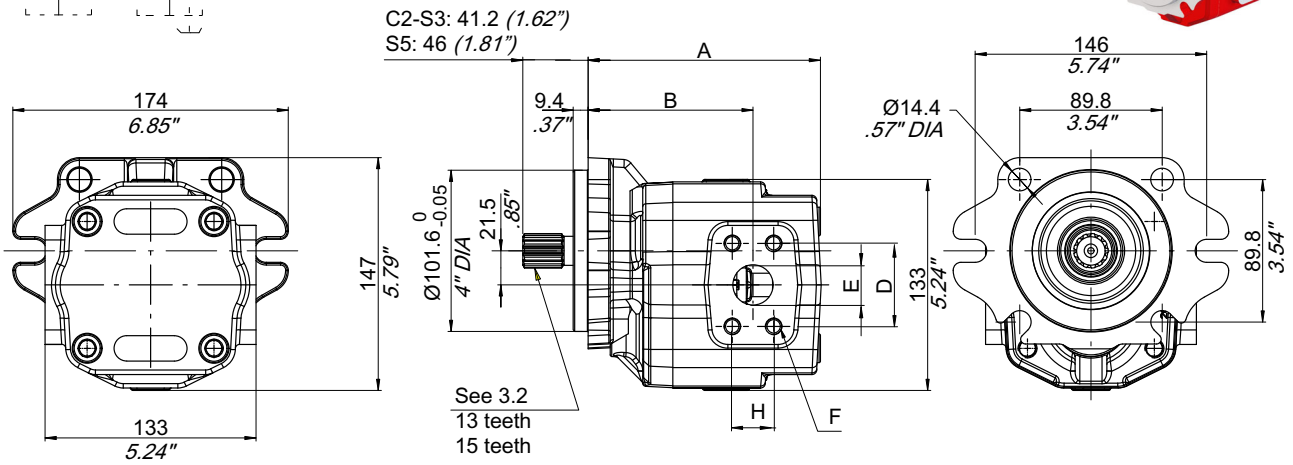
Motor description example:



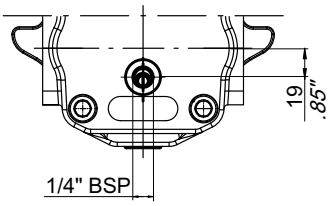


S38B2S
S58B2S





APMR External Drain



⚠ REVERSIBLE MOTORS CURRENTLY UNDER REVIEW

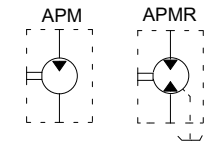
*In case of reversible motors, the smallest inlet/outlet ports available in the Catalog must be selected since they are both pressurizable (for any exceptions please consult Bucher Hydraulics)

Type	A		B		Outlet*							Inlet*						
					H		D		E		F	H		D		E		F
	mm	*inches*	mm	*inches*	mm	*inch.*	mm	*inch.*	mm	*inch.*	mm	mm	*inch.*	mm	*inch.*	mm	*inch.*	mm
15	128	*5.04*	85.5	*3.37*														
19	132	*5.20*	89.5	*3.52*	26.19	*1.03*	52.37	*2.06*	25.4	*1*		22.23	*.88*	47.63	*1.88*	19	*.75*	
23	136	*5.35*	93.5	*3.68*														
26	139.5	*5.49*	97	*3.82*														
29	142.5	*5.61*	100	*3.94*														
33	146.5	*5.77*	104	*4.09*	30.17	*1.19*	58.72	*2.31*	31.8	*1.25*	M10x 1.5							M10x 1.5
36	149.5	*5.89*	102	*4.02*														
40	154	*6.06*	106.5	*4.19*								26.19	*1.03*	52.37	*2.06*	25.4	*1*	
45	159	*6.25*	111.5	*4.39*														
50	164	*6.46*	116.5	*4.59*	35.71	*1.14*	69.85	*2.75*	38.1	*1.5*	M12x 1.75							
54	168	*6.61*	120.5	*4.74*														

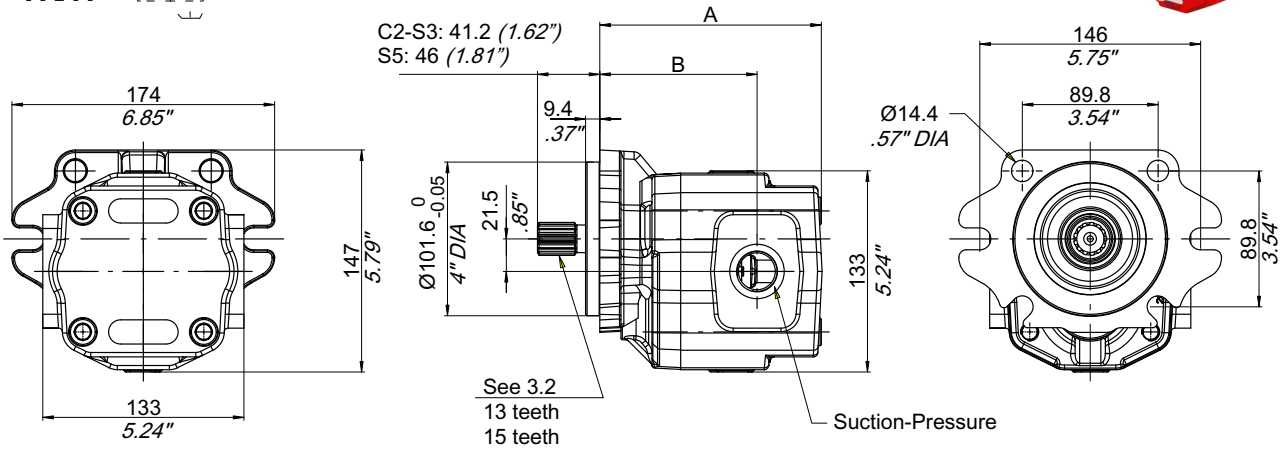
Motor description example:

APMR250HP/45_S_S38B2S G1

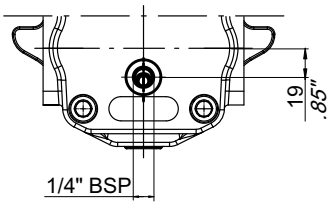
- APMR250HP: APM-APMR motor size
- 45: Displacement
- S: Rotation (S= Left-hand rotation, D= Right-hand rotation, R= reversible rotation)
- S38B2S: Series
- G1: Drain port 1/4" BSP (standard)



S38B8G
S58B8G



APMR External Drain



⚠ REVERSIBLE MOTORS CURRENTLY UNDER REVIEW

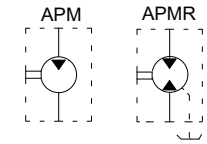
*In case of reversible motors, the smallest inlet/outlet ports available in the Catalog must be selected since they are both pressurizable (for any exceptions please consult Bucher Hydraulics)

Type	A		B		Outlet* BSPP	Inlet* BSPP
	mm	*inches*	mm	*inches*		
15	128	*5.04*	85.5	*3.37*	1”	3/4”
19	132	*5.20*	89.5	*3.52*		
23	136	*5.35*	93.5	*3.68*		
26	139.5	*5.49*	97	*3.82*		
29	142.5	*5.61*	100	*3.94*		
33	146.5	*5.77*	104	*4.09*		
36	149.5	*5.89*	102	*4.02*	1” 1/4	1”
40	154	*6.06*	106.5	*4.19*		
45	159	*6.25*	111.5	*4.39*		
50	164	*6.46*	116.5	*4.59*		
54	168	*6.61*	120.5	*4.74*		

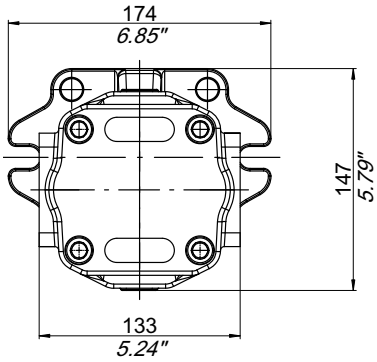
Motor description example:

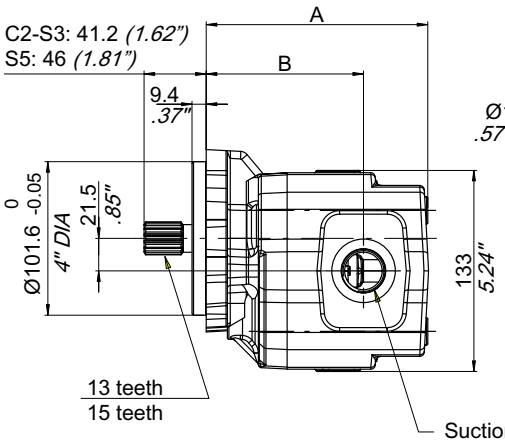
APMR250HP/15_S_S58B8G G1

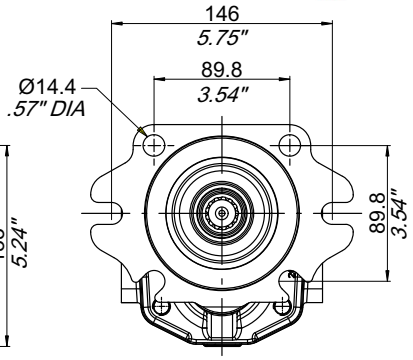
- APM-APMR motor size
- Displacement
- Rotation (S= Left-hand rotation, D= Right-hand rotation R= reversible rotation)
- Series
- Drain port 1/4” BSP (standard)



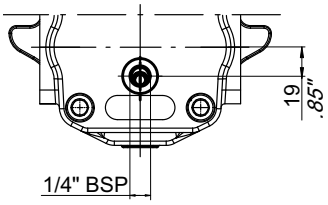
S38B8S
S58B8S







APMR External Drain



REVERSIBLE MOTORS CURRENTLY UNDER REVIEW

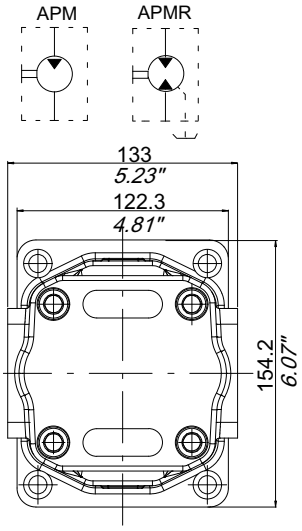
*In case of reversible motors, the smallest inlet/outlet ports available in the Catalog must be selected since they are both pressurizable (for any exceptions please consult Bucher Hydraulics)

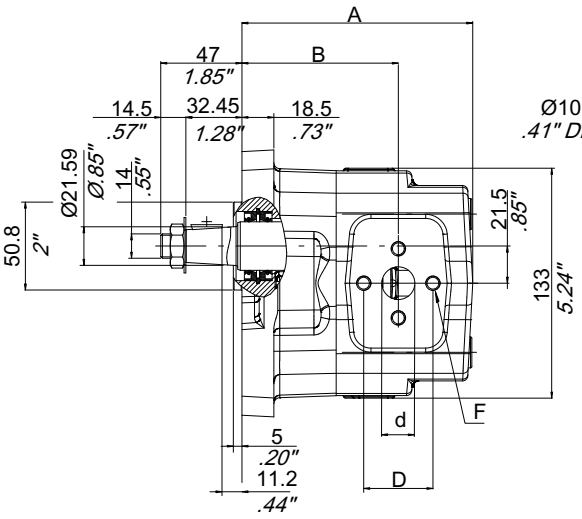
Type	A		B		Outlet* UNF	Inlet* UNF
	mm	*inches*	mm	*inches*		
15	128	*5.04*	85.5	*3.37*	1" UNF-2B (SAE16)	3/4" UNF-2B (SAE12)
19	132	*5.20*	89.5	*3.52*		
23	136	*5.35*	93.5	*3.68*		
26	139.5	*5.49*	97	*3.82*		
29	142.5	*5.61*	100	*3.94*		
33	146.5	*5.77*	104	*4.09*		
36	149.5	*5.89*	102	*4.02*	1 5/8" - 12 UNF-2B (SAE20)	1 5/16" - 12 UNF-2B (SAE16)
40	154	*6.06*	106.5	*4.19*		
45	159	*6.25*	111.5	*4.39*		
50	164	*6.46*	116.5	*4.59*		
54	168	*6.61*	120.5	*4.74*		

Motor description example:

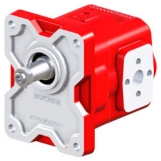
APMR250HP/19_S_S38B8S G1

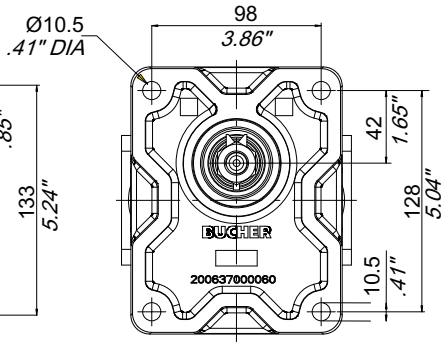
- APM-APMR motor size
- Displacement
- Rotation (S= Left-hand rotation, D= Right-hand rotation R= reversible rotation)
- Series
- Drain port 1/4" BSP (standard)



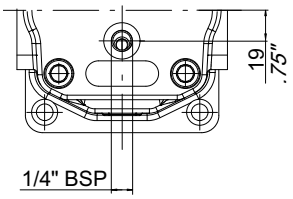


C81P2P





APMR External Drain



REVERSIBLE MOTORS CURRENTLY UNDER REVIEW

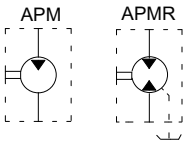
*In case of reversible motors, the smallest inlet/outlet ports available in the Catalog must be selected since they are both pressurizable (for any exceptions please consult Bucher Hydraulics)

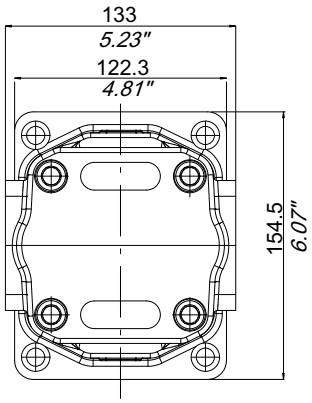
Type	A		B		Outlet*					Inlet*				
					d		D		F	d		D		F
	mm	*inches*	mm	*inches*	mm	*inches*	mm	inches	mm	mm	*inches*	mm	*inches*	mm
15	129	*5.79*	86.5	*3.41*	19	*.75*	40	*1.57*	M8x1.25	19	*.75*	40	*1.57*	M8x1.25
19	133	*5.24*	90.5	*3.56*										
23	137	*5.39*	94.5	*3.72*										
26	140.5	*5.53*	98	*3.86*										
29	143.5	*5.65*	101	*3.98*										
33	147.5	*5.81*	105	*4.13*										
36	150.5	*5.93*	103	*4.06*	25	*.98*	51	*2.01*	M10x1.5					
40	155	*6.10*	107.5	*4.23*										
45	160	*6.30*	112.5	*4.43*										
50	165	*6.50*	117.5	*4.63*										
54	169	*6.65*	121.5	*4.78*										

Motor description example:

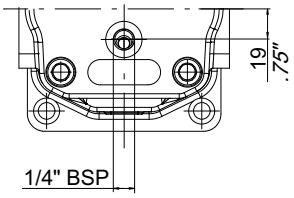
APMR250HP/19_S_C81P2 P RG1

- APM-APMR motor size
- Displacement
- Series
- Drain port 1/4" BSP (standard)
- Rotation (S= Left-hand rotation, D= Right-hand rotation R= reversible rotation)

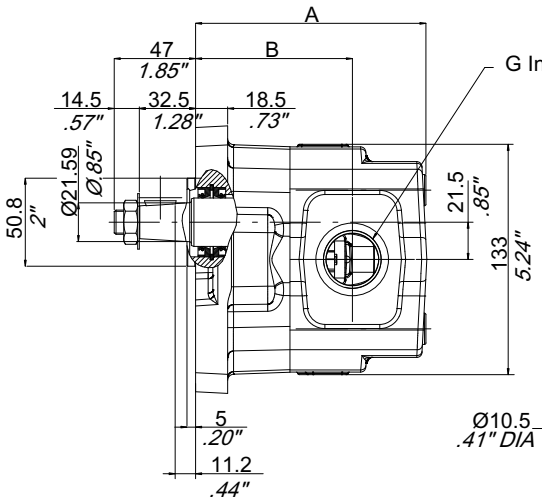


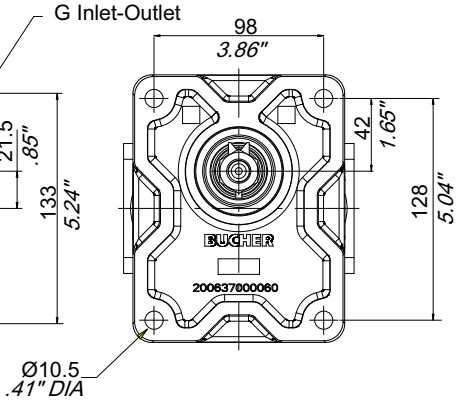


APMR External Drain



C81P8G





REVERSIBLE MOTORS CURRENTLY UNDER REVIEW

*In case of reversible motors, the smallest inlet/outlet ports available in the Catalog must be selected since they are both pressurizable (for any exceptions please consult Bucher Hydraulics)

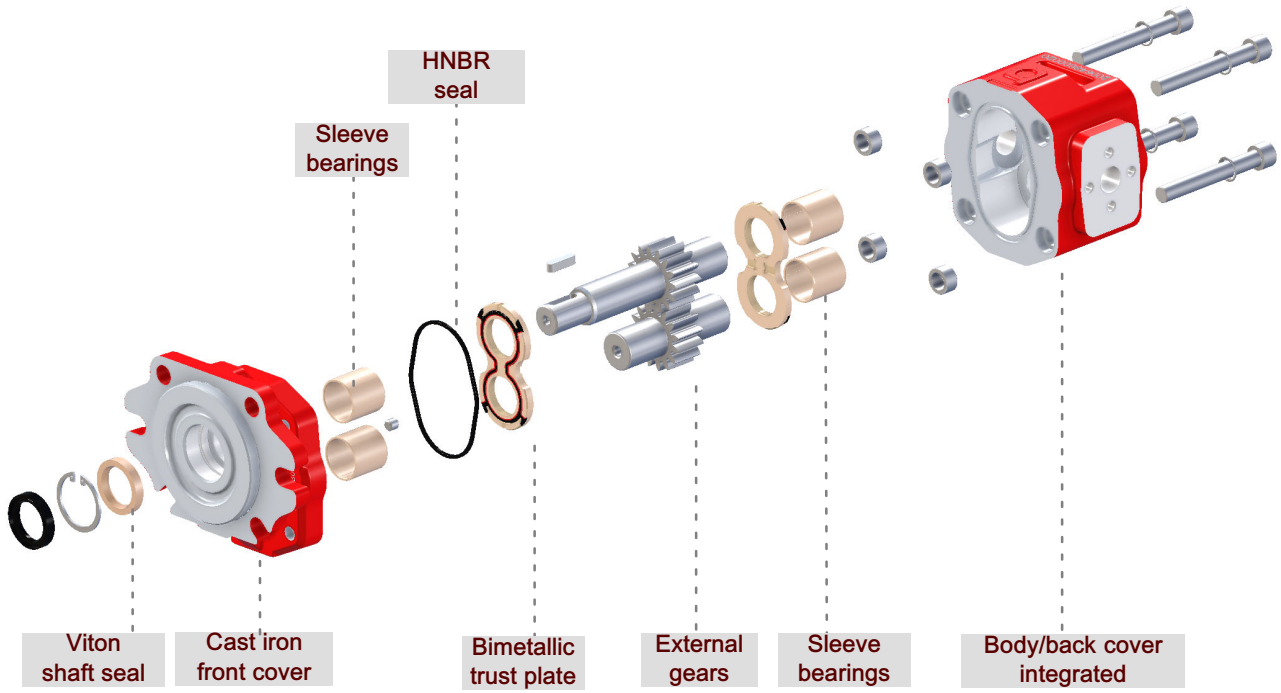
Type	A		B		Outlet*	Inlet*
Type	mm		mm		BSPP	BSPP
15	129	*5.79*	86.5	*3.41*	1”	3/4”
19	133	*5.24*	90.5	*3.56*		
23	137	*5.39*	94.5	*3.72*		
26	140.5	*5.53*	98	*3.86*		
29	143.5	*5.65*	101	*3.98*		
33	147.5	*5.81*	105	*4.13*		
36	150.5	*5.93*	103	*4.06*	1” 1/4	1”
40	155	*6.10*	107.5	*4.23*		
45	160	*6.30*	112.5	*4.43*		
50	165	*6.50*	117.5	*4.63*		
54	169	*6.65*	121.5	*4.78*		

Motor description example:

APMR250HP/19_S_C81P8G RG1

- APM-APMR motor size
- Displacement
- Series
- Rotation (S= Left-hand rotation, D= Right-hand rotation R= reversible rotation)
- Drain port 1/4” BSP (standard)

3 APM250HP Customised versions



In this section, APMR250HP motor can be configured and customized.

APMR250HP wide availability of covers, bodies and gears provides great flexibility to APMR250HP motor range and allows several different motor configurations.

In order to simplify the selection of the desired motor combination, a 'configurator form' is available and, by filling it out, it will guide you in the motor creation process.

⚠ REVERSIBLE MOTORS CURRENTLY UNDER REVIEW

3.1 Single motor customised versions order example

A	P	M	2	5	0	H	P	/	1	5	-	S	-	S	3	8	B	8	G	A	-												*

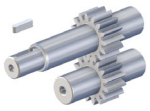
Function
APM= gear motor - unidirectional
APMR= gear motor - bidirectional-unidirectional

Series
250HP

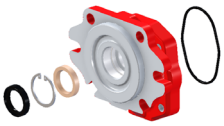
Displacement
15= 15.2 cm^3/rev
19= 19.1 cm^3/rev
23= 23 cm^3/rev
26= 26.4 cm^3/rev
29= 29.3 cm^3/rev
33= 33.2 cm^3/rev
36= 36.1 cm^3/rev
40= 40.5 cm^3/rev
45= 45.3 cm^3/rev
50= 50.2 cm^3/rev
54= 54 cm^3/rev

Rotation
S = Left-hand rotation
D = Right-hand rotation
Omitted if reversible version

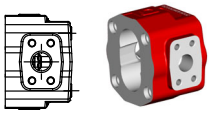
Shaft end code
see section 3.2



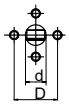
Front cover type
see section 3.3.1



Type of ports code
see section 3.3.2



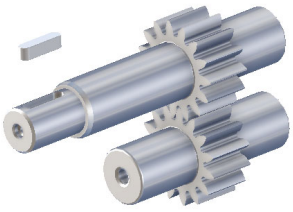
Inlet/outlet port size code combination
see section 3.3.2

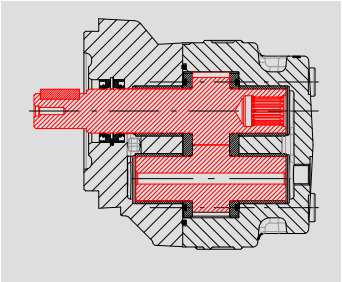


Circuits/Valves option
Example of several hydraulic circuits are available on demand (please consult Bucher Hydraulics)

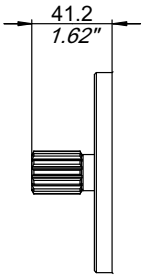
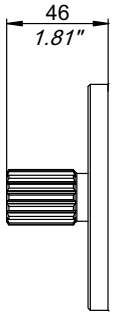
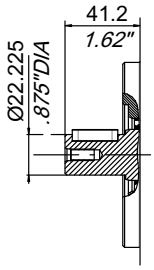
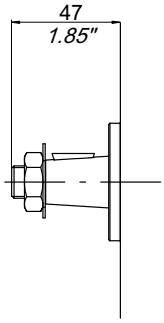
BHRE section :
Version - Progressive number (omitted)

3.2 Shaft end code



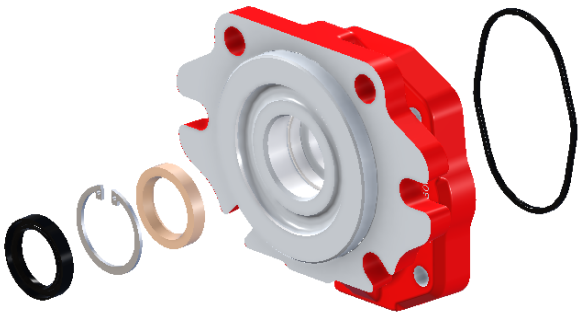


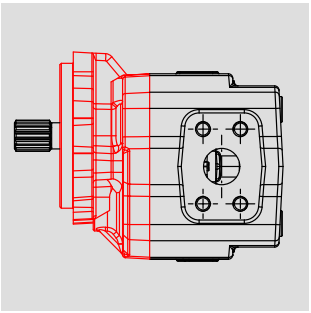
A	P	M	2	5	0	H	P	/	1	5	-	S	-	S	3											

Shaft end shape		Shaft end ordering code	Max torque
	13 teeth external spline SAE J 498-13T 16/32 DP	S3	T_{max}= 270 Nm
	15 teeth external spline SAE J 498-15T 16/32 DP	S5	T_{max}= 460 Nm
	Straight keyed Ø 22.225 mm - 0.875 inches	C2	T_{max}= 185 Nm
	Tapered 1:8	C8	T_{max}= 250 Nm

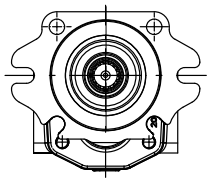
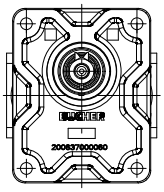
3.3 Front cover/mounting flange

3.3.1 Front cover type

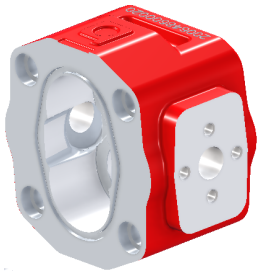


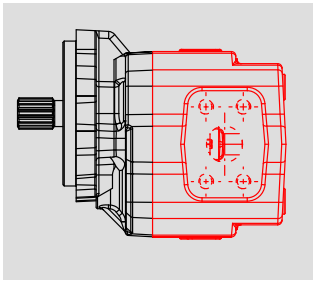


A	P	M	2	5	0	H	P	/	1	5	-	S	-	S	3	8	B									

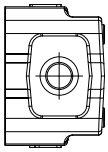
Type	Cast iron	
	Shape	Ordering code
SAE-B Two and four bolts (Ø 101.6 mm - 4 inches) with Viton shaft seal		8B
European rectangular (Ø50.8 mm - 2” inches) with Viton shaft seal		1P

3.3.2 Body type

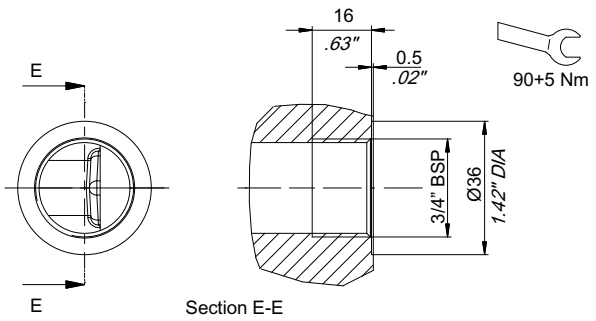




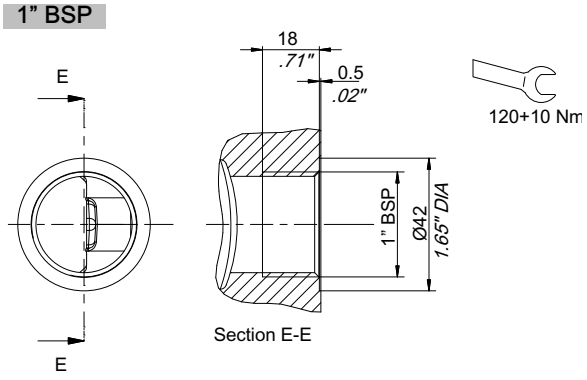
A	P	M	2	5	0	H	P	/	1	5	-	S	-	S	3	8	B	8	G	A					

Port type		Ordering code	Displacement	Dimension (mm - *inches*)		Ordering code
				Outlet	Inlet	
	BSP Ports	8G	15-33	1” BSP	3/4” BSP	A
			36-54	1 1/4” BSP	1” BSP	B

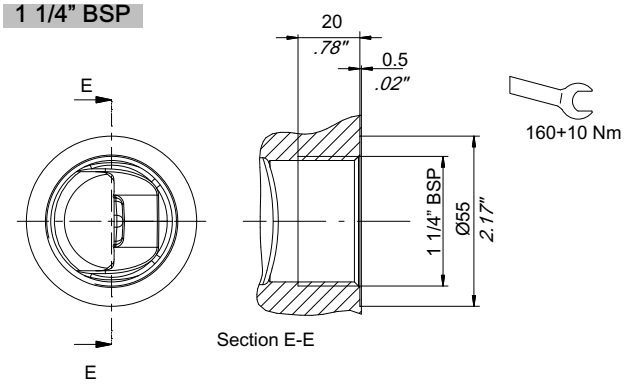
3/4” BSP



1” BSP



1 1/4” BSP



IMPORTANT!: Tightening torques depends on several different factors including lubrication, coating and surfaces finish. The fitting manufacturer shall be consulted.
In the interest of safety, only fittings with STRAIGHT THREAD ENDS should be used (e.g. DIN3852).
Fittings with TAPERED THREAD ENDS (e.g. DIN 3852 form C) should never be used, as they can cause deformation and cracks in the valve body.
Our warranty conditions will not be valid in case tapered fittings are used.
The work port adaptors have to be fastened respecting the tightening torque values indicated.

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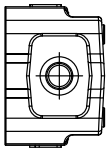
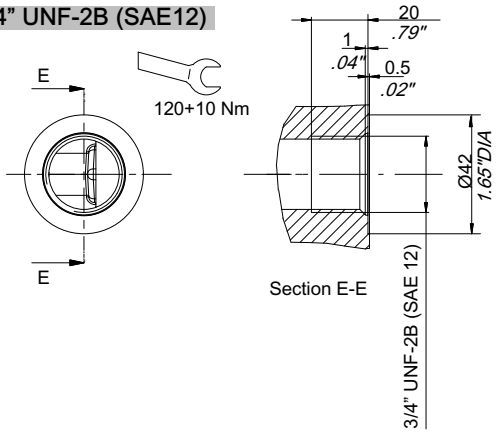
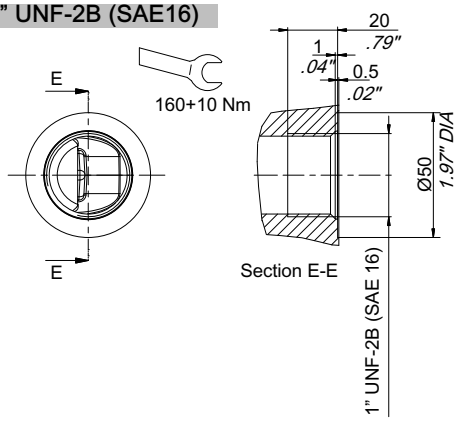
Port type		Ordering code	Displacement	Dimension (mm - *inches)*		Ordering code
				Outlet	Inlet	
	SAE threaded ports UNF	8S	15-33	1” UNF-2B (SAE16)	3/4” UNF-2B (SAE12)	A
			36-54	1 5/8”-12 UNF-2B (SAE20)	1 5/16”-12 UNF-2B (SAE16)	B

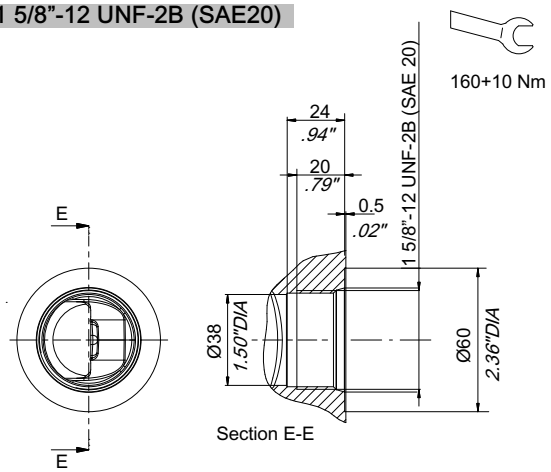
3/4” UNF-2B (SAE12)



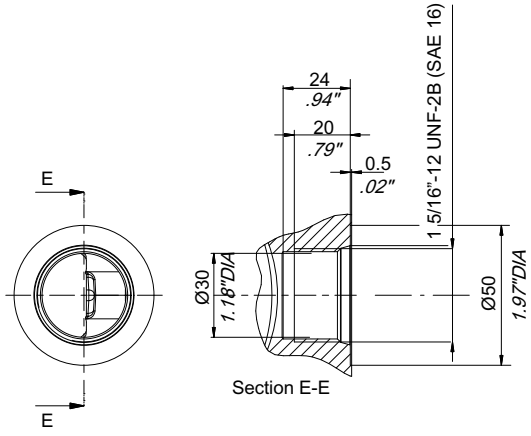
1” UNF-2B (SAE16)



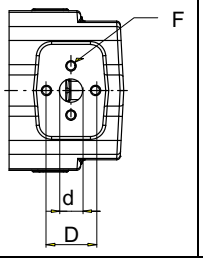
1 5/8”-12 UNF-2B (SAE20)



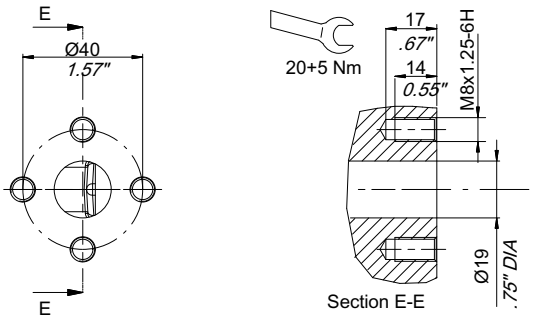
1 5/16” 12 UNF-2B (SAE16)



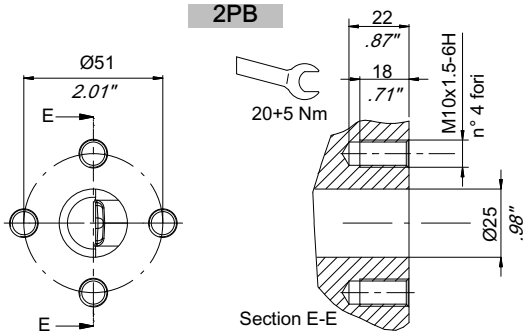
IMPORTANT!: Tightening torques depends on several different factors including lubrication, coating and surfaces finish. The fitting manufacturer shall be consulted.

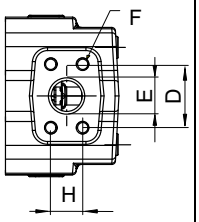
Port type		Ordering code	Displace-ment	Dimension (mm - *inches)*						Ordering code
				Outlet			Inlet			
				d	D	F	d	D	F	
	Europea n 4 bolt	2P	15-33	19 *.75*	40 *1.57*	M8x1.25	19 *.75*	40 *1.57*	M8x1.25	A
			36-54	25 *.98*	51 *2.01*	M10x1.5	19 *.75*	40 *1.57*	M8x1.25	B

2PA

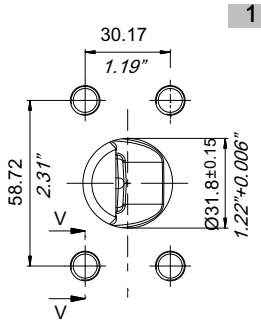


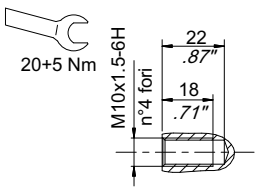
2PB



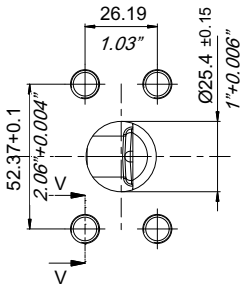
Port type		Ordering code	Displace-ment	Dimension (mm - *inches*)								Ordering code
				Oultet				Inlet				
				H	D	E	F	H	D	E	F	
	SAE FLANGED PORTS J518 (3000 PSI series)	2S	15-23	26.19 *1.03*	52.37 *2.06*	25.4 *1*	M10 x1.5	22.23 *.88*	47.63 *1.88*	19 *.75*	M10 x1.5	A
			26-40	30.17 *1.19*	58.72 *2.31*	31.8 *1.25*		26.19 *1.03*	52.37 *2.06*	25.4 *1*		B
			45-54	35.71 *1.14*	69.85 *2.75*	38.1 *1.5*	M12 x1.75					C

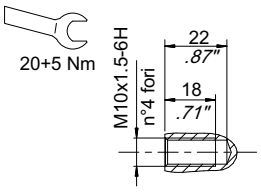
1 1/4”



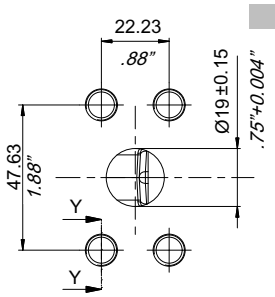


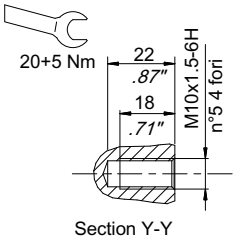
1”



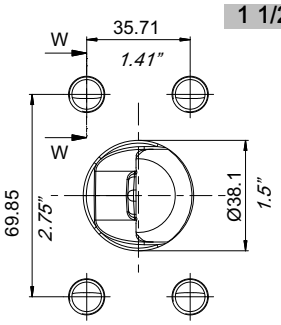


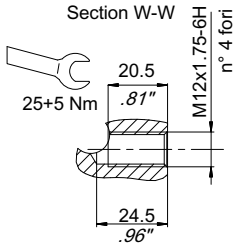
3/4”





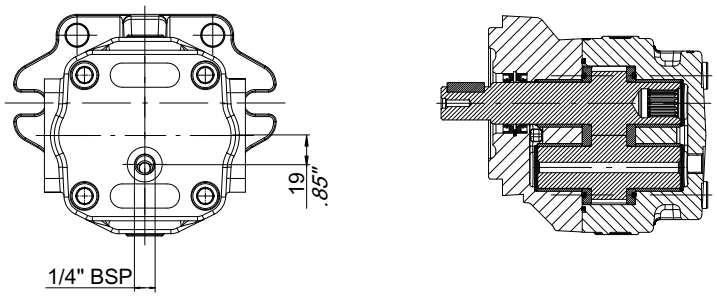
1 1/2””





	Other ports	9	If the requested port type is not included in the previous versions, please indicate number “9” and specify the details in the request note

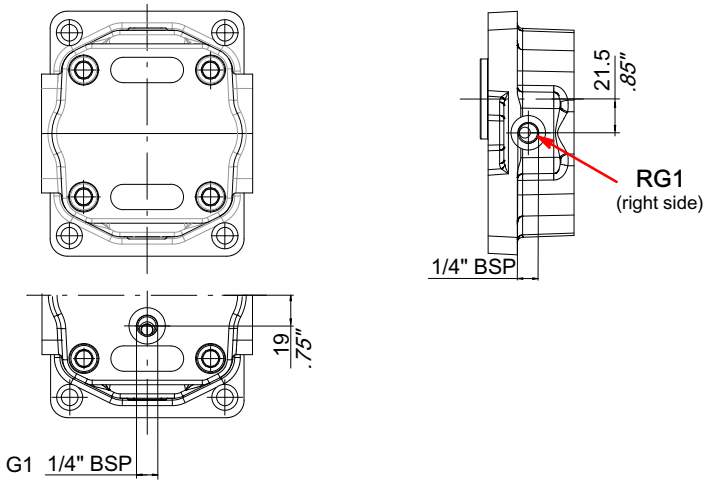
3.3.2.1 Cast iron body with rear drain port for SAE-B flange



A	P	M	R	2	5	0	H	P	/	1	5	-	C	2	8	B	-	2	P	A	-	G	1			

Type	Thread	Tightening torque	Ordering code
Rear drain line	1/4” BSP	30^{-6}_{+7} Nm	G1 (standard)
	SAE4	20^{-5}_{+5} Nm	G2
	M12x1.5	30^{-6}_{+7} Nm	G3

3.3.2.2 Cast iron body with rear or lateral (right) drain port for European front cover



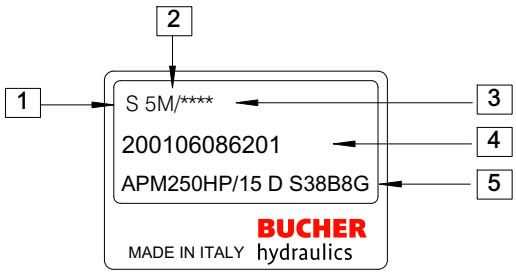
A	P	M	R	2	5	0	H	P	/	1	5	-	C	8	1	P	-	2	P	A	-	G	1			

Type	Thread	Tightening torque	Ordering code
Rear drain line	1/4” BSP	30^{-6}_{+7} Nm	G1 (standard)
	SAE4	20^{-5}_{+5} Nm	G2
	M12x1.5	30^{-6}_{+7} Nm	G3

A	P	M	R	2	5	0	H	P	/	1	5	-	C	8	1	P	-	2	P	A	-	R	G	1		

Type	Thread	Tightening torque	Ordering code
Lateral (right) drain line	1/4” BSP	30^{-6}_{+7} Nm	RG1 (standard)
	SAE4	20^{-5}_{+5} Nm	RG2
	M12x1.5	30^{-6}_{+7} Nm	RG3

4 Product identification plate



1 : Rotation (D= Clockwise rotation -
S= Counterclockwise rotation -
R= Reversible rotation)
2 : Manufacturing year and month
3 : Progressive identification no. (optional)
4 : Bucher Hydraulics S.p.A. product code
5 : Description

Manufacturing month	Manufacturing year				
	2024	2025	2026	2027	2028
January	4M	5M	6M	7M	8A
February	4N	5N	6N	7N	8B
March	4P	5P	6P	7P	8C
April	4Q	5Q	6Q	7Q	8D
May	4R	5R	6R	7R	8E
June	4S	5S	6S	7S	8F
July	4T	5T	6T	7T	8G
August	4U	5U	6U	7U	8H
September	4V	5V	6V	7V	8I
October	4Z	5Z	6Z	7Z	8J
November	4X	5X	6X	7X	8K
December	4Y	5Y	6Y	7Y	8L

5 Application form

Date:			
Contact:			
Customer:			
Location:			
Overall quantity per year:			
Minimum batch size:			
Delivery time requested:	Feasibility:	Prototypes:	Series:
Target price:			
Type of application:			

External gear motor general data						
	S	D	R		min	max
Rotation				Oil temperature (°C)		
Displacement of the motor (cm^3/rev)				Oil viscosity (cSt)	min	max
Drive shaft				Outlet line pressure		
Port type				Drain case pressure		
Front cover type				Radial load (N)		
Speed range				Axial load (N)		
Continuous work pressure (bar)				Working hours per year		
Peak work pressure (bar)				Cycles per year		
Oil type						

Additional notes:

BUCHER
hydraulics

info.it@bucherhydraulics.com www.bucherhydraulics.com

Classification: 410.110.000