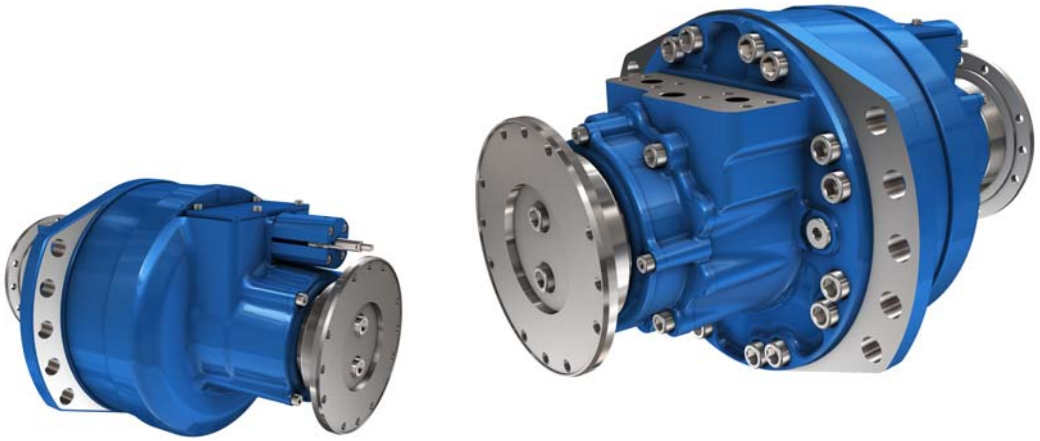
CDM 20

CREEPDRIVE MOTOR



TECHNICAL CATALOG

POCLAIN Hydraulics

FOREWORD

Product description

A vehicle equipped with a CDM20 motor features two independent transmission types :

- hydrostatic
- mechanical.

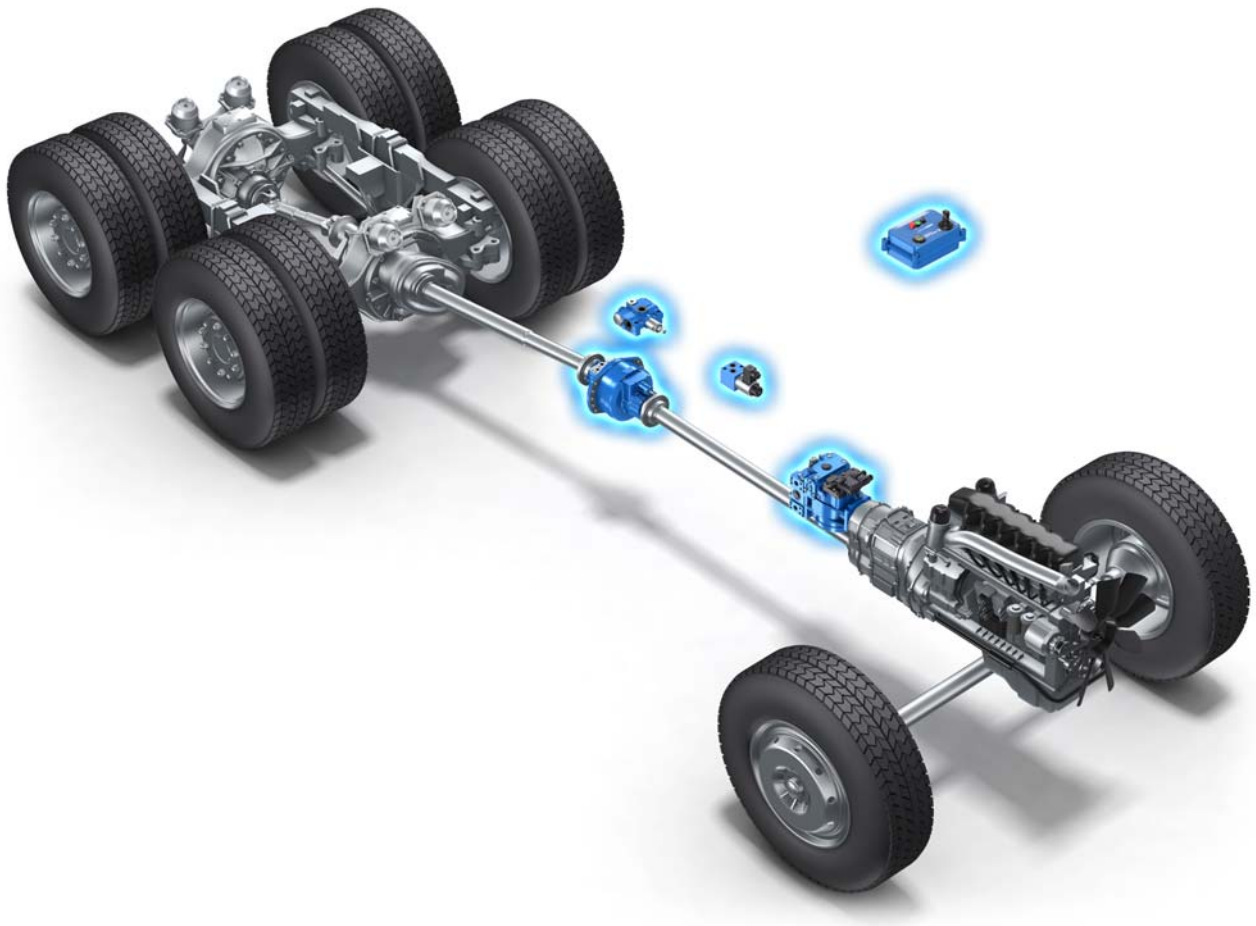
Shifting from one transmission to another is done by flipping a switch.

A CDM20 equipped vehicle uses the mechanical transmission when traveling on the road, and the hydraulic transmission when doing work at low speeds (CreepDrive mode). When the hydrostatic transmission is applied, using a closed loop system design, the wear on the primary brake system is reduced due to the braking provided by the hydrostatic system.

To use the hydrostatic drive, the gearbox is set at neutral while the engine PTO is engaged to drive the pump that supplies flow to the CDM20 motor. When the hydrostatic transmission is engaged, the maximum speed and torque are driven by the CreepDrive system.

The CDM20 motor eases remote control of the machine. At low speed, the electronic control is responsible for starting the vehicle smoothly, regulating the cruise control and ensuring safe braking. This allows the driver to focus on the quality of his work.

The CDM20 motor is at the heart of the system.
Mechanically linked to the transmission shaft at its input and output, the CDM20 motor is placed between the transmission and the drive axle.
A light and compact package can fit every type of transmission brand.



CONTENT

MODEL

B					C	D			F		P	
1	2	3	4	5	1	1	2	3	1	2	1	2
C	D	M	2	0							P	1

C1

Displacement cm^3/tr *[cu.in/rev.]*		
1 displacement	**2 displacements**	
1 416 *[86.3]*	708 *[43.2]*	**7**
1 630 *[99.4]*	815 *[49.7]*	**8**
1 821 *[111.1]*	910 *[55.6]*	**9**
2 029 *[123.8]*	1 014 *[61.9]*	**0**
2 228 *[135.9]*	1 114 *[67.9]*	**1**
2 427 *[148.1]*	1 214 *[74.0]*	**2**

D1

Valving type		
Symmetrical	Ratio 2	**A**
	Ratio <2	**B**
	Ratio >2	**C**

D2

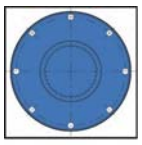
Valving cover	
Through hole chassis mount	**2**
Through hole chassis mount + Exchange	**5**

D3

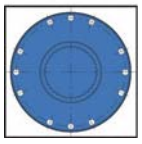
Connections	
HP: ISO 6162 (SAE flanges): DN19 PN400 LP: ISO 9974-1 (metric + spot face ports): M22x1,5	**1**
HP: ISO 6162 (SAE flanges): DN19 PN400 LP: ISO 1179-1 (BSPP + spot face ports): G21	**2**
HP: ISO 9974-1 (metric +spot face): M27x2 LP: ISO 9974-1 (metric + spot face): M22x1,5	**4**
HP: ISO 6162 (SAE flanges): DN19 PN400 LP: ISO 9974-1 (metric + spot face): 7/8”-14 UNF	**7**
HP: ISO 6162 (SAE flanges): DN19 PN400 LP: ISO 9974-1 (metric + spot face ports): M22x1,5	**9**
HP: ISO 11926-1 (SAE J514 with O-ring seal) 1” 1/16-12 UN LP: ISO 11926-1 (SAE J514 with O-ring seal) 7/8”-14 UNF	**A**

SAE (ISO 7647)

F 1 2 — 1 □

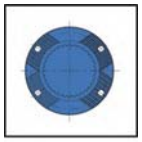


F 1 2 — 2 □

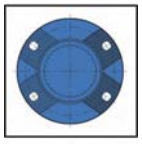


XS (ISO 8667)

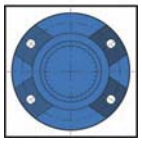
F 1 2 — B □



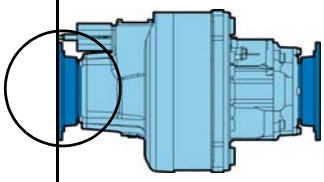
F 1 2 — C □



F 1 2 — D □



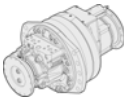
Companion flange



F1

Input shaft type *		
1	SAE (ISO 7647)	1650/1710 Series
2		1810 Series
B	XS (ISO 8667)	150 Series
C		180 Series
D		200 Series

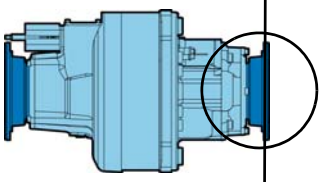
* End yokes may be available upon request.



CODE

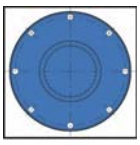
T		S					
1	2	1	2	3	4	5	6
S	1	Y					

Companion flange

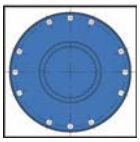


SAE (ISO 7647)

F 1 2 = 1

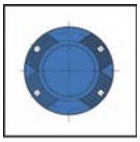


F 1 2 = 2



XS (ISO 8667)

F 1 2 = B



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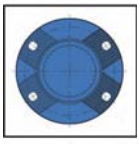
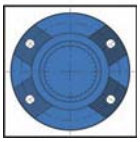


F 1 2 = D



O1

Standard	
Extra drain	Y
Tight piston rings	
Low pressure drop valving	
Speed sensor T4	
High temperature bushings	

O2-O3

Options	
Without option	0
Special paint or no paint (RAL 7015 grey topcoat as standard)	D
Customized identification plate	P

F2

Output shaft type		
SAE (ISO 7647)	1650/1710 Series	1
	1810 Series	2
XS (ISO 8667)	150 Series	B
	180 Series	C
	200 Series	D

* End yokes may be available upon request.

SAFETY INSTRUCTIONS

Display of safety instructions

Standardized safety instructions, symbols, terms and abbreviations are used so that you can use this documentation to work quickly and safely with your product. To give you a better understanding they are explained in the sections below.

⚠ SIGNAL WORD **Type and source of the hazard!**

Consequences of not avoiding the hazard.

- Indication of how to avoid the hazard.

- **Safety sign:** Draws attention to the hazard.
- **Signal word:** Identifies the degree of the hazard.
- **Type and source of hazard:** Identifies the type and source of the hazard.
- **Precautions:** States how to avoid the hazard.

Danger classes in accordance with ANSI Z535.6

Safety sign, Signal word	Meaning
⚠ DANGER	**Identifies a dangerous situation that will result in death or serious injury if not avoided.**
⚠ WARNING	**Identifies a dangerous situation that may result in death or serious injury if not avoided.**
⚠ CAUTION	**Identifies a dangerous situation that will result in moderate or minor injuries if not avoided.**
NOTICE	**Damage to equipment: the product or the environment risks damage.**

Symbols

The following symbols mark notes that are not relevant to personal safety, but are intended to make this documentation easier to understand.

Symbol	Meaning
	**Poclain Hydraulics cannot accept any responsibility or liability for damages if use is not compliant with our installation guide.**
	**General information regarding the product or the repair procedure.**
	**Information on the model number.**
	**Weight of component without oil.**
	**Volume of oil.**
	**Units.**
	**Tightening torque.**
	**Screws.**
	**Information intended for Poclain-Hydraulics personnel.**

AND METHODOLOGY

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)

General safety instruction

⚠WARNING **CreepDrive™ motors are not equipped with a brake!**

Risk to life or injury in case of loss of hydrostatic braking. The CreepDrive™ motor will not stop the vehicle.

- CreepDrive motors must be installed only on vehicles that are equipped with an independent braking system.

⚠WARNING **CreepDrive™ motors are not intended for use outside listed torque limits.**

Danger to life or risk of injury in case od break in the driveline.

- Functional Torque Limit (FTL) means the torque to which the driveshaft can be loaded without yielding or creating plastic deformation of any of the parts that adversely affect the driveshaft kinematics or durability.
- For dynamic applications, proper product selection must be checked depending on expected service life and torque duty cycle. If needed, contact your Poclain Hydraulics application engineer.

⚠CAUTION **Not all SAE flange connections can transmit the FTL by friction.**

Risk of premature wear and failure if friction connections are torqued beyond their capabilities.

- Poclain Hydraulics does not guarantee the capability of standard-defined interfaces to meet the requirements of all applications.

General installation instruction

NOTICE **Damage to equipment due to improper installation procedure.**

Risk of damage to the motor.

- Use Poclain Hydraulics motor installation guide No. 801478127K.

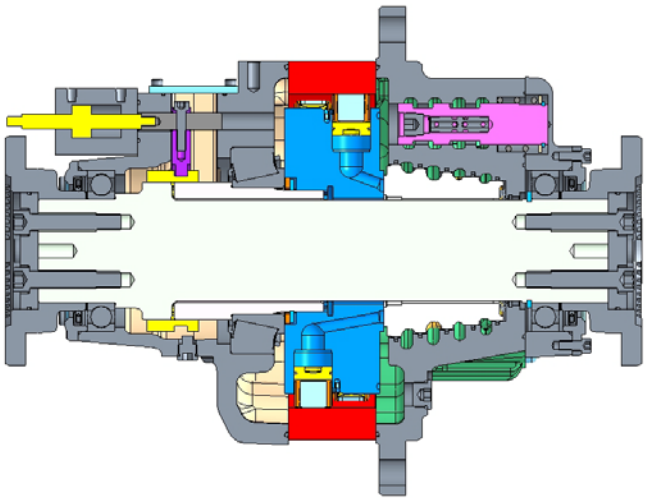
Inappropriate components or products used in a system or application relevant to safety could result in serious damage to person or property. Use only permitted products or components mentioned in the machine or equipment manufacturer´s documentation especially for safety system or control parts.

Improper use

Any use other than that described as intended use is considered improper and is therefore impermissible. Poclain Hydraulics accepts no liability whatsoever for damage resulting from improper use. The user bears all risks arising from improper use.

CHARACTERISTICS

Longitudinal section



160 kg *[353 lbs]*

4 L *[244.1 in³]*

Hydrostatic operation (CreepDrive™ mode)

		C	7		8		9		0		1		2	
Max. pressure	bar *[PSI]*		450 *[6 526]*		450 *[6 526]*		450 *[6 526]*		450 *[6 526]*		450 *[6 526]*		450 *[6 526]*	
			❶	❷	❶	❷	❶	❷	❶	❷	❶	❷	❶	❷
Displacement	cm³/rev *[in³/rev]*		1 416 *[86.4]*	708 *[43.2]*	1 630 *[99.5]*	815 *[49.7]*	1 821 *[111.1]*	910 *[55.5]*	2 029 *[123.8]*	1 014 *[61.9]*	2 228 *[135.9]*	1 114 *[68]*	2 427 *[148.1]*	1 214 *[74.1]*
Max. speed	rpm		248	363	215	315	193	282	173	253	157	230	145	212
Max. power	kW *[HP]*		175 *[235]*	160 *[214]*	165 *[221]*	150 *[201]*	150 *[201]*	135 *[181]*	140 *[188]*	125 *[168]*	120 *[161]*	120 *[161]*	105 *[141]*	105 *[141]*
Th. torque at 100 bar *[1000 PSI]*	Nm *[lb.ft]*		2 254 *[1 662]*	1 126 *[830]*	2 594 *[1 913]*	1 296 *[956]*	2 898 *[2 137]*	1 447 *[1 037]*	3 229 *[2 382]*	1 614 *[1 190]*	3 546 *[2 615]*	1 773 *[1 308]*	3 863 *[2 849]*	1 932 *[1 425]*
Max. continuous case pressure	bar *[PSI]*		1 *[14.5]*											
Max. peak case pressure			3 *[43.5]*											

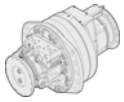
Mechanical operation (road mode)

Max. speed without case flushing	rpm	3250
Max. speed with case flushing		3700
Max. continuous case pressure	bar *[PSI]*	0,5 *[7.25]*

Torque capacity

Companion flange		XS150	XS180	XS200	SAE 1710	SAE 1810
Defining standard		ISO 8667	ISO 8667	ISO 8667	ISO 7647	ISO 7647
Functional Torque Limit (FTL)	Nm *[lb.ft]*	14 000 *[10 326]*	27 200 *[20 062]*	27 200 *[20 062]*	15 700 *[11 580]*	22 000 *[16 226]*
Hydrostatic torque limit		8 900 *[6 564]*	16 600 *[12 244]*	16 600 *[12 244]*	10 700 *[7 892]*	13 700 *[10 105]*

In case of requirement of constant speed below 0,4 km/h *[0.25 MPH]*, consult your Poclain Hydraulics application engineer.



WARNING **Torque limits are dependent upon duty cycle.**

Danger to life or risk of injury in case of break in the driveline.

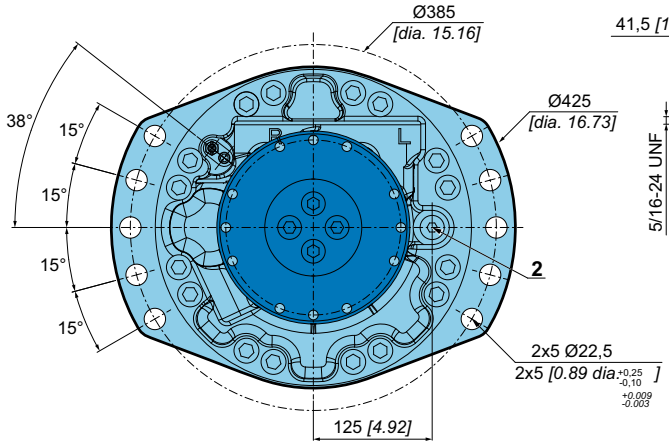
- The hydrostatic torque limit is defined for operation in hydrostatic mode only. For a more precise evaluation of your duty cycle, please contact your Poclain Hydraulics application engineer.
- Poclain Hydraulics recommends you contact your application engineer if you plan on exceeding 50% of the Functional Torque Limit (FTL).
- Poclain Hydraulics recommends that you include a torque control in your system in order to ensure that the motor does not exceed the hydrostatic torque limit.

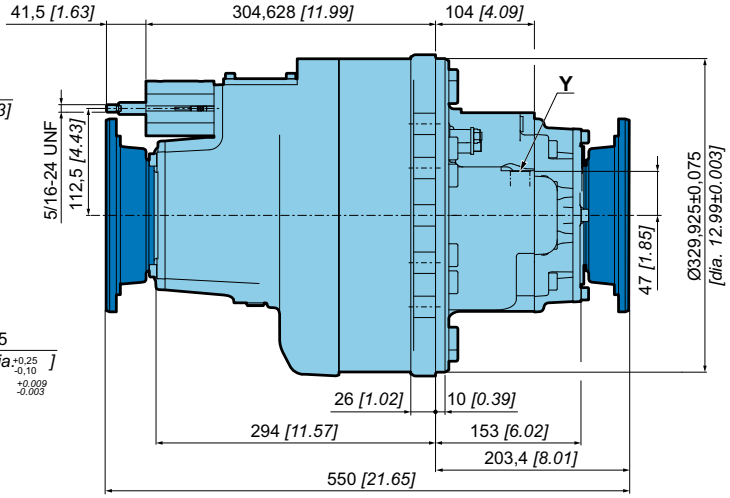
NOTICE **Case flushing needs are dependent on the type of application.**

Risk of damage to the motor.

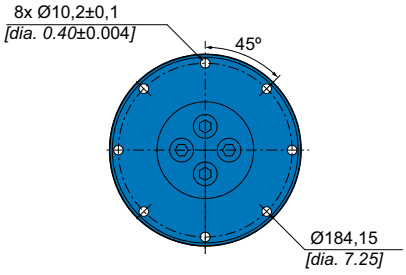
- Contact your Poclain Hydraulics application engineer for recommendations on use of case flushing.

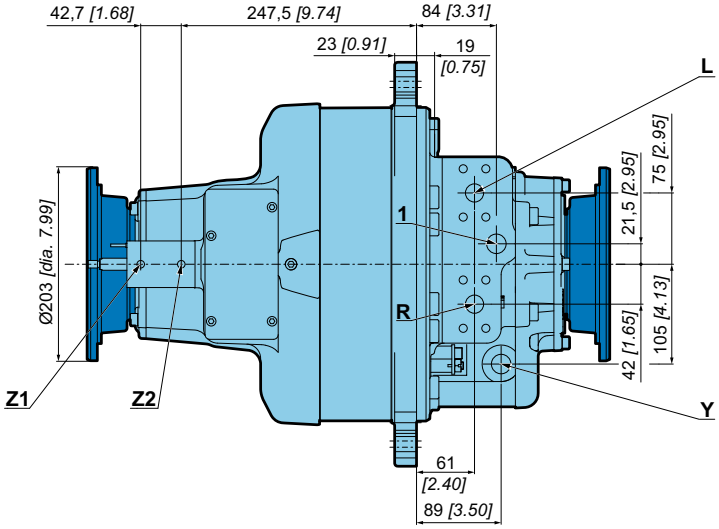
Dimensions (Companion flange SAE - ISO 7647)



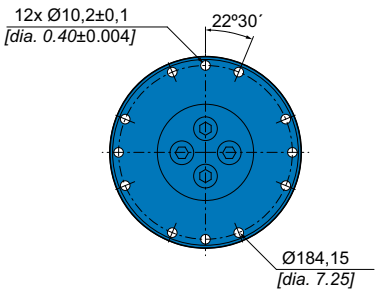


1650/1710 Series

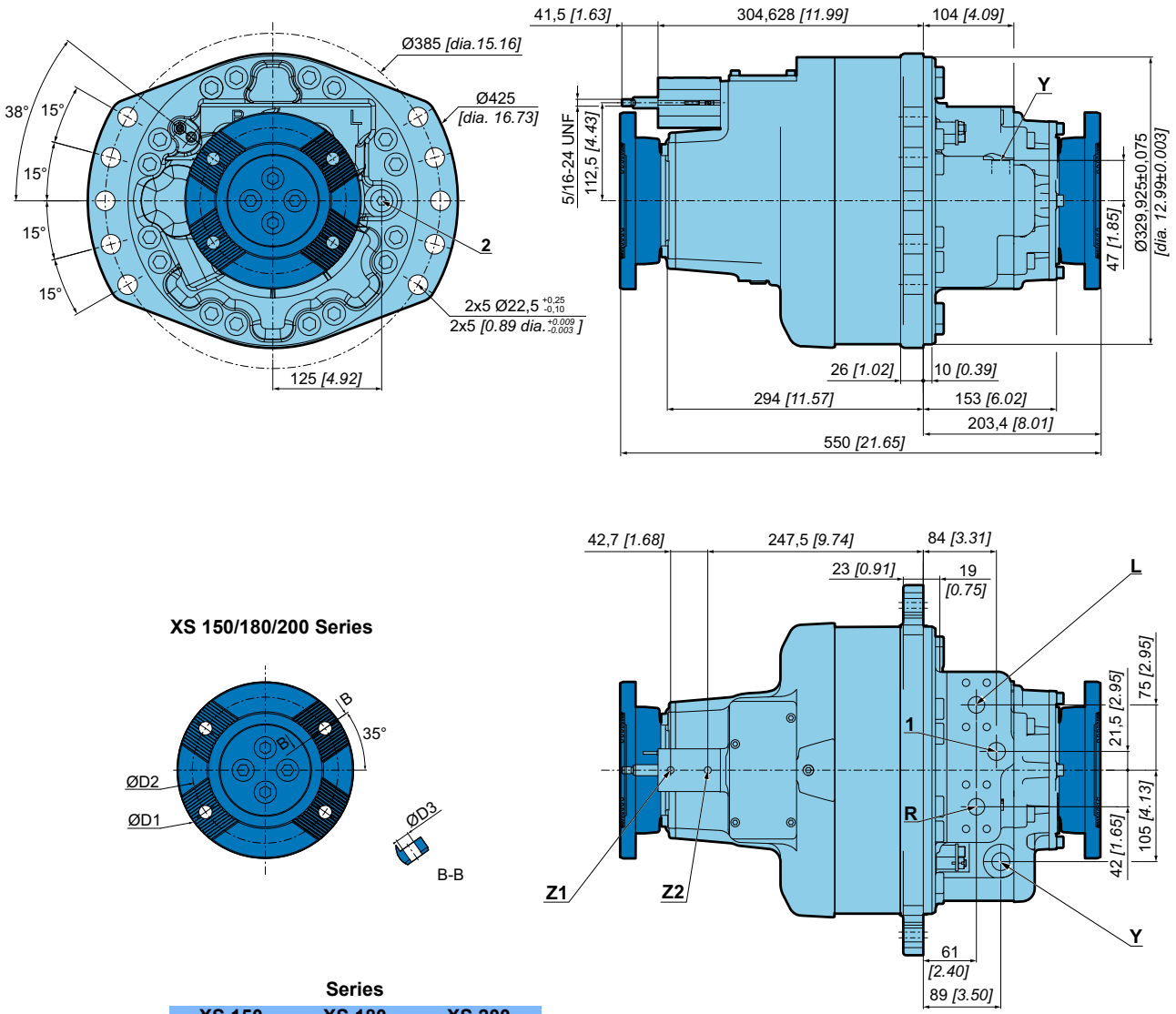




1810 Series



Dimensions (Companion flange XS - ISO 8667)

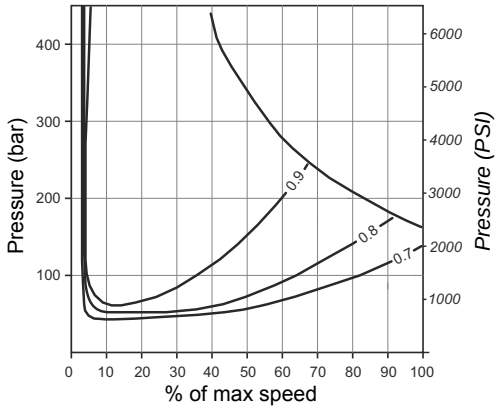


	Series		
	XS 150	**XS 180**	**XS 200**
ØD1	149,5 *[5.89]*	179,5 *[7.07]*	199,5 *[7.85]*
ØD2	130 *[5.12]*	150 *[5.90]*	165 *[6.49]*
ØD3	M12 x 1,75	15,1 [0.59]	15,1 *[0.59]*

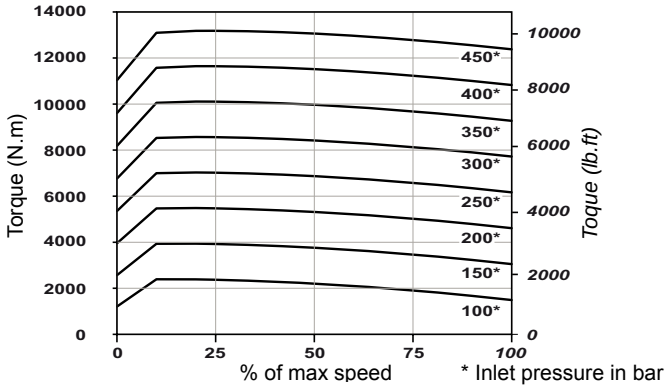
Efficiency (Creep mode)

Overall efficiency

Average values given for guidance for code 0 displacement after 100 hours of operation with HV46 hydraulic fluid at 50°C *[122°F]*.



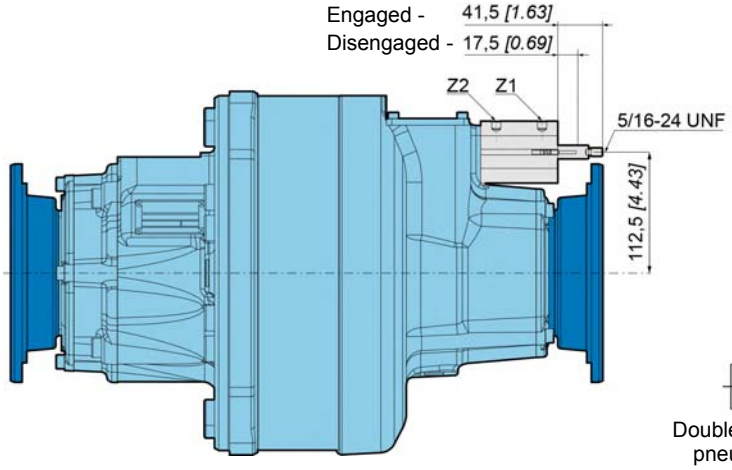
Actual output torque



For a precise calculation, consult your Poclain Hydraulics application engineer.

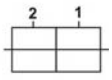
Double rod cylinder actuated clutch

The double rod cylinder can be used to manually control the CreepDrive Motor engagement and disengagement sequences. The axial force applied to the rod should not exceed 700 N *[157.4 lbf]*. No radial force should be applied to the rod. The rod should have two stable positions to stay within the engaged or disengaged state.



Pneumatic actuation	
Min. pressure	1,3 bar *[18.8 PSI]*
Max. pressure	13 bar *[188.5 PSI]*

Pneumatic connections	
Port	**ANSI B1.20.1**
Z1 (air supply to disengage)	1/8-27 NPTF port
Z2 (air supply to engage)	



Double rod air cylinder pneumatic symbol

NOTICE

If it is necessary to move the vehicle before the system is completely installed, contact your Poclain Hydraulics application engineer.

NOTICE

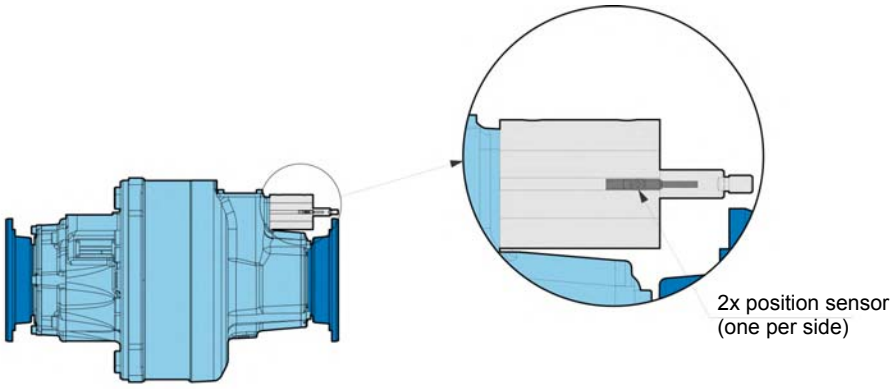
The cylinder has no rest position. It must be continously supplied with air pressure to guarantee the engaged or disengaged position. Failure to do so can result in damage to the components.

NOTICE

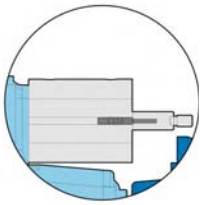
Make sure that air cylinder is supplied with clean dry air without debris.

Position sensors

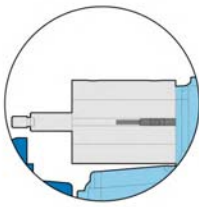
Position sensors allow for verification of clutch engagement or disengagement.



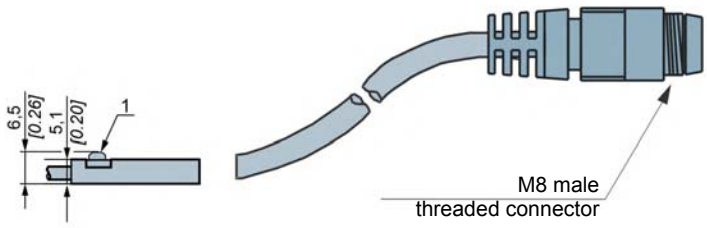
Engaged sensor



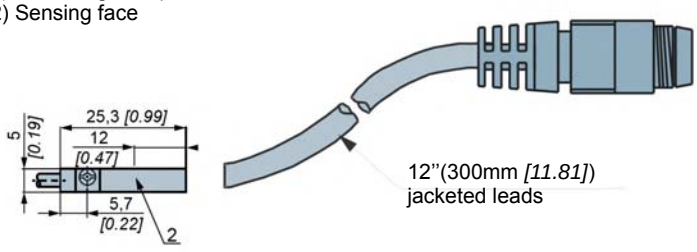
Disengaged sensor



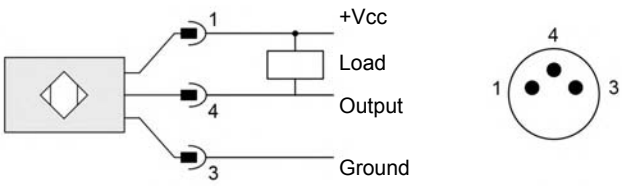
Features	
Power supply	10 to 30 V
Current comsumption	10 mA max.
Operating temperature	-25°C to +85°C *[-13°F to +185 °F]*
Protection rating	IP65



(1) Fastening clamp
(2) Sensing face



Connector layout

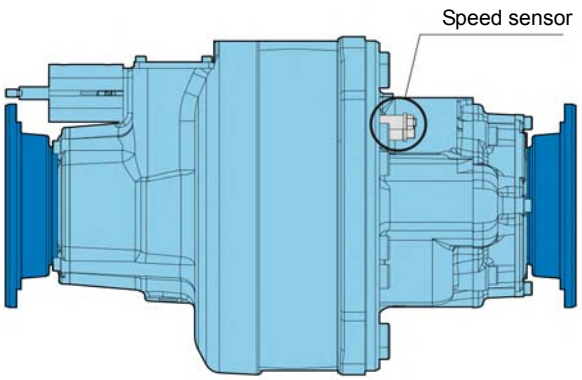


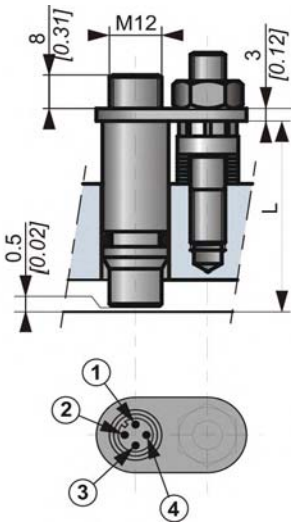
Connections

Pin	Function
1	+Vcc
4	Output
3	Ground

Speed sensor

The speed sensor only picks up the rotating speed when the motor is in CreepDrive mode (engaged) and doesn't provide any information when the motor is in road mode (disengaged).



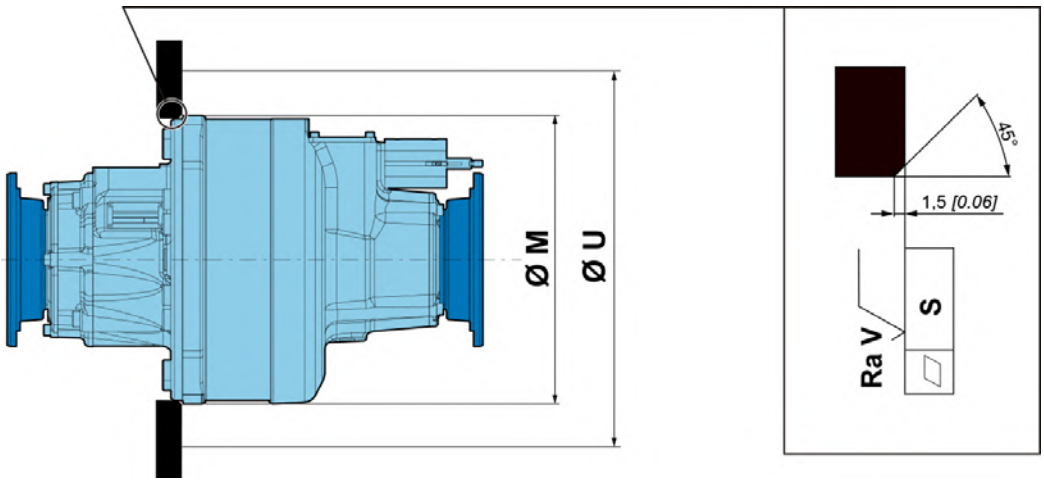


Pin number	Function
1	Power supply
2	Not connected
3	Ground
4	Square frequency signal

Features	
Electrical connection	M12, 4pin connector
Power supply	8 - 32 V
Length of sensor (**L**)	53 *[2.09]*
Material	Brass or stainless steel housing
Signal output	1 push-pull square wave signal Maximum load current: 20 mA Low output voltage: < 1.5 V High output voltage: > (power supply 3.5 V)
Current comsumption	20 mA max.
Frequency range	0 - 15 kHz
Operating temperature	-40°C to +125°C *[-40°F to 257°F]*
Pulse number per revolution	120
Maximum range	1.15 mm *[0.045"]*
Protection rating	IP68 (sensitive side) / IP67 (connector side)
Electrical protection	Protected against reverse polarity, short circuit to ground and supply
Mean Time To Failure (MTTF)	1 338 years with operating profile of 21% (8h per day, 229 days per year). Calculated according ISO13849 1 with component database SN29500
Mean Time To Dangerous Failure (MTTFd)	2 677 years

To install the sensor, see the "Installation guide" brochure No. B61352L.

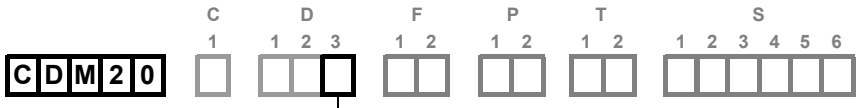
Chassis mounting



	ØM (1)	ØU	S	Ra V		Class
CreepDrive motor	330 *[12,99]*	385 *[15,16]*	0,2 *[0,008]*	12,5 *[0,492]*	2 x 5 M20 x 2.5	**10,9**

(1) +0,3 *[+0,012]*
+0,2 *[+0,008]*

Hydraulic connections



	Old standards	Standards	Power supply	Case drain	2nd displacement control
			R-A	1, 2	Y
A	SAE J514	**ISO 11926-1**	1 1/16-12 UNF-2B	7/8-14 UNF-2B	3/4-16 UNF-2B
2	ISO 6 162 BSPP	**ISO 6162 ISO 1179-1**	DN19 PN400	Ø21 *[0.83 dia.]*	Ø21 *[0.83 dia.]*
1	ISO 6 162 DIN 3 852	**ISO 6162 ISO 9974-1**	DN19 PN400	M22x1,5	M22x1,5
9	ISO 6 162 DIN 3 852	**ISO 6162 ISO 9974-1**	DN19 PN400	M22x1,5	M22x1,5
4	ISO 6 162 BSPP	**ISO 6162 ISO 1179-1**	M27x2	M22x1,5	M22x1,5
7	ISO 6 162 SAE J514	**ISO 6162 ISO 11926-1**	DN19 PN400	7/8-14 UNF-2B	7/8-14 UNF-2B

Advice for use

⚠CAUTION **Poclain Hydraulics recommends using the Poclain electronics package.**

Danger to life or risk of injury if electronic safety measures are not implemented correctly.

- Poclain Hydraulics will not be held liable if another electronics system is used and causes injury or damage to the components.

The vehicles equipped with CreepDrive Motor feature two independent transmission types:

- Hydrostatic transmission: The vehicle is in CreepDrive mode. The clutch of the CreepDrive motor is engaged.
- Mechanical transmission: The vehicle is in road mode. The clutch of the CreepDrive motor is disengaged.

To shift from one transmission to another, the CreepDrive Motor goes through an engagement or disengagement stage.

NOTICE **To avoid damage to the CreepDrive motor, the engagement and disengagement stages must be done in the following steps.**

Engagement and disengagement required conditions in normal use:

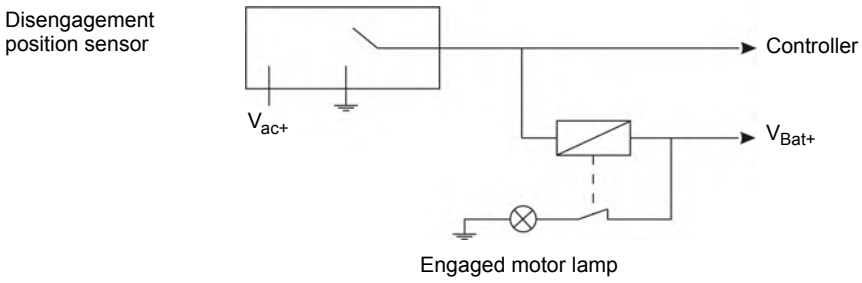
- No flow supplied to the hydraulic motor.
- The truck drive must be stopped: vehicle at 0km/h and parking or service brake must be applied
- The truck drive shaft must be free from external torque: gear box in neutral

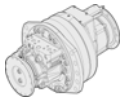
Engagement and disengagement are done with a non synchronized clutch.

NOTICE **Be careful. The use of the main transmission is not allowed when the CreepDrive motor is engaged (the gearbox must be in neutral). Poclain Hydraulics will not be liable for any damage done to any components on the vehicle if the main transmission is used while CreepDrive mode is engaged.**

CreepDrive motor engagement must be indicated by a lamp on the instrument panel.

Wiring example: The lamp must be controlled by the disengagement position sensor through a 12V or 24V NC relay.





General information

NOTICE

The CreepDrive motor is rated for specific torque limits, dependent upon the selected configuration. Poclain Hydraulics recommends customers do not exceed the torque levels listed in this catalog. Use of this product outside of approved torque limits may result in damage to the product and loss of main driveline functionality. Poclain Hydraulics will not be held liable in the event that a user operates the product outside of its scope of intended use.

NOTICE

Dynamic engagement or disengagement causes damage to the CreepDrive motor components.

NOTICE

Chassis distortion should not produce additional force on the CreepDrive motor.

NOTICE

The drive shafts must be balanced and all angles should be checked by a certified driveline installer to avoid additional force, vibration or noise.

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