



# CDM MOTORS



## CDM222-050. CREEPDRIVE MOTOR.

### FOREWORD

#### Product description

The vehicle equipped with CDM 222-050 motor features two independent transmission types :

- hydrostatic and,
- mechanical.

Shifting from one to another is simply done by activating a switch.

The mechanical transmission is used for travelling on the road (Road mode), while its hydraulic counterpart is used for working at low speed (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.

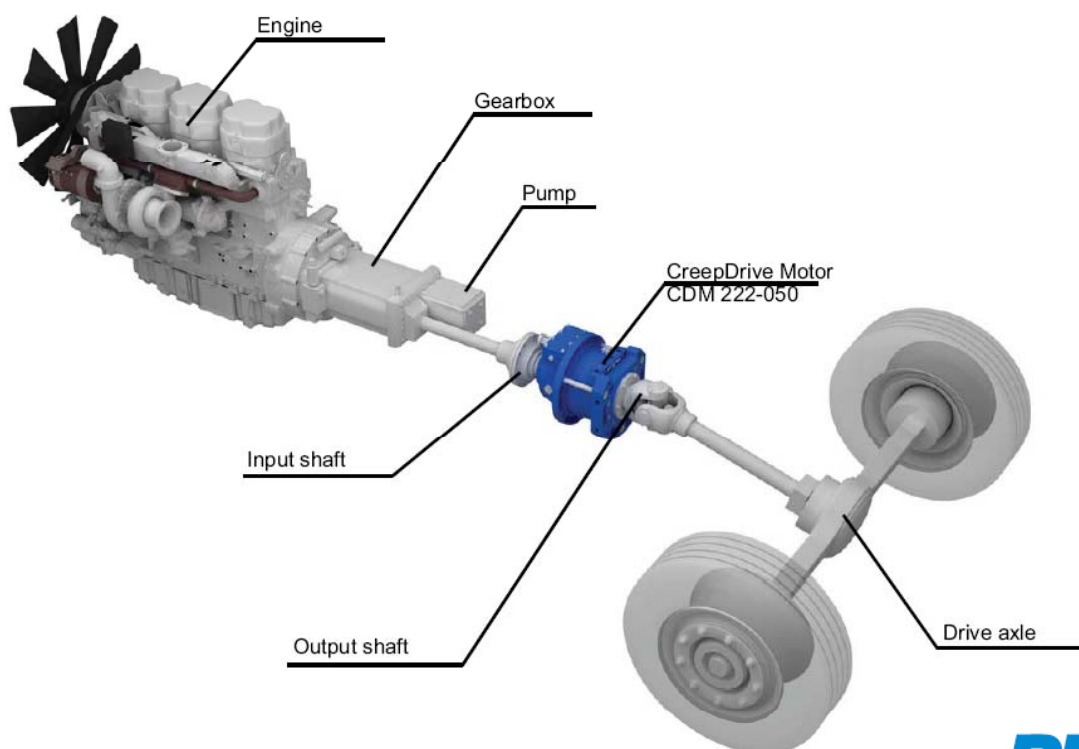
To use the hydrostatic drive, the gearbox is set at neutral while the engine PTO is engaged to drive the pump that supplies flow to the CDM 222-050 motor. When the hydrostatic transmission is engaged, the maximum speed and torque are defined by the CDM 222-050 motor.

Moreover, the CDM 222-050 motor eases the 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.

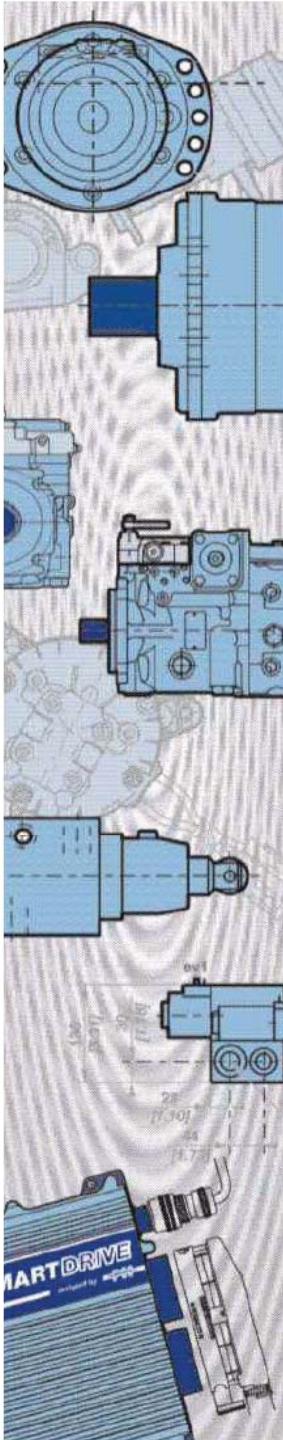
The CDM 222-050 motor is at the heart of the system.

Mechanically linked to the transmission shaft at its input and output, the CDM 222-050 motor is placed between the transmission and the drive axle.

A light and compact package can fit every type of transmission brand.



## CONTENT



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Model Code

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Characteristics

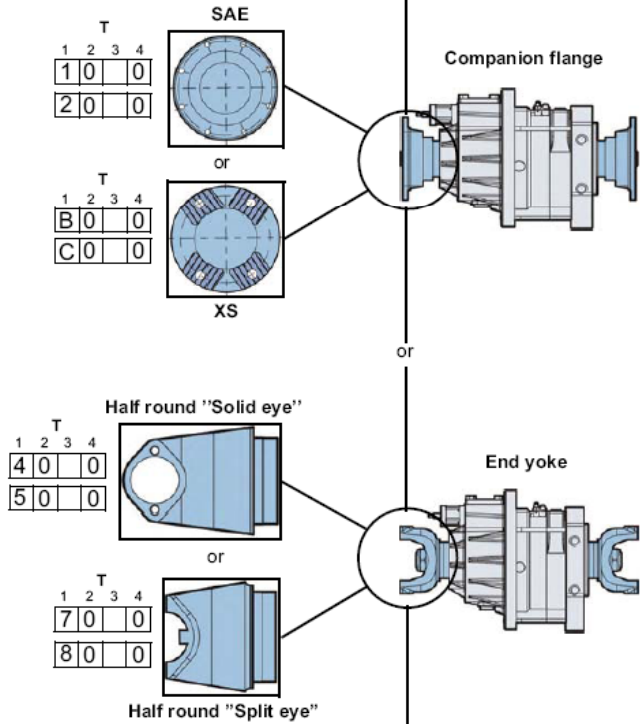
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MODEL



| Displacement cm <sup>3</sup> /tr [cu.in/rev.] |   |
|---|---|
| 667 [40.7]                                    | 8 |
| 833 [50.8]                                    | 0 |
| 1 000 [61.0]                                  | 2 |

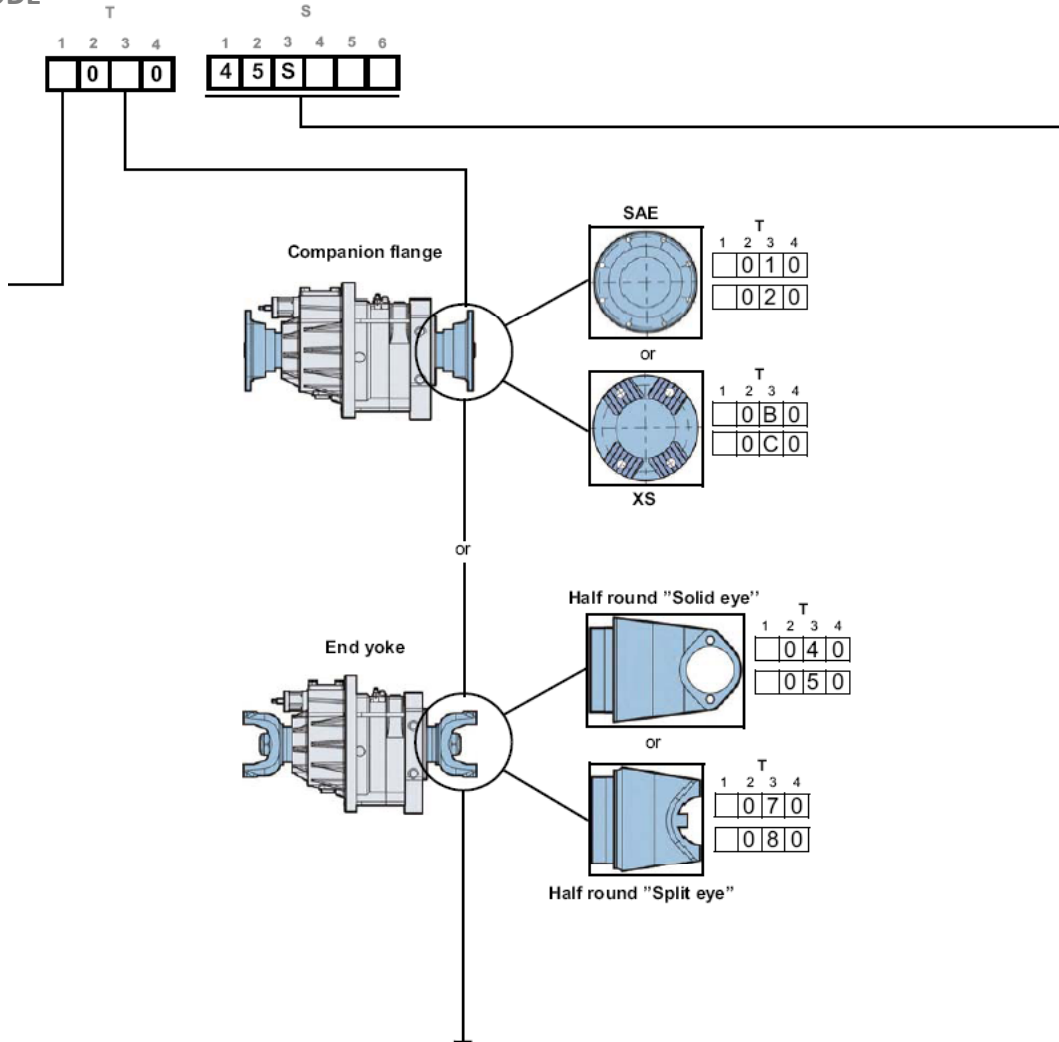
| Connections                             |   |
|---|---|
| ISO 9974-1 (metric ports)               | 4 |
| ISO 11926-1 (SAE J514 with O-ring seal) | A |



| Input shaft type |                        |                 |   |
|------------------|------------------------|-----------------|---|
| Companion flange | SAE                    | Serie 1650/1710 | 1 |
|                  |                        | Serie 1810      | 2 |
|                  | XS                     | Serie 150       | B |
|                  |                        | Serie 180       | C |
| End yoke         | Half round "Solid eye" | Serie 1710      | 4 |
|                  |                        | Serie 1810      | 5 |
|                  | Half round "Split eye" | Serie 1710      | 7 |
|                  |                        | Serie 1810      | 8 |



CODE



| Output shaft type |                        |                 |   |
|-------------------|------------------------|-----------------|---|
| Companion flange  | SAE                    | Serie 1650/1710 | 1 |
|                   |                        | Serie 1810      | 2 |
|                   | XS                     | Serie 150       | B |
|                   |                        | Serie 180       | C |
| End yoke          | Half round "Solid eye" | Serie 1710      | 4 |
|                   |                        | Serie 1810      | 5 |
|                   | Half round "Split eye" | Serie 1710      | 7 |
|                   |                        | Serie 1810      | 8 |

| Options                                      |   |
|--|---|
| Without option                               | 0 |
| Stroke end sensor on the clutch control*     | 4 |
| Hydraulic connection for case flushing*      | 5 |
| Special paint or no paint (Grey as standard) | D |
| Number plate specific to the customer        | P |
| Speed sensor*                                | S |

\* as standard



**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 code.**



**Weight of component without oil.**



**Volume of oil.**



**Units.**



**Tightening torque.**



**Screws.**



**Information intended for Poclain-Hydraulics personnel.**

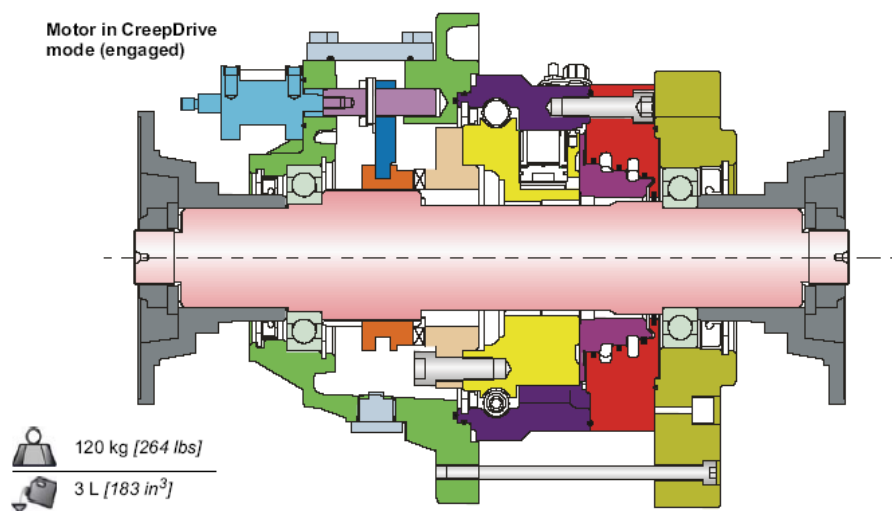
The views in this document are created using metric standards.

The dimensional data is given in mm and in inches (inches are between brackets and italic)



## CHARACTERISTICS

### Longitudinal section



### Features

|                          |                         | Displacement cm <sup>3</sup> /tr [in <sup>3</sup> /rev] |                 |               |               |
|--------------------------|-------------------------|---|-----------------|---------------|---------------|
|                          |                         | 667 [40.7]  | 833 [50.8]      | 1000 [61.0]   |               |
| Road mode                | Max. torque N.m [lb.ft] | In continuous duty                                      | 22 200 [16 370] |               |               |
|                          |                         | In intermittent duty                                    | 42 000 [31 000] |               |               |
|                          | Max. speed RPM          | Without case flushing                                   | 2 800*          |               |               |
|                          |                         | With case flushing**                                    | 3200*           |               |               |
| CreepDrive mode          | Continuous use          | Max. torque N.m [lb.ft]                                 | 2 880 [2 124]   | 3 597 [2 653] | 4 316 [3 183] |
|                          |                         | Max. speed RPM  | 200             | 170           | 142           |
|                          |                         | Max. pressure bar [PSI]                                 | 275 [3 990]     |               |               |
|                          | Occasional use***       | Max. power kW [HP]                                      | 40 [54]         |               |               |
|                          |                         | Max. torque N.m [lb.ft]                                 | 4 190 [3 090]   | 5 232 [3 859] | 6 278 [4 630] |
|                          |                         | Max. pressure bar [PSI]                                 | 400 [5 800]     |               |               |
| Max. temperature °C [°F] |                         | 80 [176]  |                 |               |               |

\* Contact your Poclain Hydraulics application engineer for approval of higher speeds.

\*\* Contact your Poclain Hydraulics application engineer for use of case flushing.

\*\*\* The service life is influenced by the pressure, the speed and the power. For an accurate service life calculation of your application please consult your Poclain Hydraulics application engineer.



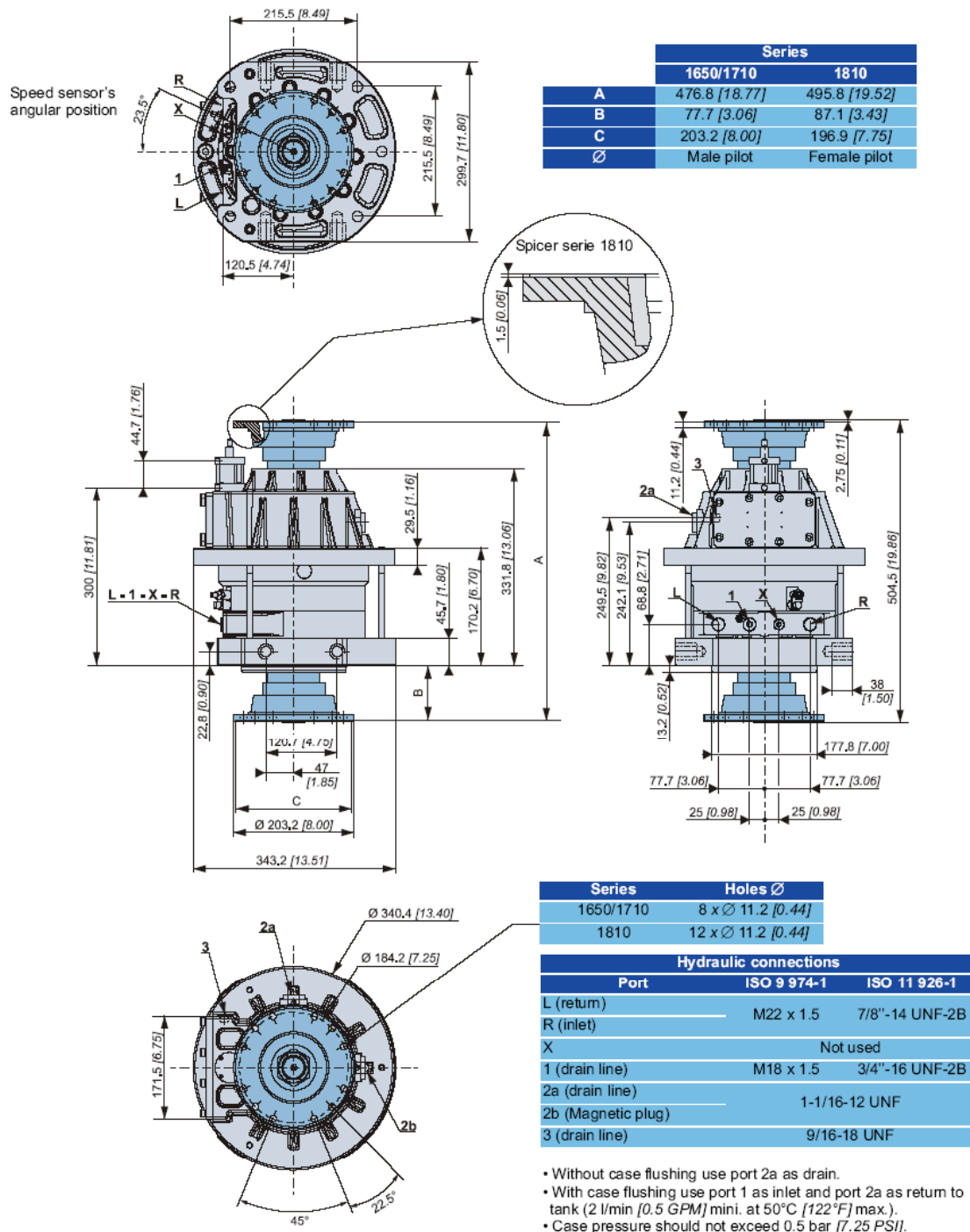
During use in on-road mode (disengaged mode), motor case temperature can exceed 80°C [176 °F]. In this condition, Poclain Hydraulics recommends to use case flushing to keep the motor in a proper operational temperature.



Case pressure should not exceed 0.5 bar [7.25 PSI].

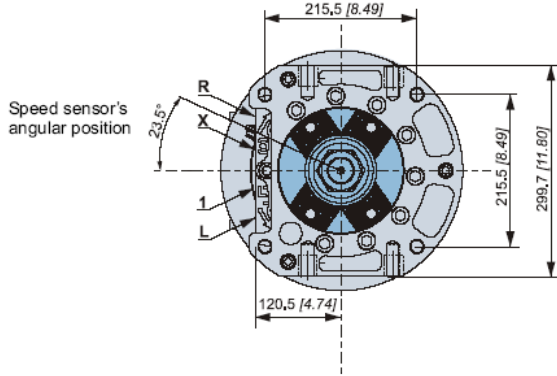


### Dimensions (Companion flange SAE)

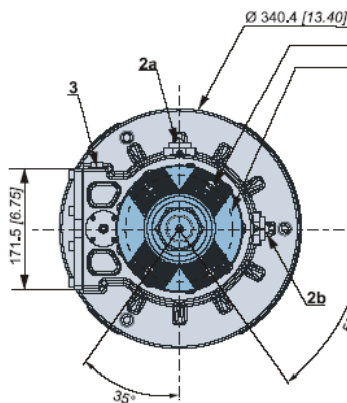
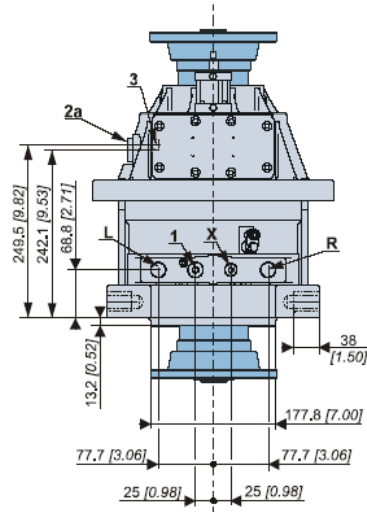
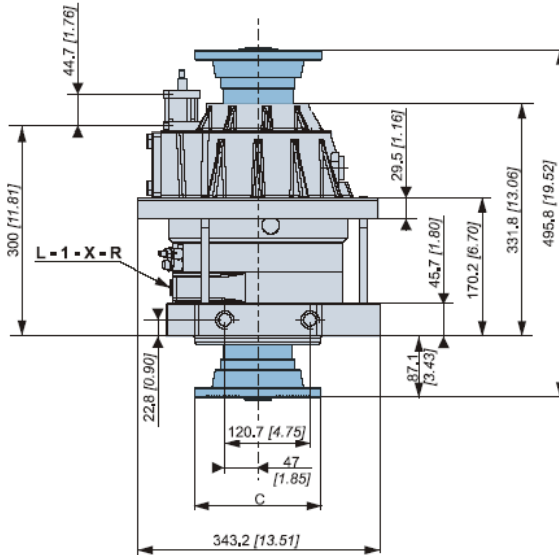




**Dimensions (Companion flange XS)**



| Series   |                       |
|----------|-----------------------|
| XS 150   | XS 180                |
| <b>C</b> | 155 [6.10] 180 [7.09] |

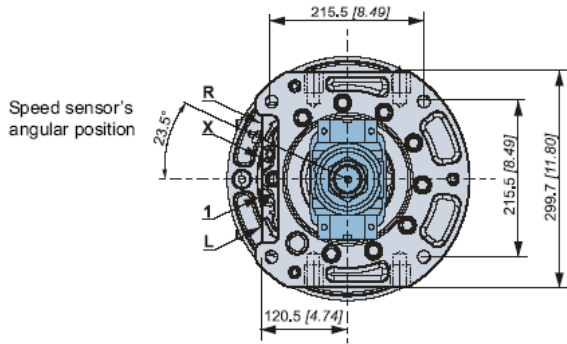


| Series                |               |                |
|-----------------------|---------------|----------------|
|                       | XS 150        | XS 180         |
| Holes Ø               | M12 x 1.75    | 15 [0.6]       |
| Bolt circle Ø         | 130 [5.12]    | 150 [5.90]     |
| Hydraulic connections |               |                |
| Port                  | ISO 9 974-1   | ISO 11 926-1   |
| L (return)            | M22 x 1.5     | 7/8"-14 UNF-2B |
| R (inlet)             |               |                |
| X                     | Not used      |                |
| 1 (drain line)        | M18 x 1.5     | 3/4"-16 UNF-2B |
| 2a (drain line)       | 1-1/16-12 UNF |                |
| 2b (Magnetic plug)    |               |                |
| 3 (drain line)        | 9/16-18 UNF   |                |

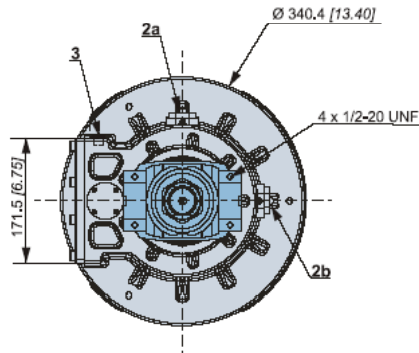
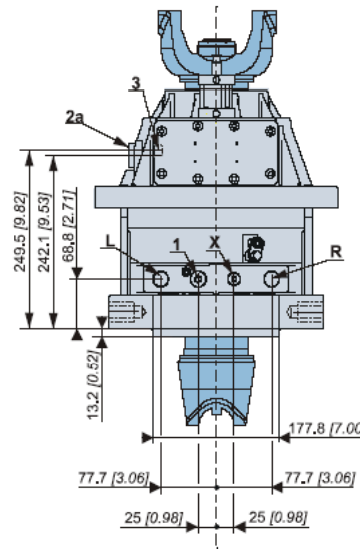
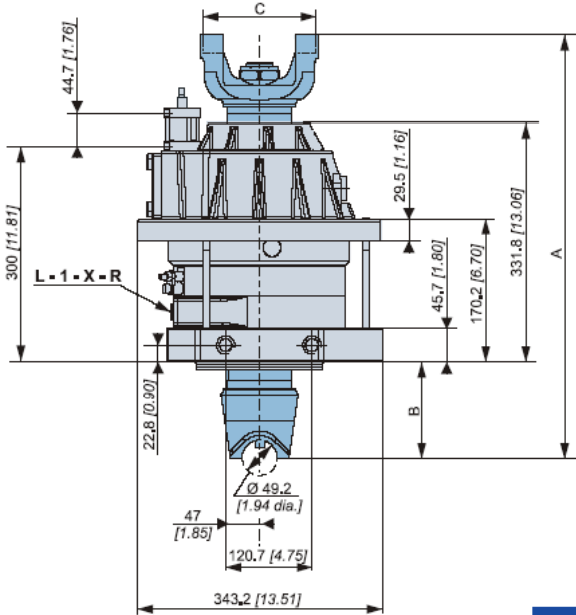
- Without case flushing use port 2a as drain.
- With case flushing use port 1 as inlet and port 2a as return to tank (2 l/min [0.5 GPM] mini. at 50°C [122°F] max.).
- Case pressure should not exceed 0.5 bar [7.25 PSI].



**Dimensions (End yoke half round "split eye")**



|   | Series        |               |
|---|---------------|---------------|
|   | 1710          | 1810          |
| A | 581.7 [22.90] | 597.6 [23.53] |
| B | 130.0 [5.12]  | 137.9 [5.43]  |
| C | 157.2 [6.19]  | 194.1 [7.64]  |

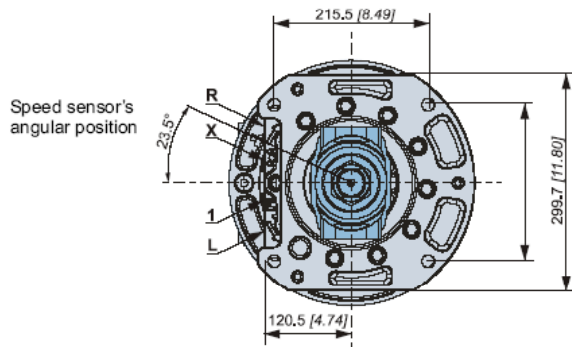


| Port               | Hydraulic connections |                |
|--------------------|-----------------------|----------------|
|                    | ISO 9 974-1           | ISO 11 926-1   |
| L (return)         | M22 x 1.5             | 7/8"-14 UNF-2B |
| R (inlet)          | M22 x 1.5             | 7/8"-14 UNF-2B |
| X                  | Not used              |                |
| 1 (drain line)     | M18 x 1.5             | 3/4"-16 UNF-2B |
| 2a (drain line)    | 1-1/16-12 UNF         |                |
| 2b (Magnetic plug) | 1-1/16-12 UNF         |                |
| 3 (drain line)     | 9/16-18 UNF           |                |

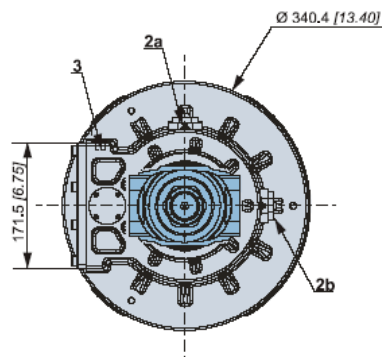
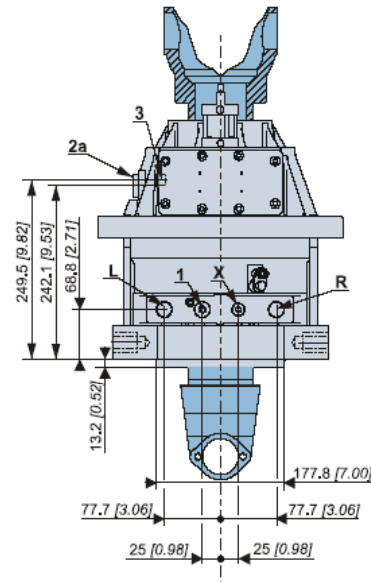
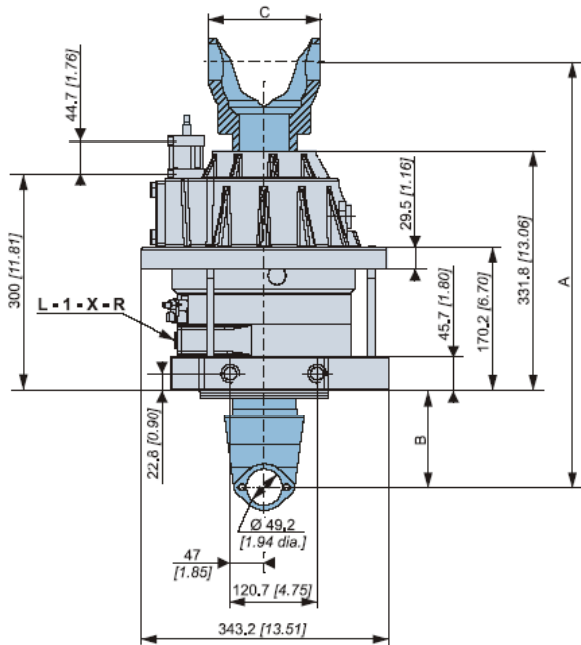
- Without case flushing use port 2a as drain.
- With case flushing use port 1 as inlet and port 2a as return to tank (2 l/min [0.5 GPM] mini. at 50°C [122°F] max.).
- Case pressure should not exceed 0.5 bar [7.25 PSI].



**Dimensions (End yoke half round "solid eye")**



|   | Series        |               |
|---|---------------|---------------|
|   | 1710          | 1810          |
| A | 581.7 [22.90] | 597.6 [23.53] |
| B | 130.0 [5.12]  | 137.9 [5.43]  |
| C | 154.8 [6.09]  | 191.7 [7.54]  |



| Port               | Hydraulic connections |                |
|--------------------|-----------------------|----------------|
|                    | ISO 9 974-1           | ISO 11 926-1   |
| L (return)         | M22 x 1.5             | 7/8"-14 UNF-2B |
| R (inlet)          | M22 x 1.5             | 7/8"-14 UNF-2B |
| X                  | Not used              |                |
| 1 (drain line)     | M18 x 1.5             | 3/4"-16 UNF-2B |
| 2a (drain line)    | 1-1/16-12 UNF         |                |
| 2b (Magnetic plug) | 1-1/16-12 UNF         |                |
| 3 (drain line)     | 9/16-18 UNF           |                |

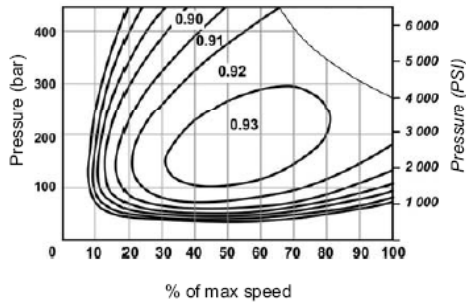
- Without case flushing use port 2a as drain.
- With case flushing use port 1 as inlet and port 2a as return to tank (2 l/min [0.5 GPM] min. at 50°C [122°F] max.).
- Case pressure should not exceed 0.5 bar [7.25 PSI]



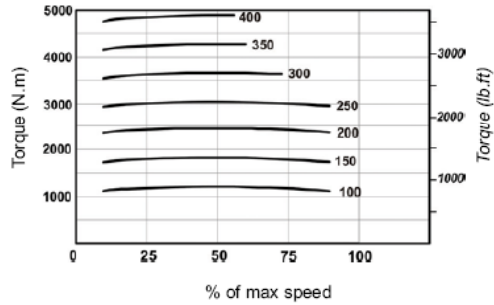
**Efficiency (Creep mode)**

**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].



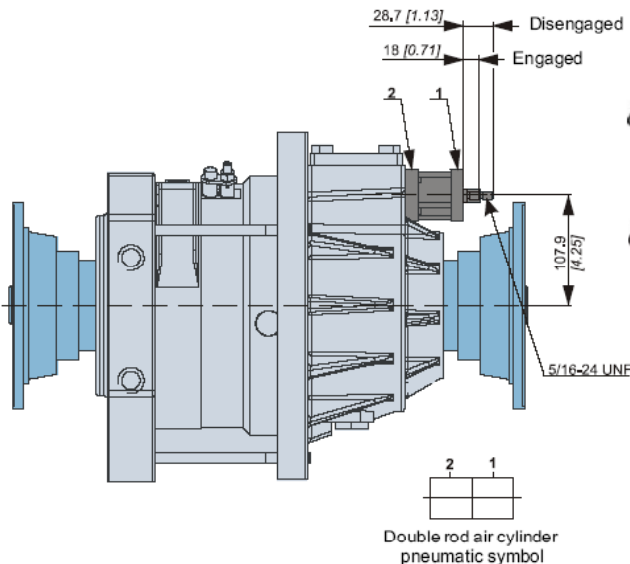
**Actual output torque**



The starting torque is taken to be approximately 85% of the first value for available pressure. For a precise calculation, consult your Poclair Hydraulics application engineer.

**Double rod cylinder shifted dog type 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 be equivalent to the force generated when used with air pressure. No radial force should be applied to the rod. The rod should have two stable positions to stay within the engaged or disengaged state.



The cylinder has no rest position. It must be continuously supplied with air pressure to guaranty the engaged or disengaged position.



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

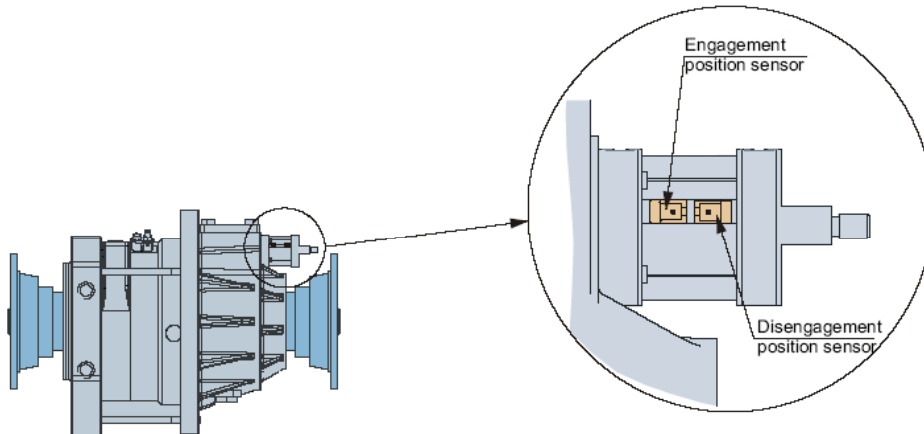
| Pneumatic actuation  |                      |
|----------------------|----------------------|
| Mini. pressure       | 6.2 bar [90 PSI]     |
| Max. pressure        | 13.8 bar [200 PSI]   |
| Max. load on the rod | 81.6 daN [179.9 lbs] |

| Pneumatic connections       |              |
|-----------------------------|--------------|
| Port                        | ANSI B1.20.1 |
| 1 (air supply to engage)    | 1/8-27NPT    |
| 2 (air supply to disengage) | 1/8-27NPT    |

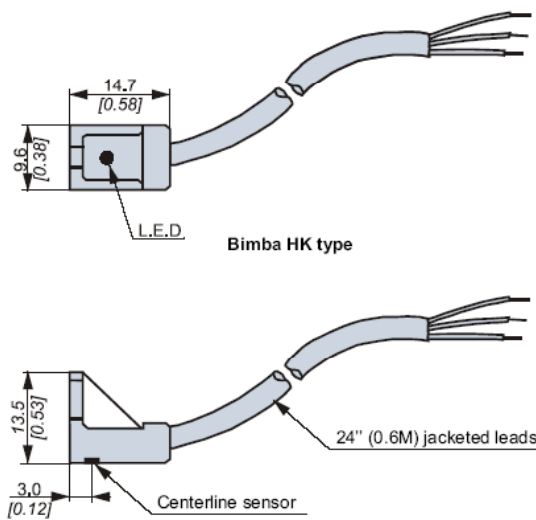


**Position sensors**

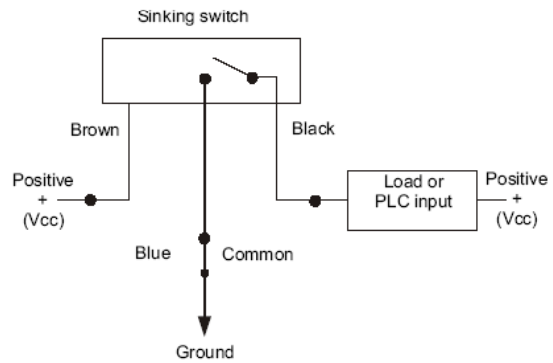
The position sensors allow to verify the engagement or disengagement of the clutch.



| Features            |             |
|---------------------|-------------|
| Power supply        | 5 to 30 V   |
| Current consumption | 150 mA max. |



Typical solid state sinking configuration for HK models (NPN)



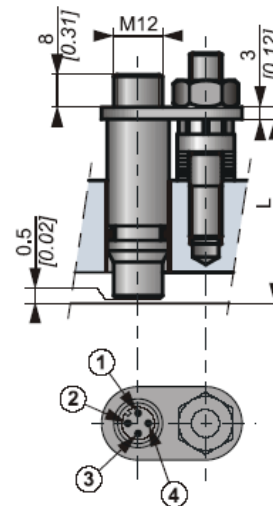
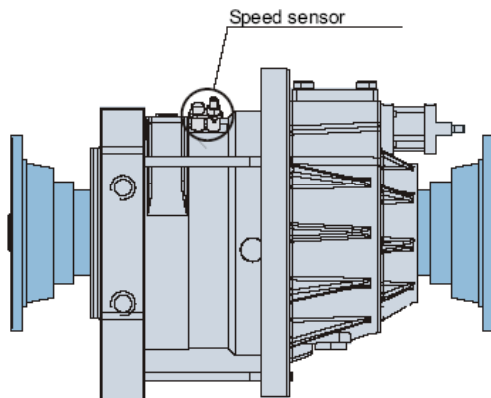
Basic circuit layout for Programmable Logic Controllers (PLC) and normally off relays and solenoids

Shorting black wire to supply voltage will damage switch



## 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).

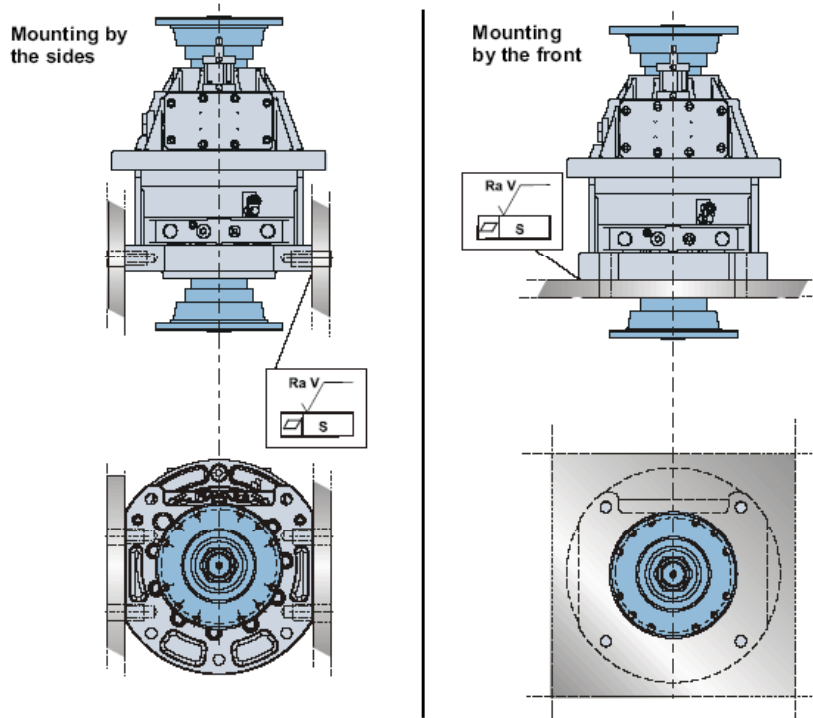


To install the sensor, see the "Installation guide" brochure No. 801478197L.

| Pin number | Function                |
|------------|-------------------------|
| 1          | Power supply            |
| 2          | Direction signal        |
| 3          | Ground                  |
| 4          | Square frequency signal |

| Features                       |  |
|--------------------------------|--|
| Electrical connection          | M12 connector  |
| Power supply                   | 8 to 32 V  |
| Protect against false polarity |  |
| Current consumption            | 20 mA max  |
| Signal output                  | 1 push-pull square wave signal<br>1 push-pull direction signal<br>Low output voltage : < 1.5 V<br>High output voltage : > (power supply - 2.9 V) |
| Frequency range                | 0 to 15 kHz  |
| Protection rating              | IP68   |
| Length of sensor (L)           | 44 [1.73]  |
| Operating temperature          | 40°C to +125°C [-40°F to 257°F]  |
| Pulse number per revolution    | 63   |

## Chassis mounting



| Chassis mounting | S<br>mm [in] | Ra V<br>$\mu\text{m} [\mu\text{in}]$ |  | Class |  N.m [lb.ft] |
|------------------|--------------|--------------------------------------|---|-------|---|
| Side             | 0.2 [0.01]   | 12.5 [0.49]                          | 4 x M20 x 2.5   | 12.9  | 690 [509]   |
| Front            |              |                                      |   |       |   |

## Advices for use

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

- Hydrostatic transmission: The vehicle is in mode CreepDrive. 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 to another transmission, the CreepDrive Motor goes through engagement or disengagement stage.



To avoid damage to the CDM 222-050 motor, the engagement and disengagement stages must be done in the following steps.

**Engagement stage (from road mode to CreepDrive mode):**

- The gear box must be in neutral.
- The shaft must be stopped.

**Disengagement stage (from CreepDrive mode to road mode):**

- The shaft must be stopped.
- The shaft must be free from external torque.



Engagement and disengagement are done with a non synchronized clutch. Engagement and disengagement of the clutch must be done progressively to make easier the shift from one transmission to another.

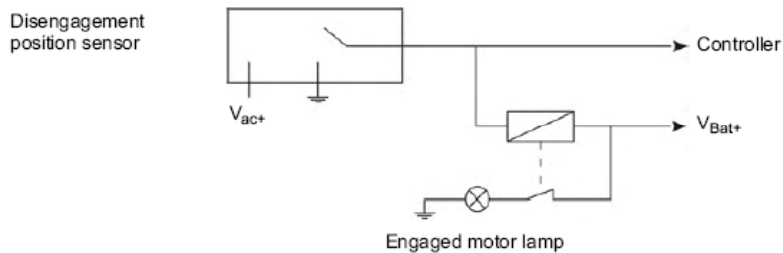


**BE CAREFUL**  
The use of the main transmission is not allowed when the CDM 222-050 motor is engaged (the gear box must be in neutral).



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

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





**General information**

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



Chassis distortion should not produce additional effort on the CreepDrive Motor.



The drive shafts must be balanced to avoid additional effort on the Creepdrive Motor.