# MOTORS M HYDRAULIC MOTORS



### TECHNICAL CATALOG







Clockwise or Counterclockwise

Displacement

Max. speed

Min. speed

Weight

Rotation

**Rated pressure** 

Max. pressure

# CONTENT





#### Methodology :

This document is intended for manufacturers of machines that incorporate Poclain Hydraulics products. It describes the technical characteristics of Poclain Hydraulics products and specifies installation conditions that will ensure optimum operation. This document includes important comments concerning safety. They are indicated in the following way:



Safety comment.

This document also includes essential operating instructions for the product and general information. These are indicated in the following way:

Essential instructions.
General information .
Information on the model number.Information on the model code.
Weight of component without oil.
Volume of oil.
Units.
Tightening torque.
Screws.
Information intended for Poclain-Hydraulics personnel.

The views in this document are created using metric standards. The dimensional data is given in mm and in inches (inches are between brackets and italic)



# **MOTOR MO**



### **MODEL CODE**



Motor M0

application engineer for further information.



### **CHARACTERISTICS**

#### **Features**

Displacement	cm³/rev [in³/rev.]	From 7,07 [0.43] to 17,84 [1.09]
Max. speed	rpm	3 600
Min. speed	rpm	500
Rated pressure	bar [PSI]	210 [3046]
Max. pressure	bar [PSI]	300 [4351]
Min. charge pressure	bar [PSI]	5-6 [72-87]
Mounting flange and shaft		Key shaft or splined shaft
Weight	kg <i>[lb]</i>	3,5 [7.72]
Rotation		Clockwise (B to A) or Counterclockwise (A to B)

#### **Motor Performance**

Power of the motor given at rated pressure and max. speed							
Displacement cm <sup>3</sup> /rev [in <sup>3</sup> /rev]	7,07 [0.43]	9,07 [0.55]	11,82 [0.72]	13,07 [0.80]	13,69 <i>[0.84]</i>	16,78 [1.02]	17,84 <i>[1.09]</i>
<b>Power</b> kW [hp]	8,9 [11.94]	11,4 [15.29]	14,9 [19.98]	16,5 [22.13]	17,2 [23.07]	21,1 [28.30]	22,5 [30.17]

#### Dimensions





### Mounting flanges and shaft



Splined info	
Standard	ANSI B92.1a-1996
Pitch	16/32" D.P.
Number of teeth	9
Pressure angle	30°
Tolerance class	5





V

02

04

#### Connections



Side connection



**Rear connection** 





40

# **OPTIONS**

Roller Bearing	ΟW			
1 2 3 4 M0 CR	Motor			
It is an optional high capacity bearing.				
Depending on the characteristics of shaft load, the duty cycle of the application and the expected life time of your application, Roller bearing might be needed.				
Consult your Poclain Hydraulics Application Engineer.				
Customized identification plate	M1			
It is possible to provide our products with dedicated plate (your part number engraved on the plate) when requested.	Motor			
This option is available only for minimum volume of 50 pieces.				
Consult your Poclain Hydraulics application engineer for other possibilities.	Motor M2			
Fluorinated elastomer seals				
MO 2 3 4 EV				
Standard NBR sealing are designed to resist temperatures up to 90°C [194° F] and HV type oils.				
If your application is outside these limits, fluorinated elastomer seals might be recommended.	r M3			
Consult your Poclain Hydraulics Application Engineer.				
UNF Thread ports				
1 2 3 4				
MOFU				
The power supply ports A, B and drain port T are also available with UNF threads.PortFunctionISO 11926-1 (option FU)A; BPower supply3/4-16 UNF-SAETDrain9/16-18 UNF-SAE	rating parameters			
	Ope			



#### Finishing coat



The motors can be delivered with finishing coat when requested. Standard paint is RAL 9005 (black color).



Consult your Poclain Hydraulics application engineer for other colors of topcoat.

# **MOTOR M1**



# 

ñ

1	
Displacement cm <sup>3</sup> /rev [in <sup>3</sup> /rev]	V
9,08 [0.55]	09
10,11 [0.62]	10
12,19 [0.74]	12
15,35 [0.94]	15
17,80 [1.09]	17
19,05 [1.16]	20
20,31 [1.24]	21

2	
Shaft	V
Key shaft (D=19 mm [0.75 inch])	C2
Splined shaft (Z=11; 16/32 D.P.)	<b>S</b> 2
Splined shaft (Z=13; 16/32 D.P.)	<b>S</b> 3

3	$\bot$
Connections	V
Side	02
Twin port	03
Rear	04
Side and rear	05

4	
Options	V
Without options	00
Roller bearings	CR
Customized identification plate	DP
Fluorinated elastomer seals	EV
Flange port	FS
UNF Thread ports	FU
Relief valve on "A"	MA
Relief valve on "B"	MB
Relief valve on "A+B"	MM
Finishing coat	PA
Anticavitation valve on "A"	RA
Anticavitation valve on "B"	RB
Anticavitation valve on "A+B"	RR
Rear drain port	RD
Flushing valve	VS

In case of request for a combination of several options, please contact your Poclain Hydraulics application engineer for further information.

5*	
High pressure relief valve setting Max. system pressure (bar [PSI])	V
150 [2175]	15
200 [2900]	20
250 [3625]	25
300 [4351]	30

\* Motors with option MA, MB, MM.

٦

## **CHARACTERISTICS**

#### **Features**

Displacement	cm³/rev [in³/rev.]	From 9,08 [0.55] to 20,31 [1.24]
Max. speed	rpm	3 600
Min. speed	rpm	500
Rated pressure	bar [PSI]	210 [3046]
Max. pressure	bar [PSI]	320 [4641]
Min. charge pressure	bar [PSI]	5-6 [72-87]
Mounting flange and shaft		SAE-A
Weight	kg <i>[lb]</i>	8 [17.64]
Rotation		Clockwise (B to A) or Counterclockwise (A to B)

#### **Motor Performance**

#### Power of the motor given at rated pressure and max. speed

Displacement cm <sup>3</sup> /rev [in <sup>3</sup> /rev]	9,08 <i>[0.55]</i>	12,19 [0.74]	15,35 <i>[0.94]</i>	17,80 <i>[1.09]</i>	19,05 <i>[1.16]</i>	20,31 <i>[1.24]</i>
Power kW [hp]	11,4 [15.29]	15,4 [20.65]	19,3 [25.88]	22,4 [30.04]	24,0 [32.18]	25,6 [34.33]

#### **Dimensions**





#### Mounting flanges and shaft



3

4

1

Splined info	
Standard	ANSI B92.1a-1996
Pitch	16/32" D.P.
Number of teeth	11
Pressure angle	30°
Tolerance class	5





#### Mounting flanges and shaft



# S3 Splined shaft

Max. torque: 220 Nm [1947 in.lbf]

Splined info	
Standard	ANSI B92.1a-1996
Pitch	16/32" D.P.
Number of teeth	13
Pressure angle	30°
Tolerance class	5













#### Connections



#### 05 Side and rear connection



# **OPTIONS**

Roller Bearing	MO
M 1 2 3 4 CR	Motor
It is an optional high capacity bearing.	
Depending on the characteristics of shaft load, the duty cycle of the application and the expected life time of your application, Roller bearing might be needed.	
Consult your Poclain Hydraulics Application Engineer.	
Customized identification plate	Ξ
It is possible to provide our products with dedicated plate (your part number engraved on the plate) when requested	Motor
This option is available only for minimum volume of 50 pieces.	
Consult your Poclain Hydraulics application engineer for other possibilities.	otor M2
	W
Fluorinated elastomer seals	
M 1 2 3 4 EV	
Standard NBR sealing are designed to resist temperatures up to 90°C [194° F] and HV type oils.	0
If your application is outside these limits, fluorinated elastomer seals might be recommended.	or M
Consult your Poclain Hydraulics Application Engineer.	Moto

**Operating parameters** 



#### Flange port

The A and B ports are SAE flange 6000.





#### **UNF Thread ports**



The power supply ports A, B and drain port T are also available with UNF threads.

Port	Function	ISO 11926-1 (option FU)
A; B	Power supply	3/4-16 UNF-SAE
Т	Drain	9/16-18 UNF-SAE







#### Finishing coat



The motors can be delivered with finishing coat when requested. Standard paint is RAL 9005 (black color).



Consult your Poclain Hydraulics application engineer for other colors of topcoat.

#### Anticavitation valve on "A"



A check valve with anticavitation function is available for A side.



#### Anticavitation valve on "B"



A check valve with anticavitation function is available for B side.





#### Anticavitation valve on "A+B"



A check valve with anticavitation function is available for A and B side.



#### **Rear drain port**



The drain connection is available in the rear side of the motor.



#### **Flushing valve**



An exchange valve is available for M1 motor. The valve is integrated in the motor cover and permits to control the temperature in the circuit by a flow that is directed from the low pressure side to the motor housing.



Motor M0



# **MOTOR M2**



### **MODEL CODE** M 2

1		
Displacement cm <sup>3</sup> /rev [in <sup>3</sup> /rev]		
21,05 <i>[1.28]</i>	21	
24,41 [1.49]	24	
28,34 [1.73]	28	

28,34 [1.73] 34,36 [2.10] 34 40 41,11 [2.51] 45,34 [2.77] 45 49,06 [2.99] 50

2		
Shaft	V	
Key shaft (D=22,22 mm [0.87 inch])	<b>C</b> 3	
Key shaft (D=25 mm [0.98 inch])	<b>D6</b>	
Splined shaft (Z=13; 16/32 D.P.)	<b>S</b> 3	
Splined shaft (Z=15; 16/32 D.P.)	<b>S4</b>	

3	$\bot$
Connections	V
Side	02
Twin port	03
Rear	04
Side and rear	05

4	4
Options	V
Without options	00
Roller bearings	CR
Customized identification plate	DP
Fluorinated elastomer seals	EV
Flange port	FS
UNF Thread ports	FU
Relief valve on "A"	MA
Relief valve on "B"	MB
Relief valve on "A+B"	MM
Finishing coat	PA
Anticavitation valve on "A"	RA
Anticavitation valve on "B"	RB
Rear drain port	RD
T4 speed sensor (without rotation direction)	SS
Flushing valve	VS

In case of request for a combination of several options, please contact your Poclain Hydraulics application engineer for further information.

5*	
High pressure relief valve setting Max. system pressure (bar [PSI])	V
150 [2175]	15
200 [2900]	20
250 [3625]	25
300 [4351]	30
* Motors with option MA, MB, MM.	

Motor M1

**Motor M0** 



# **CHARACTERISTICS**

#### **Features**

Displacement	cm³/rev [in³/rev.]	From 21,05 [1.28] to 49,06 [2.99]	
Max. speed	rpm	3 600	
Min. speed	rpm	500	
Rated pressure	bar [PSI]	210 [3046]	
Max. pressure	bar [PSI]	315 [4569]	
Min. charge pressure	bar [PSI]	5-6 [72-87]	
Mounting flange and shaft		SAE-B	
Weight	kg <i>[lb]</i>	12 [26.46]	
Rotation		Clockwise (B to A) or Counterclockwise (A to B)	
Rotation Kg [ID]		Clockwise ( <b>B</b> to <b>A</b> ) or Counterclockwise ( <b>A</b> to <b>B</b> )	

#### **Motor Performance**

#### Power of the motor given at rated pressure and max. speed

Displacement cm <sup>3</sup> /rev [in <sup>3</sup> /rev]	21,05 [1.28]	24,41 <i>[1.49]</i>	28,34 [1.73]	34,36 [2.10]	41,11 [2.51]	45,34 [2.77]	49,06 [2.99]
Power kW [hp]	26,5 [35.54]	30,8 [41.30]	35,7 [47.87]	43,3 [58.07]	51,8 <i>[69.46]</i>	57,1 [76.57]	61,8 [82.88]

#### Dimensions





Rotation	Flow direction
Clockwise (CW)	B to A
Counter clockwise (CCW)	A to B



# fre a

**Motor M0** 

#### Mounting flanges and shaft







Motor M1



#### Mounting flanges and shafts



Splined info	
Standard	ANSI B92.1a-1996
Pitch	16/32" D.P.
Number of teeth	15
Pressure angle	30°
Tolerance class	5



#### POCLAIN HYDRAULICS

### Connections







**Motor M2** 



Ý 04

#### Connections



#### **Rear connection**



#### Side and rear connection



### **OPTIONS**





#### Flange port

The A and B ports are SAE flange 6000.





### **UNF Thread ports**



The power supply ports A, B and drain port T are also available with UNF threads.

Port	Function	ISO 11926-1 (option FU)
A; B	Power supply	1-1/16-12 UNF
Т	Drain	3/4-16 UNF







#### **Finishing coat**



The motors can be delivered with finishing coat when requested. Standard paint is RAL 9005 (black color).



Consult your Poclain Hydraulics application engineer for other colors of topcoat.

#### Anticavitation valve on "A"



A check valve with anticavitation function is available for A side.



#### Anticavitation valve on "B"



A check valve with anticavitation function is available for B side.



#### POCLAIN HYDRAULICS

#### Rear drain port



The drain connection is available in the rear side of the motor.



#### **Speed sensor**



A speed sensor can be installed on M2 motor.





Look at the "Mobile Electronic" N° A01889D technical catalogue for the sensor specifications and its connection.

Speed sensor sends a signal of 9 pulses per revolution.

#### Flushing valve



An exchange valve is available for M2 motor. The valve is integrated in the motor cover and permits to control the temperature in the circuit by a flow that is directed from the low pressure side to the motor housing.



# **MOTOR M3**



**Motor M0** 

\* Motors with option MA, MB, MM.



# **CHARACTERISTICS**

#### **Features**

Displacement	cm³/rev [in³/rev.]	From 49,57 [3.02] to 64,60 [3.94]
Max. speed	rpm	3 600
Min. speed	rpm	500
Rated pressure	bar [PSI]	250 [3625]
Max. pressure	bar [PSI]	350 [5076]
Min. charge pressure	bar [PSI]	5-6 [72-87]
Mounting flange and shaft		SAE-B
Weight	kg <i>[lb]</i>	15 [33.07]
Rotation		Clockwise (B to A) or Counterclockwise (A to B)

#### **Motor Performance**

#### Power of the motor given at rated pressure and max. speed

Displacement cm <sup>3</sup> /rev [in <sup>3</sup> /rev]	49,57 [3.02]	57,01 <i>[3.48]</i>	60,79 [3.71]	64,60 [3.94]
Power kW [hp]	74,4 [99.77]	85,5 [114.66]	91,2 [122.30]	96,9 [129.95]

#### Dimensions







Rotation	Flow direction
Clockwise (CW)	B to A
Counter clockwise (CCW)	A to B





#### Mounting flanges and shafts



Splined info	
Standard	ANSI B92.1a-1996
Pitch	16/32" D.P.
Number of teeth	15
Pressure angle	30°
Tolerance class	5



**Operating parameters** 



#### Connections



#### POCLAIN HYDRAULICS

#### Connections



### 05 Side and rear connection





**Motor M0** 

Motor M1



# **OPTIONS**



#### **Fluorinated elastomer seals**



Standard NBR sealing are designed to resist temperatures up to 90°C [194° F] and HV type oils.

If your application is outside these limits, fluorinated elastomer seals might be recommended.

Consult your Poclain Hydraulics Application Engineer.



#### Flange port

The A and B ports are SAE flange 6000.



Port	Function	ISO 11926-1 (option FU)
A; B	Power supply	1-1/16-12 UNF
Т	Drain	3/4-16 UNF

41

**Operating parameters** 





#### POCLAIN HYDRAULICS



#### Anticavitation valve on "B"



A check valve with anticavitation function is available for B side.



#### Anticavitation valve on "A+B"



A check valve with anticavitation function is available for A and B side.



#### **Rear drain port**



The drain connection is available in the rear side of the motor.



#### POCLAIN HYDRAULICS

**Motor M0** 

Motor M1

**Motor M2** 

#### Installed speed sensor



A speed sensor can be installed on M3 motor.

ñ



Look at the "Mobile Electronic" N° A01889D technical catalogue for the sensor specifications and its connection.

Speed sensor sends a signal of 9 pulses per revolution.

#### **Flushing valve**



An exchange valve is available for M3 motor. The valve is integrated in the motor cover and permits to control the temperature in the circuit by a flow that is directed from the low pressure side to the motor housing.



Motor M3



# **OPERATING PARAMETERS**

#### Poclain Hydraulics recommandations for fluid



Poclain hydraulics recommends the use of hydraulic fluids defined by the ISO 15380 and ISO 6743-4 standards. For temperate climates, the following types are recommended.

- HM 46 or HM 68 for fixed installations.
- HV 46 or HV 68 for mobile installations.
- HEES 46 for mobile installations.

These specifications correspond to category 91H of the CETOP standard, parts 1, 2 and 3 of the DIN 51524 standard, and grades VG32, VG 46 and VG68 of the ISO 6743-4 standards.

It is also possible to use ATF, HD, HFB, HFC or HFD type hydraulic fluid upon Poclain Hydraulics specific approval of the components' operating conditions.

Standardized designations for the fluids

- HM : Mineral fluids having specific antioxidant, anticorrosion and antiwear properties (HLP equivalent to DIN 51524 parts 1 and 2).
- HV : HM mineral fluids providing improved temperature and viscosity properties (DIN 51524 part 3).
- HEES :Biodegradable fluids based on organic esters.

It is also possible to use a fluid that meets the biodegradability criteria and is compatible in the event of accidental food contact. The BIOHYDRAN FG 46 fluid designed by the company Total has undergone testing of its properties and performance on our test benches. Since this type of fluid has not yet been categorized, it is the responsibility of machine manufacturers to validate its compatibility with all of the components used in order to guarantee that the intended functions will be fulfilled and this for the desired life time of all equipment items.



For biodegradable fluids, consult your Poclain Hydraulics' application engineer



During operation, the temperature of the oil must be between  $0^{\circ}C$  [32°F] and 80°C [176°F]; the minimum and maximum temperatures may be exceeded momentarily by  $\pm 20^{\circ}C$  [ $\pm 68^{\circ}F$ ] for a duration of less than 30 minutes. For all applications outside these limits, please consult with your Poclain Hydraulics' application engineer.

#### Fluid and filtration

The contaminating particles suspended in the hydraulic fluid cause the hydraulic mechanisms moving part wear. On hydraulic pumps, these parts operate with very small dimensional tolerances. In order to reach the part life, it is recommended to use a filter that maintains the hydraulic fluid contamination class at a max. of:

9 according to NAS 1638 20/18/15 according to ISO 4406:1999

According to the type of application decided for the pump, it is necessary to use filtration elements with a filtration ratio of:

β 20 to 30 ≥ 100

Making sure that this ratio does not worsen together with the increasing of the filter cartridge differential pressure.

If these values cannot be observed, the component life will consequently be reduced and it is recommended to contact the Poclain Hydraulics Customer Service.

#### Filters on charge circuit

Filters on the charge circuit (F0-F2) are designed without by-pass. The max. pressure drop on the filtration part must not exceed 2 bar [29 PSI] (3 bar [43.5 PSI] in case of cold starting) at pump full rating. To monitor the pressure drop, It is recommended to use the clogging indicator on the filtration element (F2 option). Contact your Poclain Hydraulics Application engineer, each time the pump is not charged by its internal charge pump.

Filters on charge circuit are mounted on the pump special support.

#### Filters assembling

The suction filter is mounted on the suction line. Check that the pressure before the charge pump is 0.8 bar abs. [11.6 PSI abs.], measured on the pump suction port (0.5 bar [7.2 PSI] for cold starting).

#### **Viscosity range**

For both max. efficiency and life of the unit, the operative viscosity should be chosen within the optimum range of:  $\sqrt{\text{opt}}$  = optimum operating viscosity from 16 to 36 mm<sup>2</sup>/s [from 74.1 to 166.8 SUS] referred to the closed loop temperature.

#### Working conditions: the following limits of viscosity apply

are concurrently satisfied.

 $\sqrt{\text{min}} = 5 \text{ mm}^2/\text{s}$  [23 SUS] short-duration at a max. permissible leakage oil temperature of 90° C [194°F]  $\sqrt{\text{max}} = 1000 \text{ mm}^2/\text{s}$  [4 634 SUS] short-duration, on cold start.



1





Poclain Hydraulics reserves the right to make any modifications it deems necessary to the products described in this document without prior notification. The information contained in this document must be confirmed by Poclain Hydraulics before any order is submitted.

Illustrations are not binding.

The Poclain Hydraulics brand is the property of Poclain Hydraulics S.A.





www.poclain-hydraulics.com