CREEPDRIVE ASSIST
LOW SPEED APPLICATIONS
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).
CreepDrive Assist for Low speed applications

POCLAIN HYDRAULICS

Description

Joystick
- Allows to set the hydraulic motor tractive effort

Display
- Provides the CreepDrive state

Controller
- Manages the AddiDrive Assist from the joystick and sensors information

CreepDrive Box
- Simplifies the installation of the creepDrive System on vehicles

CreepDrive Box

Engine

Gearbox

Pump

Input shaft

CreepDrive Motor

Output shaft

Drive axle
CreepDrive Assist for Low speed applications

**Description**

**Hydraulic**

1. Pump
   - Provides the flow to the hydraulic circuit.

2. CreepDrive motor
   - Provides the tractive effort to the shaft.

3. Valves
   - Allows to deflect a part of oil to the cooling system.

4. Tank + Cooler + Filter
   - Stores the hydraulic circuit oil.
   - Allows to cool the hydraulic circuit oil.

**Electronic**

5. Controller + Software

6. Joystick

7. Pressure sensor
   - Measures the pressure on the High Pressure system

8. Display

9. CreepDrive box

**Mark | Designation | Quantity**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pump</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>CreepDrive motor</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Exchange valve</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Tank-Cooler-Filter</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Controller + Software</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Joystick</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Pressure sensor</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>Display</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>CreepDrive box</td>
<td>1</td>
</tr>
</tbody>
</table>
Principle of functioning

The vehicles equipped with a CreepDrive 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 traveling on the road, while its hydraulic counterpart is used for working at low speed. 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 hydraulic Motor. When the hydrostatic transmission is engaged, the maximum speed and torque are defined by the drive axle ratio.

Moreover, the CreepDrive 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 frees the driver’s attention from the monotonous driving functions and allows him to focus on the quality of his work.

The CreepDrive motor is at the heart of the system. Mechanically linked to the transmission shaft at its input and output, the CreepDrive motor is placed between the transmission and the drive axle.

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

- The use of the main transmission is not allowed when the CreepDrive motor is engaged (The gear box must be in neutral).
- Engagement and disengagement of CreepDrive motor must be done when the vehicle is stopped with gear box in neutral and brakes activated.
- When the engine is cut-off, the CreepDrive motor is disengaged of the shaft.
- The CreepDrive system is inoperable when the brake is activated.
- The CreepDrive system is inoperable when the oil temperature exceeds 80°C [176°F].
- A error light indicator, located in the dashboard, informs the driver when the CreepDrive presents failures.
CreepDrive components

<table>
<thead>
<tr>
<th>Hydraulic components</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hydraulic Pump</strong></td>
<td>+ P90 / 055&lt;br&gt;+ P90 / 075&lt;br&gt; &gt; page 8&lt;br&gt;+ PW085&lt;br&gt;+ PW096&lt;br&gt; &gt; page 10</td>
</tr>
<tr>
<td><strong>Hydraulic motor</strong></td>
<td>• CreepDrive motor&lt;br&gt; &gt; page 12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exchange valve</th>
<th>• VE 60&lt;br&gt; &gt; page 15</th>
</tr>
</thead>
</table>

| Tank-Cooler-Filter  | • Tank + Cooler + Filter<br> > page 16 |

<table>
<thead>
<tr>
<th>Electrical components</th>
<th></th>
</tr>
</thead>
</table>

**CreepDrive Box**

Simplifies the installation of the creepDrive System on vehicles.

The CreepDrive Box includes:

- 1 control unit
- 1 main wiring harness
- 1 vehicle status wiring harness
- 2 pressure sensors

> page 19

**Electronic kit**

Allows to order in one time the electrical components.

The electronic kit includes:

- 1 controller SmartDrive Easy Plus
- 1 SD Easy 42-pin connector
- 1 Male communication connector
- 2 pump solenoid connectors
- 1 pump feedback connector
- 2 pump pressure sensors
- 2 pressure sensor cables
- 1 CAN bus cable (120 ohm)
- 2 speed sensor cables
- 1 joystick and its counterpart connector kit
- 1 display
- 1 display cable

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**Retail electronic components**

Allows to order the electronic components one by one according to your need.

- Controller SmartDrive™ Easy Plus<br> > page 28
- SmartDrive™ Easy Cable<br> > page 29
- SD Easy 42-pin connector<br> > page 30
- Male communication connector<br> > page 31
- Pump pressure sensors<br> > page 32
- Pressure sensor cables<br> > page 33
- Pump feedback connector<br> > page 34
- Pump solenoid connectors<br> > page 35
- Speed sensor cables<br> > page 38
- Joystick and its counterpart connector kit<br> > page 41
- Display<br> > page 43
- Display cable<br> > page 45
- CAN bus cable (120 ohm)<br> > page 46
**HYDRAULIC PUMP**

**Pump P90 055** or **Pump P90 075**

**Function**

Provides the flow to the hydraulic circuit.

**Features**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Unit</th>
<th>Pump size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow at rated speed</td>
<td>L/min [US gal/min]</td>
<td>215 [57]</td>
</tr>
<tr>
<td>Torque at maximum displacement (theoretical)</td>
<td>N.m/bar [lbf.in/1000 PSI]</td>
<td>0.88 [530]</td>
</tr>
<tr>
<td>Weight (with control opt. SA or SB)</td>
<td>kg [lb]</td>
<td>40 [88]</td>
</tr>
<tr>
<td>Rotation</td>
<td></td>
<td>Clockwise or Counterclockwise</td>
</tr>
<tr>
<td>Shafts</td>
<td></td>
<td>Splined, straight keyed, and tapered shafts available.</td>
</tr>
</tbody>
</table>

**Input speed**

- Minimum: 500 min⁻¹(rpm)
- Continuous: 3900 min⁻¹(rpm)
- Maximum: 4250 min⁻¹(rpm)

**System pressure**

- Rated: 420 [6000] bar [PSI]
- Maximum: 480 [7000] bar [PSI]
- Minimum low loop: 10 [145] bar [PSI]

**Inlet pressure (charge inlet)**

- Minimum (continuous): 0.7 [9] bar (abs.) [in. Hg vac.]
- Minimum (cold start): 0.2 [24] bar (abs.) [in. Hg vac.]

**Case pressure**

- Continuous: 3 [43] bar [PSI]
- Maximum (cold start): 5 [73] bar [PSI]

**Control**

Proportional electronic control driven by the Poclain Hydraulics electronic boxes.
- Our electronic control boxes control the displacement and the direction of the flow while monitoring permanently the functioning parameters of the engine and of the complete hydraulic system.
- Two contamination resistant solenoid valves control the displacement and the direction of the flow.
- A sensor linked to the swash plate monitors permanently the actual displacement setting.
CreepDrive Assist for Low speed applications

Dimensions

Size 055

Size 075

Model code specifications

See technical catalogue N°A18586C for further informations.
CreepDrive Assist for Low speed applications

POCLAIN HYDRAULICS

HYDRAULIC PUMP

Pump PW 085 or Pump PW 096

Function

Provides the flow to the hydraulic circuit.

Features

<table>
<thead>
<tr>
<th>Unit</th>
<th>Pump size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>085</td>
</tr>
<tr>
<td>Displacement cm³/rev</td>
<td>85.2 [5.20]</td>
</tr>
<tr>
<td>Flow at rated speed (theoretical) L/min [US gal/min]</td>
<td>170 [44.91]</td>
</tr>
<tr>
<td>Torque at maximum displacement (theoretical) N.m/bar [lbf.in/1000 PSI]</td>
<td>0.88 [530]</td>
</tr>
<tr>
<td>Weight kg [lb]</td>
<td>71 [157]</td>
</tr>
<tr>
<td>Rotation Clockwise or Counterclockwise</td>
<td></td>
</tr>
<tr>
<td>Shafts Splined, straight keyed, and tapered shafts available.</td>
<td></td>
</tr>
</tbody>
</table>

Input speed

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum min⁻¹(rpm)</td>
<td>500</td>
</tr>
<tr>
<td>Continuous</td>
<td>3650</td>
</tr>
<tr>
<td>Maximum</td>
<td>3850</td>
</tr>
</tbody>
</table>

System pressure

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated bar [PSI]</td>
<td>420 [6000]</td>
</tr>
<tr>
<td>Maximum</td>
<td>500 [7252]</td>
</tr>
<tr>
<td>Minimum low loop bar [PSI]</td>
<td>10 [145]</td>
</tr>
</tbody>
</table>

Inlet pressure (charge inlet)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum (continuous) bar (abs.) [in. Hg vac.]</td>
<td>0.7 [9]</td>
</tr>
<tr>
<td>Minimum (cold start)</td>
<td>0.2 [24]</td>
</tr>
</tbody>
</table>

Case pressure

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous bar [PSI]</td>
<td>3 [43]</td>
</tr>
<tr>
<td>Maximum (cold start)</td>
<td>5 [73]</td>
</tr>
</tbody>
</table>

Control

Proportional electronic control driven by the Poclain Hydraulics electronic boxes.

- Our electronic control boxes control the displacement and the direction of the flow while monitoring permanently the functioning parameters of the engine and of the complete hydraulic system.
- Two contamination resistant (IP69K) solenoid valves controls the displacement and the direction of the flow.
- A sensor linked to the swash plate monitors permanently the actual displacement setting.
CreepDrive Assist for Low speed applications

Dimensions

![Diagram of CreepDrive Assist for Low speed applications]

**Model code specifications**

<table>
<thead>
<tr>
<th>PW</th>
<th>085</th>
</tr>
</thead>
<tbody>
<tr>
<td>096</td>
<td></td>
</tr>
</tbody>
</table>

See technical catalogue N°B03739N for further informations.
HYDRAULIC MOTOR

CreepDrive Motor CDM 222

Connections types

Features

<table>
<thead>
<tr>
<th>Through shaft</th>
<th>Continuous use</th>
<th>Displacement cm³/tr [in³/rev]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Max. torque N.m [lb.ft]</td>
<td>667 [40.7]</td>
</tr>
<tr>
<td></td>
<td>Max. speed RPM</td>
<td>2 500*</td>
</tr>
<tr>
<td></td>
<td>Max. speed RPM</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>Max. pressure bar [PSI]</td>
<td>275 [3 990]</td>
</tr>
<tr>
<td></td>
<td>Max. power kW [HP]</td>
<td>40 [54]</td>
</tr>
<tr>
<td></td>
<td>Max. pressure bar [PSI]</td>
<td>400 [5 800]</td>
</tr>
</tbody>
</table>
*Contact Poclain Hydraulics for approval of higher speeds
**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.

Weight kg [lb] 120 [264]

Temperature*°C [°F] 0 to 80 [32 to 176]

Oil capacity L [in³] 3 [183]
Poclain Hydraulics
CreepDrive Assist for Low speed applications

Dimensions

<table>
<thead>
<tr>
<th>Description</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic pump</td>
<td></td>
</tr>
<tr>
<td>Hydraulic Motor</td>
<td></td>
</tr>
<tr>
<td>Hydraulic valve</td>
<td></td>
</tr>
<tr>
<td>Electronic Kit</td>
<td></td>
</tr>
<tr>
<td>Companion flange (SAE)</td>
<td></td>
</tr>
<tr>
<td>1650/1710</td>
<td>1810</td>
</tr>
<tr>
<td>A 476.8 [18.77]</td>
<td>495.8 [19.52]</td>
</tr>
<tr>
<td>B 77.7 [3.06]</td>
<td>87.1 [3.43]</td>
</tr>
<tr>
<td>C 203.2 [8.00]</td>
<td>196.9 [7.75]</td>
</tr>
<tr>
<td>Tank-Cooler-Filter</td>
<td></td>
</tr>
<tr>
<td>CreepDrive Box</td>
<td></td>
</tr>
<tr>
<td>Electronic Components</td>
<td></td>
</tr>
<tr>
<td>Onboard software</td>
<td></td>
</tr>
</tbody>
</table>

| Companion flange (XS)           |                         |
| XS 150                          | XS 180                  |
| C 155 [6.10]                    | 180 [7.09]              |

| End yoke (Half round «Split eye»)|                         |
| 1710                            | 1810                    |
| A 581.7 [22.90]                 | 597.4 [23.52]           |
| B 130.0 [5.12]                  | 137.9 [5.43]            |
| C 157.2 [6.19]                  | 194.1 [7.64]            |

| End yoke (Half round «Solid eye»)|                         |
| 1710                            | 1810                    |
| A 581.7 [22.90]                 | 597.4 [23.52]           |
| B 130.0 [5.12]                  | 137.9 [5.43]            |
| C 154.8 [6.09]                  | 191.7 [7.54]            |

See technical catalogue N°A19965B for further informations.
EXCHANGE VALVE

Function

Exchange valves are for use in bleeding hot oil from the low pressure side of a hydrostatic transmission circuit. The hot oil can be cooled, filtered or used as a source of oil for flushing other pump and motor case.

Features

- Max. pressure: 450 bar [6527 PSI]
- Exchange Relief valve adjustment range: 12 to 30 bar [174 to 435 PSI]
- Low pressure selector spool operating pressure: 8 bar [116 PSI]
- Exchange Flow (10 bar [145 PSI] ΔP): 60 L/min [15.85 gal/min] (ΔP A→T or B→T)
- Exchange direction: Forward and/or reverse
- Weight: 3.8 kg [8.38 lb]

See technical catalogue N°A01887B for further informations.
CreepDrive Assist for Low speed applications

POCLAIN HYDRAULICS

TANK-COOLER-FILTER

Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>12 V</th>
<th>24 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air flow (m³/h)</td>
<td>2300</td>
<td>2400</td>
</tr>
<tr>
<td>Tank capacity [L [G US]]</td>
<td>15 [3.96]</td>
<td></td>
</tr>
<tr>
<td>Weight [Kg [lb]]</td>
<td>18 [39.68]</td>
<td></td>
</tr>
<tr>
<td>Nominal flow [L/min [GPM]]</td>
<td>45 [11.88]</td>
<td></td>
</tr>
<tr>
<td>Max. pressure [bar [PSI]]</td>
<td>20 [290]</td>
<td></td>
</tr>
<tr>
<td>Max. temperature [°C [°F]]</td>
<td>120 [248]</td>
<td></td>
</tr>
<tr>
<td>Fan diameter [mm [in]]</td>
<td>305 [12]</td>
<td></td>
</tr>
<tr>
<td>Noise emissions [db]</td>
<td>68</td>
<td></td>
</tr>
<tr>
<td>Protection</td>
<td>IP67</td>
<td></td>
</tr>
</tbody>
</table>

Hydraulic symbol

Performance and pressure drop

![Graphs showing performance and pressure drop](image-url)
**Dimensions**

```
Dimensions

POCLAIN HYDRAULICS
CreepDrive Assist for Low speed applications

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```
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CreepDrive Assist for Low Speed Applications

CREEPDRIVE BOX
(1ST SOLUTION)

Presentation

Poclain Hydraulics has designed the CreepDrive Box to simplify installation of the CreepDrive System on vehicles.

The CreepDrive Box contains the following elements:

1 Control unit

The control unit includes:

- Joystick which sets the hydraulic motor tractive effort on forward and reverse directions.
- Display which provides speed and system information.
- SmartDrive ECU.
- Start, Stop and emergency stop buttons for CreepDrive System.
- Light indicator for hydraulic motor engagement.

1 Main wiring harness

Wiring harness terminated with several connectors for connecting all components of the hydrostatic transmission to the control unit.

2 Pressure sensors

The pressure sensor measures the pressure on the high pressure loop.

Commercial name

<table>
<thead>
<tr>
<th>Part number</th>
<th>KIT-SD-CREEPDRIVE-12V-P90</th>
<th>KIT-SD-CREEPDRIVE-24V-P90</th>
</tr>
</thead>
<tbody>
<tr>
<td>A50664U</td>
<td></td>
<td>A50665V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Commercial name</th>
<th>KIT-SD-CREEPDRIVE-12V-PW</th>
<th>KIT-SD-CREEPDRIVE-24V-PW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>B17792N</td>
<td>B17793P</td>
</tr>
</tbody>
</table>

Supply voltage

- 10 to 15.6 v
- 20 to 30 V

Max. current

- 15 A

Sections of wires

- 1 mm²

Operating temperature range

-20 °C to +70 °C [-4 °F to +158 °F]

Degrees of protection

IP 65

Electrical protection

Reverse polarity

Kit mass

14.3 kg [31.52 lb]

ECU programming

Programming with a PC using the PHASESTM software application

ECU set-up

Set-up with the PHASESTM software or the HHT

Functions of the SmartDrive ECU

The software functions available with the control unit are:

- Control of the CreepDrive hydrostatic transmission.
- Limitation of the engine overspeed.
- Limitation of the system pressure / power / torque.
- Regulation of the speed.
- Diagnostic with Display 1.5.
- Control of the stop / reverse light.

These software functions can be customized via PHASES software or hand held terminal (HHT).

The parameters may be subject to special access authorization.

The SmartDrive Easy Plus is supplied without onboard software. See page 49 for onboard software installation.
## Dimensions of the control unit

<table>
<thead>
<tr>
<th>Commercial name</th>
<th>SD-CDM-BOX-12V</th>
<th>SD-CDM-BOX-24V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>B13561P</td>
<td>B13562Q</td>
</tr>
</tbody>
</table>

![Dimensions of the control unit](image)

- **Connector X1**: Bulkhead mounting connector.
- **Connector X2**: CAN bus termination plug.
- **Connector X3**: Cable length: 3000 mm ± 50  
  \[118.1 \text{ in} ± 1.97\]

CreepDrive Box is delivered with not assembled legs.

## Dimensions of the harnesses

### Main wiring harness

<table>
<thead>
<tr>
<th>Commercial name</th>
<th>CABLE-CDM-MAIN-8000-P90</th>
<th>CABLE-CDM-MAIN-8000-PW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>A50663T</td>
<td>B13638X</td>
</tr>
</tbody>
</table>

![Main wiring harness](image)

- **Connector X1**: Slit corrugated tube
- **Connector X2**: Supply voltage
- **Connector X3**: Vehicle status
- **Connector X3**: CreepDrive motor
- **Connector X3**: P90 or PW pump

### Vehicle status wiring harness

<table>
<thead>
<tr>
<th>Commercial name</th>
<th>CABLE-CDM-STATUS-5000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>A39995X</td>
</tr>
</tbody>
</table>

![Vehicle status wiring harness](image)

- **Connector X3**: PVC cable
- **Connector X3**: Slit corrugated tube
- **Connector X3**: Vehicle status
- **Connector X3**: Supply voltage
- **Connector X3**: CreepDrive motor
- **Connector X3**: P90 or PW pump

![Vehicle status wiring harness](image)
Harness extension (This cable is an option. It is not available in the CreepDrive Box)

<table>
<thead>
<tr>
<th>Commercial name</th>
<th>CABLE-CDM-EXTENSION-5000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>A47641J</td>
</tr>
</tbody>
</table>

Installation of the control unit in the cab

The CreepDrive Box must be installed within the operator’s reach to the vehicle service brakes.

Machine wiring recommendations

- The brake and reverse lights do not need to be relayed (Relays in the control unit. Max. current of 5A).
- A 16 A fuse is integrated into the control unit.
- The two wires Vbat+ and Vbat- must be plugged and supplied with the supply voltage of the battery after the contact (ignition key).

Input wiring for "Parking brake / Service brake"
The switch / sensor "parking brake / brake service" must be closed to allow the engagement of the CreepDrive system. This input is active in the high state. The battery voltage must be connected to the switch / sensor "Parking brake / brake service".

Input wiring for "Neutral gear"
The switch / sensor "Neutral gear" must be closed to allow the engagement of the CreepDrive system. This input is active in the low state. The earth must be connected to the switch / sensor "Neutral gear".

Output wiring for "Stop/Reverse lights"
Lamps supply by the CreepDrive Box control unit will be done in parallel with vehicle harness. It has to be checked that voltage presence on vehicle harness lights control doesn’t create any error or dysfunction.

Any unused wires must be insulated from shorting to ground or a power source to prevent possible unintended vehicle motion.
Electrical wiring for main wiring harness

The vehicle status wiring harness is an option which allows connecting some signals only available in the truck’s cab. These signals are also available on the Power supply and Vehicle status harnesses of the Main wiring harness.
## Description of connectors

**Connector X1 (Main wiring harness bulkhead mounting connector)**

<table>
<thead>
<tr>
<th>Pin number</th>
<th>Wire name</th>
<th>Component name</th>
<th>Wiring harness name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vbat1+</td>
<td>Power supply</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Vbat2+</td>
<td>Power supply</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Vbat1-</td>
<td>Power supply</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Vbat2-</td>
<td>Power supply</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Park brake+</td>
<td>Park brake sensor</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Park brake signal</td>
<td>Park brake sensor</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Park brake-</td>
<td>Park brake sensor</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Gear box neutral+</td>
<td>Gear box sensor</td>
<td>Vehicle status</td>
</tr>
<tr>
<td>9</td>
<td>Gear box neutral signal</td>
<td>Gear box sensor</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Gear box neutral-</td>
<td>Gear box sensor</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>CAN H</td>
<td>Bus CAN</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>CAN L</td>
<td>Bus CAN</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Reverse light+</td>
<td>Reverse/Stop light</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Stop light+</td>
<td>Reverse/Stop light</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>CDM engaged+</td>
<td>CDM engaged sensor</td>
<td>CDM engaged sensor</td>
</tr>
<tr>
<td>16</td>
<td>CDM engaged signal</td>
<td>CDM engaged sensor</td>
<td>CDM engaged sensor</td>
</tr>
<tr>
<td>17</td>
<td>CDM engaged-</td>
<td>CDM engaged sensor</td>
<td>CDM engaged sensor</td>
</tr>
<tr>
<td>18</td>
<td>CDM disengaged+</td>
<td>CDM disengaged sensor</td>
<td>CDM disengaged sensor</td>
</tr>
<tr>
<td>19</td>
<td>CDM disengaged signal</td>
<td>CDM disengaged sensor</td>
<td>CDM disengaged sensor</td>
</tr>
<tr>
<td>20</td>
<td>CDM disengaged-</td>
<td>CDM disengaged sensor</td>
<td>CDM disengaged sensor</td>
</tr>
<tr>
<td>21</td>
<td>Motor frequency+</td>
<td>Motor speed sensor</td>
<td>Motor speed sensor</td>
</tr>
<tr>
<td>22</td>
<td>Motor frequency signal</td>
<td>Motor speed sensor</td>
<td>Motor speed sensor</td>
</tr>
<tr>
<td>23</td>
<td>Motor frequency-</td>
<td>Motor speed sensor</td>
<td>Motor speed sensor</td>
</tr>
<tr>
<td>24</td>
<td>Valve CDM+</td>
<td>CDM valve</td>
<td>CDM valve</td>
</tr>
<tr>
<td>25</td>
<td>Valve CDM-</td>
<td>CDM valve</td>
<td>CDM valve</td>
</tr>
<tr>
<td>26</td>
<td>Electro valve 1C/2C or mandatory stop light +</td>
<td>1C/2C valve</td>
<td>CDM valve</td>
</tr>
<tr>
<td>27</td>
<td>Electro valve 1C/2C or mandatory stop light -</td>
<td>1C/2C valve</td>
<td>CDM valve</td>
</tr>
<tr>
<td>28</td>
<td>Valve S1+</td>
<td>S1 valve</td>
<td>S1 valve</td>
</tr>
<tr>
<td>29</td>
<td>Valve S1-</td>
<td>S1 valve</td>
<td>S1 valve</td>
</tr>
<tr>
<td>30</td>
<td>Valve S2+</td>
<td>S2 valve</td>
<td>S2 valve</td>
</tr>
<tr>
<td>31</td>
<td>Valve S2-</td>
<td>S2 valve</td>
<td>S2 valve</td>
</tr>
<tr>
<td>32</td>
<td>Feedback sensor+</td>
<td>Feedback sensor</td>
<td>Feedback sensor</td>
</tr>
<tr>
<td>33</td>
<td>Feedback sensor signal</td>
<td>Feedback sensor</td>
<td>Feedback sensor</td>
</tr>
<tr>
<td>34</td>
<td>Feedback sensor-</td>
<td>Feedback sensor</td>
<td>Feedback sensor</td>
</tr>
<tr>
<td>35</td>
<td>Pump frequency+</td>
<td>Pump frequency</td>
<td>Pump frequency</td>
</tr>
<tr>
<td>36</td>
<td>Pump frequency signal</td>
<td>Pump frequency</td>
<td>Pump frequency</td>
</tr>
<tr>
<td>37</td>
<td>Pump frequency-</td>
<td>Pump frequency</td>
<td>Pump frequency</td>
</tr>
<tr>
<td>38</td>
<td>FWD pressure+</td>
<td>FWD pressure sensor</td>
<td>FWD pressure sensor</td>
</tr>
<tr>
<td>39</td>
<td>FWD pressure signal</td>
<td>FWD pressure sensor</td>
<td>FWD pressure sensor</td>
</tr>
<tr>
<td>40</td>
<td>FWD pressure-</td>
<td>FWD pressure sensor</td>
<td>FWD pressure sensor</td>
</tr>
<tr>
<td>41</td>
<td>REV pressure+</td>
<td>REV pressure sensor</td>
<td>REV pressure sensor</td>
</tr>
<tr>
<td>42</td>
<td>REV pressure signal</td>
<td>REV pressure sensor</td>
<td>REV pressure sensor</td>
</tr>
<tr>
<td>43</td>
<td>REV pressure-</td>
<td>REV pressure sensor</td>
<td>REV pressure sensor</td>
</tr>
<tr>
<td>44</td>
<td>Valve PTO+</td>
<td>PTO valve</td>
<td>PTO valve</td>
</tr>
<tr>
<td>45</td>
<td>Valve PTO-</td>
<td>PTO valve</td>
<td>PTO valve</td>
</tr>
<tr>
<td>46</td>
<td>Cutoff+</td>
<td>Cutoff valve</td>
<td>Cutoff valve</td>
</tr>
<tr>
<td>47</td>
<td>Cutoff-</td>
<td>Cutoff valve</td>
<td>Cutoff valve</td>
</tr>
</tbody>
</table>
CreepDrive Assist for Low Speed Applications

POCLAIN HYDRAULICS

Connector X2 (Male communication connector)

<table>
<thead>
<tr>
<th>Pin number</th>
<th>Wire name</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>+5Vout</td>
</tr>
<tr>
<td>E</td>
<td>CAN L</td>
</tr>
<tr>
<td>F</td>
<td>CAN L</td>
</tr>
<tr>
<td>H</td>
<td>Rx RS232</td>
</tr>
<tr>
<td>L</td>
<td>Tx RS232</td>
</tr>
<tr>
<td>K</td>
<td>CAN H120</td>
</tr>
<tr>
<td>M</td>
<td>CAN H</td>
</tr>
<tr>
<td>N</td>
<td>CAN H</td>
</tr>
<tr>
<td>P</td>
<td>-Vbat</td>
</tr>
<tr>
<td>R</td>
<td>-Vbat</td>
</tr>
</tbody>
</table>

Connector X3 (Vehicle status connector)

<table>
<thead>
<tr>
<th>Pin number</th>
<th>Wire name</th>
<th>Wire number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>+Vbat</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>+Vbat</td>
<td>2</td>
</tr>
<tr>
<td>C</td>
<td>-Vbat</td>
<td>3</td>
</tr>
<tr>
<td>D</td>
<td>-Vbat</td>
<td>4</td>
</tr>
<tr>
<td>E</td>
<td>CAN H</td>
<td>5</td>
</tr>
<tr>
<td>F</td>
<td>CAN L</td>
<td>6</td>
</tr>
<tr>
<td>G</td>
<td>CAN H120</td>
<td>7</td>
</tr>
<tr>
<td>H</td>
<td>Park brake+</td>
<td>8</td>
</tr>
<tr>
<td>J</td>
<td>Park brake signal</td>
<td>9</td>
</tr>
<tr>
<td>K</td>
<td>Park brake-</td>
<td>10</td>
</tr>
<tr>
<td>L</td>
<td>Gear box neutral+</td>
<td>11</td>
</tr>
<tr>
<td>M</td>
<td>Gear box neutral signal</td>
<td>12</td>
</tr>
<tr>
<td>N</td>
<td>Gear box neutral-</td>
<td>13</td>
</tr>
<tr>
<td>P</td>
<td>Reverse light output</td>
<td>14</td>
</tr>
<tr>
<td>R</td>
<td>Stop light output</td>
<td>15</td>
</tr>
</tbody>
</table>

If the vehicle status wiring harness is used, do not connect the corresponding signals of the main harness. They have to remain isolated (voltage presence).

Use of the CAN BUS

A CAN BUS termination plug is delivered mounted on the control unit connector X3.

If the vehicle CAN BUS is not activated, wire a termination resistance on connector X3:

- either by using the CAN BUS terminaison plug.
- or linking the wires 6 and 7 of the vehicle status wiring harness (X3).

If the vehicle CAN BUS is activated, (information of the speed engine, gear box neutral, parking brake / service brake), plug the CAN BUS to the control unit with the vehicle status harness or the main wiring harness.
## ELECTRONIC KIT
### (2ND SOLUTION)

The Electronic kit allows to order in one time the electrical components required to the CreepDrive system.

For P90 pumps
Electronic kit (P/N: A29444E) includes

- Controller SmartDrive Easy Plus (x 1)
- SD Easy 42-pin connector (x 1)
- Male communication connector (x 1)
- Pump solenoid connector (x 1)
- Pump feedback connector (x 1)
- Pump pressure sensor 600 bar (x 2)
- Pressure sensor cable (x 2)
- Speed sensor cable 90° (x 2)
- 120 ohm CAN bus cable (x 1)
- Joystick and its counterpart connector kit (x 1)
- Display (x 1)
- Display cable (x 1)

For PW pumps
Electronic kit (P/N: B18955C) includes

- Controller SmartDrive Easy Plus (x 1)
- SD Easy 42-pin connector (x 1)
- Male communication connector (x 1)
- Pump solenoid connector (x 3)
- Pump feedback connector (x 1)
- Pump pressure sensor 600 bar (x 2)
- Pressure sensor cable (x 2)
- Speed sensor cables 90° (x 2)
- 120 ohm CAN bus cable (x 1)
- Joystick and its counterpart connector kit (x 1)
- Display (x 1)
- Display cable (x 1)

See the following pages to get more information on each electronic component.
### ELECTRONIC COMPONENTS

(3rd solution)

This section allows to order the electronic components one by one according to your need.

<table>
<thead>
<tr>
<th>Component Description</th>
<th>P/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller SmartDrive™ Easy Plus (x 1)</td>
<td>B20252M</td>
</tr>
<tr>
<td>SmartDrive™ Easy cable 1 m (x 1)</td>
<td>A20311C</td>
</tr>
<tr>
<td>SmartDrive™ Easy cable 5 m (x 1)</td>
<td>A20313E</td>
</tr>
<tr>
<td>120 ohm CAN bus cable (x 1)</td>
<td>A25657N</td>
</tr>
<tr>
<td>Pressure sensor cable (x 2)</td>
<td>003141105U</td>
</tr>
<tr>
<td>SD Easy 42-pin connector (x 1)</td>
<td>A02809D</td>
</tr>
<tr>
<td>Male communication connector (x 1)</td>
<td>A50515H</td>
</tr>
<tr>
<td>Pump solenoid connector (x 1)-for P90</td>
<td>007142211X</td>
</tr>
<tr>
<td>Pump solenoid connector (x 3)- for PW</td>
<td>A42310P</td>
</tr>
<tr>
<td>Pump feedback connector (x 1)-for P90</td>
<td>007142212Z</td>
</tr>
<tr>
<td>Pump feedback connector (x 1)-for PW</td>
<td>B02468G</td>
</tr>
<tr>
<td>Pump speed sensor cable 90° (x 2)</td>
<td>A04999J</td>
</tr>
<tr>
<td>Pressure sensor 600 bar (x 2)- for PW</td>
<td>003241171M</td>
</tr>
<tr>
<td>Pressure sensor 600 bar (x 2)-for P90</td>
<td>003241170L</td>
</tr>
<tr>
<td>Joystick and its counterpart connector kit (x 1)</td>
<td>003442799X</td>
</tr>
<tr>
<td>Display (x 1)</td>
<td>A47449A</td>
</tr>
<tr>
<td>Display cable (x 1)</td>
<td>A19974L</td>
</tr>
</tbody>
</table>

See the following pages to get more information on each electronic component.
Functions

• Manages the CreepDrive effort according to the joystick direction and angle.
• Manages the engagement and the disengagement of the CreepDrive.

Commercial name  SD-EASY-PLUS
Part number B20252M

Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>12 V DC / 24 V DC</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-40°C à 85°C [-40 °F à 185°F]</td>
</tr>
<tr>
<td>Overall dimensions</td>
<td>See below</td>
</tr>
<tr>
<td>Material</td>
<td>Aluminum</td>
</tr>
<tr>
<td>Mass</td>
<td>0.5 kg [1.1 lb]</td>
</tr>
<tr>
<td>Mounting</td>
<td>4 x Ø 5.5 mm 4 x [0.22” dia.]</td>
</tr>
<tr>
<td>ECU protection index with its connectors</td>
<td>IP 65 (weather proofing)</td>
</tr>
<tr>
<td>Maximum current</td>
<td>14 A</td>
</tr>
<tr>
<td>Electrical protection</td>
<td>Excess voltage, reverse polarity, short circuit</td>
</tr>
<tr>
<td>ECU programming</td>
<td>Programming with a PC using the PHASES™ software application</td>
</tr>
<tr>
<td>ECU set-up</td>
<td>Set-up with the software PHASES™ or the HHT</td>
</tr>
</tbody>
</table>

Dimensions

See technical catalogue N°A05609W for further informations.
SMARTDRIVE™ EASY CABLE

<table>
<thead>
<tr>
<th>Commercial name</th>
<th>CABLE-SD-EASY-42-1000</th>
<th>CABLE-SD-EASY-42-5000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>A20311C</td>
<td>A20313E</td>
</tr>
<tr>
<td>Function</td>
<td>Connect a SmartDrive™ Easy Plus or SmartDrive™ Auto ECU to the machine wiring and have a male communication connector.</td>
<td></td>
</tr>
<tr>
<td>Compatibility</td>
<td>Electronic transmission management with SmartDrive™ Easy Plus or SmartDrive™ Auto ECU.</td>
<td></td>
</tr>
</tbody>
</table>

**Features**

<table>
<thead>
<tr>
<th>Length of cable</th>
<th>1m</th>
<th>5m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>PVC</td>
<td></td>
</tr>
<tr>
<td>Number of wires</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Sections of wires</td>
<td>1mm²</td>
<td></td>
</tr>
</tbody>
</table>

**Electrical wiring**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>26</td>
<td>Not connected</td>
</tr>
<tr>
<td>27</td>
<td>Not connected</td>
</tr>
<tr>
<td>42</td>
<td>42</td>
</tr>
</tbody>
</table>

The non used wires should be individually insulated because of possible voltage.
# 42-PIN MAIN CONNECTOR

<table>
<thead>
<tr>
<th>Commercial name</th>
<th>KIT-CONNECTEUR-MAIN-SD-EASY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>A02809D</td>
</tr>
</tbody>
</table>

## Features

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>AMP reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector:</td>
<td>1-967281-1</td>
</tr>
<tr>
<td>Protective cover:</td>
<td>0-965643-1</td>
</tr>
</tbody>
</table>

### Componants

#### Power

- 7 female contacts: 929937-3
- 7 insulants: 828905-1
- 6 stoppers: 828922-1

#### Signals

- 40 female contacts: 962876-1
- 40 insulants: 963530-1
- 36 stoppers: 963531-1

## Cable section

- For power pins 1.5 to 2.5 mm² [0.0023 to 0.004 in²]
- For signal pins 0.5 to 1.0 mm² [0.0008 to 0.0015 in²]

## Insulation diameter

- For power pins 2.2 to 3.0 mm² [0.0034 to 0.0046 in²]
- For signal pins 1.4 to 1.9 mm² [0.0021 to 0.003 in²]

## Operating temperature

- -40°C to 85°C [-40°F to 185°F]

## Ingress protection

- IP 68

## Mounting tools for the connector

<table>
<thead>
<tr>
<th>AMP reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crimpers</td>
</tr>
<tr>
<td>Chuck-jaw for power spindles</td>
</tr>
<tr>
<td>Chuck-jaw for control spindles</td>
</tr>
<tr>
<td>Extractor for power spindles</td>
</tr>
<tr>
<td>Extractor for control spindles</td>
</tr>
</tbody>
</table>
MALE COMMUNICATION CONNECTOR

<table>
<thead>
<tr>
<th>Commercial name</th>
<th>KIT CONNECTEUR MALE COM SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>A50515H</td>
</tr>
<tr>
<td>Compatibility</td>
<td>SmartDrive™ Easy, SmartDrive™ Auto</td>
</tr>
</tbody>
</table>

**Features**

- **Manufacturer**: Amphénol
- **Components**:
  - Receptacle: PT02A12-14P023
  - Closing cap: BECN1207
  - Seal: JE12
- **Wire range**: 0.38 to 0.93 mm²
- **Insulation diameter**: 1.2 to 2.4 mm
- **Operating temperature**: -55°C to +125°C [-67°F to 257°F]
- **Ingress Protection**: IP68
- **Material**: Aluminium with plated nickel

**Connector mounting**

Strip the wires to a length of 5 mm [0.19 in].

Solder the wires onto the pins as shown in the table below.

<table>
<thead>
<tr>
<th>N° pin SD Easyconnector</th>
<th>Function</th>
<th>N° pin male communication connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>5V RS 232</td>
<td>A</td>
</tr>
<tr>
<td>12</td>
<td>CAN L</td>
<td>E, F</td>
</tr>
<tr>
<td>26</td>
<td>RX RS 232</td>
<td>H</td>
</tr>
<tr>
<td>14</td>
<td>CAN H 120</td>
<td>K</td>
</tr>
<tr>
<td>27</td>
<td>TX RS 232</td>
<td>L</td>
</tr>
<tr>
<td>13</td>
<td>CAN H</td>
<td>M, N</td>
</tr>
<tr>
<td>42</td>
<td>Ground</td>
<td>P, R</td>
</tr>
</tbody>
</table>

**Risk of damage to the serial port of the ECU.**

When connecting an external equipment working with the RS232 link, be sure to connect as following:
- RX RS 232 (Easy) → TX RS232 (Various equipment)
- TX RS 232 (Easy) → RX RS232 (Various equipment)
# PUMP PRESSURE SENSOR

![600 bar pressure sensors](image)

<table>
<thead>
<tr>
<th>Commercial name</th>
<th>PRES-SENSOR-600B-MH2-9/16</th>
<th>PRES-SENSOR-600B-MH2-G1/4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designation</td>
<td>for P90 pump</td>
<td>for PW pump</td>
</tr>
<tr>
<td>Part number</td>
<td>003241170L</td>
<td>003241171M</td>
</tr>
<tr>
<td>Function</td>
<td>Measure the pressure on the High Pressure system</td>
<td></td>
</tr>
</tbody>
</table>

## Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>PRES-SENSOR-600B-MH2-9/16</th>
<th>PRES-SENSOR-600B-MH2-G1/4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>5 V ± 0.5 V</td>
<td></td>
</tr>
<tr>
<td>Output signal</td>
<td>0.5 V to 4.5 V ratiometric</td>
<td></td>
</tr>
<tr>
<td>Pressure range</td>
<td>600 bars [8702 PSI]</td>
<td></td>
</tr>
<tr>
<td>Over pressure safety</td>
<td>1200 bars [17404 PSI]</td>
<td></td>
</tr>
<tr>
<td>Pressure connection with O’ring</td>
<td>9/16&quot; - G 1/4&quot;</td>
<td></td>
</tr>
<tr>
<td>Response time</td>
<td>≤ 5 ms</td>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
<td>≤ 1% FS</td>
<td></td>
</tr>
<tr>
<td>Using temperature range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>-40 °C to 125 °C [-40 °F to 257 °F]</td>
<td></td>
</tr>
<tr>
<td>Ambient</td>
<td>-40 °C to 100 °C [-40 °F to 212 °F]</td>
<td></td>
</tr>
<tr>
<td>Storage</td>
<td>-40 °C to 120 °C [-40 °F to 248 °F]</td>
<td></td>
</tr>
<tr>
<td>Ingress protection</td>
<td>IP 67</td>
<td></td>
</tr>
<tr>
<td>CE conformity</td>
<td>EN 61326</td>
<td></td>
</tr>
<tr>
<td>Shock resistance</td>
<td>500 g according to DIN EN 837</td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>20 g according to IEC 68-2</td>
<td></td>
</tr>
</tbody>
</table>

## Layout

<table>
<thead>
<tr>
<th>Layout</th>
<th>Capteur G1/4</th>
<th>Capteur 9/16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor side view</td>
<td><img src="image" alt="Sensor side view" /></td>
<td><img src="image" alt="Sensor side view" /></td>
</tr>
<tr>
<td>Connector side view</td>
<td><img src="image" alt="Connector side view" /></td>
<td><img src="image" alt="Connector side view" /></td>
</tr>
</tbody>
</table>

- A: Ground
- B: 5 Vcc
- C: Signal 0.5 to 4.5 V
# PRESSURE SENSOR CABLE

## Commercial name
- CABLE-PRESSURE-SENSOR-3M

## Part number
- 003141105U

## Features
- **Length of cable**: 3 m
- **Material**: PVC
- **Number of wires**: 3
- **Sections of wires**: 0.5 mm²

## Layout

![Diagram of electrical wiring](image)

## Electrical wiring

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Green</td>
</tr>
<tr>
<td>B</td>
<td>Brown</td>
</tr>
<tr>
<td>C</td>
<td>White</td>
</tr>
</tbody>
</table>
PUMP FEEDBACK CONNECTOR

for P90 pump only

<table>
<thead>
<tr>
<th>Commercial name</th>
<th>KIT CONNECTEUR CAPT CDE SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>007142212Z</td>
</tr>
</tbody>
</table>

**Features**

<table>
<thead>
<tr>
<th>Features</th>
<th>Delphi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>Delphi</td>
</tr>
<tr>
<td>Components</td>
<td></td>
</tr>
<tr>
<td>3-way male connector</td>
<td>12015793</td>
</tr>
<tr>
<td>3 female contacts</td>
<td>12089188</td>
</tr>
<tr>
<td>3 seals</td>
<td>12015323</td>
</tr>
<tr>
<td>Wire section</td>
<td>0.5 to 0.8 mm²</td>
</tr>
<tr>
<td>Insulation diameter</td>
<td>2 to 2.9 mm</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-40°C to +125°C [-40°F to +257°F]</td>
</tr>
<tr>
<td>Ingress protection</td>
<td>IP 67</td>
</tr>
</tbody>
</table>

**Connector mounting**

**Locking device position**

1. Fit a seal on each wire.
2. Strip 5 mm [0.19 in] off the wires.
3. Crimp the terminals with the 1201 4254 Packard Electric pliers, pinching the seal with the lug.
4. Plug the terminal into its compartment. If a terminal is wrongly inserted, use extraction tool Ref 1201 4012 to remove it. Fold down the connector latch.

A = Ground  
B = Signal  
C = +5 VDC

Pump feedback connection

S2  S1
POCLAIN HYDRAULICS

CreepDrive Assist for Low speed applications

PUMP SOLENOID CONNECTORS

✓ for P90 pump only

<table>
<thead>
<tr>
<th>Commercial name</th>
<th>CDE SA CONNECTOR KIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>007142211X</td>
</tr>
</tbody>
</table>
| Compatibility   | Displacement shift valve block  
                  Bypass valve block  
                  Electro-valve solenoid control |

Features

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Hirschmann</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>ISO 4400 - DIN43650-A</td>
</tr>
<tr>
<td>Components</td>
<td>2 connectors 931957-100</td>
</tr>
<tr>
<td>Wire section</td>
<td>max. 1.5 mm²</td>
</tr>
<tr>
<td>Cable diameter</td>
<td>6 to 11.5 mm</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-40°C to +125°C [-40°F to +257°F]</td>
</tr>
<tr>
<td>Ingress Protection</td>
<td>IP65</td>
</tr>
</tbody>
</table>

Connector mounting

1. Unscrew the packing gland and the screw.
2. Open the connector with a flat-headed screwdriver inserted in part B of the slot.
   Strip the wire over a length of 5 mm [0.19 in].
   Pass the wire through the gland, then through the cover A.
   Plug the wire into B. Wire No.3 has to be earthed.
3. Re-assemble B and A: The “3” mark has to be nearest the gland.
   Refit the packing gland and the screw.

Pump must be oriented in the machine with control on the top or side of the pump. It cannot be on the bottom.
### 3-PIN DTM DEUTSCH CONNECTOR

#### Commercial name
- KIT-CONNECT-DTM-3S-NW8.5

#### Part number
- B02468G

#### Compatibility
- Position sensor

#### Features

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>Deutsch</td>
</tr>
<tr>
<td>Components</td>
<td>1 Deutsch connector DTM DTM 06-3S</td>
</tr>
<tr>
<td></td>
<td>1 Backshell 180° NW8.5 1028-005-0305</td>
</tr>
<tr>
<td></td>
<td>1 Wedge lock WM-3S</td>
</tr>
<tr>
<td></td>
<td>4 socket contact size 20 0462-201-20141</td>
</tr>
<tr>
<td>Wire section</td>
<td>0.2 to 0.5 mm²</td>
</tr>
<tr>
<td>Cable diameter</td>
<td>1.35 to 3.05 mm</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-55°C to +125°C [-40°F to +257°F]</td>
</tr>
<tr>
<td>Ingress Protection</td>
<td>IP6K9K</td>
</tr>
</tbody>
</table>

#### Mounting tool
- Crimp tool: HDT-48-00

#### Layout

![Diagram of 3-PIN DTM DEUTSCH CONNECTOR](image_url)
# 2-PIN DT DEUTSCH CONNECTOR

✓ for PW pump only

<table>
<thead>
<tr>
<th>Commercial name</th>
<th>KIT-CONNECT-2-PIN-DEUTSCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>A42310P</td>
</tr>
<tr>
<td>Compatibility</td>
<td>Electro valve</td>
</tr>
</tbody>
</table>

**Features**

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Deutsch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Components</td>
<td>1x Deutsch connector DT DT 06-2S</td>
</tr>
<tr>
<td></td>
<td>1x Wedgelock W2S-P012</td>
</tr>
<tr>
<td></td>
<td>3x socket contact 0462-201-16141</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wire section</th>
<th>0.5 to 0.1 mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable diameter</td>
<td>2.23 to 3.68 mm</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-55°C to +125°C [-40°F to +257°F]</td>
</tr>
<tr>
<td>Ingress Protection</td>
<td>IP67</td>
</tr>
</tbody>
</table>

**Mounting tool**

Crimp tool: HDT-48-00

**Layout**

- Connector
- Wedgelock
- Socket contact

<table>
<thead>
<tr>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.2 [1.23]</td>
</tr>
<tr>
<td>15 [0.59]</td>
</tr>
<tr>
<td>19.3 [0.76]</td>
</tr>
<tr>
<td>11.58 [0.46]</td>
</tr>
</tbody>
</table>
# SPEED SENSOR CABLE

For pump and CreepDrive Motor

## Commercial name
- **ELEC-CABLE- M12-90°-5000**

## Part number
A04999J

## Compatibility
Speed sensor, digital sensor and temperature sensor.

## Features
- **Length of cable**: 5 m
- **Material**: PUR
- **Number of wires**: 4
- **Sections of wires**: 0.34 mm²
- **Protection**: IP68

## Dimensions

![Dimensions Diagram](image)

## Electrical wiring

### CreepDrive motor speed sensor

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power supply</td>
</tr>
<tr>
<td>2</td>
<td>Not used</td>
</tr>
<tr>
<td>3</td>
<td>Ground</td>
</tr>
<tr>
<td>4</td>
<td>Square frequency signal</td>
</tr>
</tbody>
</table>

### P90 pump speed sensor

#### Top view

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Supply</td>
</tr>
<tr>
<td>2</td>
<td>Not used</td>
</tr>
<tr>
<td>3</td>
<td>Signal</td>
</tr>
<tr>
<td>4</td>
<td>Ground</td>
</tr>
</tbody>
</table>

#### Side view

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power supply</td>
</tr>
<tr>
<td>2</td>
<td>Not used</td>
</tr>
<tr>
<td>3</td>
<td>Signal</td>
</tr>
<tr>
<td>4</td>
<td>Ground</td>
</tr>
<tr>
<td>5</td>
<td>Square frequency signal</td>
</tr>
</tbody>
</table>

### PW pump speed sensor

#### Top view

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Supply</td>
</tr>
<tr>
<td>2</td>
<td>Not used</td>
</tr>
<tr>
<td>3</td>
<td>Signal</td>
</tr>
<tr>
<td>4</td>
<td>Ground</td>
</tr>
</tbody>
</table>

#### Side view

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power supply</td>
</tr>
<tr>
<td>2</td>
<td>Not used</td>
</tr>
<tr>
<td>3</td>
<td>Signal</td>
</tr>
<tr>
<td>4</td>
<td>Ground</td>
</tr>
<tr>
<td>5</td>
<td>Square frequency signal</td>
</tr>
</tbody>
</table>
CREEPDRIVE MOTOR
CLUTCH POSITION SENSOR

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

**Features**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>10 to 30 V</td>
</tr>
<tr>
<td>Current consumption</td>
<td>10 mA max.</td>
</tr>
</tbody>
</table>

**Typical solid state sinking configuration (NPN)**

- Sinking switch
- Load or PLC input
- Common
- Ground

**Pin Function**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(+Vcc)</td>
</tr>
<tr>
<td>4</td>
<td>Output</td>
</tr>
<tr>
<td>3</td>
<td>Ground</td>
</tr>
</tbody>
</table>

(1) Fastening clamp
(2) Sensing face

Basic circuit layout for Programmable Logic Controllers (PLC) and normally off relays and solenoids.
ENGAGEMENT LAMP OF CREEPDRIVE MOTOR

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.

![Wiring Diagram]

- Disengagement position sensor
- Engaged motor lamp
- Controller
- V_{Ac+}
- V_{Bat+}
JOYSTICK WITH CENTER LOCK

Function

Joystick with medium lock. Provide the translation speed setting.

Commercial name: JOYSTICK-35°-HANDLE-LOCK
Part number: 003442799X

Features

Supply voltage: 5 V
Output signal: 10% to 90% of supply voltage
Resistance: 2k Ohm Tolerance ±20%
Expected service life: 500 000 cycles
Electrical stroke: ± 32°
Mechanical stroke: ± 35°
Maximum applied force: 300 N full deflection, 130 mm from flange
Operating force: 17.8 N full deflection, 55 mm from flange
Breakout force: 6.2 N, 55 mm from flange
Directional switches communication angle: 5° ± 1° either side of center
Direction switches max. load current: 200 mA resistive
Operating temperature range: - 25 °C to + 70 °C [-13 °F to 158 °F]
Mass: 560 g [1.23 lb] with HKN handle fitted
Ingress protection: IP 65

Connector features

Manufacturer: AMP
Components: Connector (174046-2)
16 pins (175062-1)
Wire range: 0.3 to 0.56 mm²
Wire insulation diameter: 1.8 to 2 mm

Mounting tools

Chuck-jaw + crimpers: 58522-1

See technical catalogue N°A01889D for further informations.
CreepDrive Assist for Low speed applications

POCLAIN HYDRAULICS

Layout

Bottom view

Top view

Connector

Pin

Installation

Electrical wiring

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Directional switches Y-</td>
</tr>
<tr>
<td>9</td>
<td>Ground</td>
</tr>
<tr>
<td>10</td>
<td>Output voltage signal</td>
</tr>
<tr>
<td>11</td>
<td>Supply</td>
</tr>
<tr>
<td>13</td>
<td>Common directional switches</td>
</tr>
<tr>
<td>14</td>
<td>Directional switches Y+</td>
</tr>
</tbody>
</table>

When wiring, check that the wire can neither be cut off, nor torn off when the machine is working or moving.
# DISPLAYS

![](image)

**SD-Display 1.5** or **SD-Display 4.3C**

<table>
<thead>
<tr>
<th>Features</th>
<th>SD-Display 1.5</th>
<th>SD-Display 4.3C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial name</td>
<td>SD-DISPLAY 1.5</td>
<td>SD-DISPLAY 4.3C</td>
</tr>
<tr>
<td>Part number</td>
<td>A47449A</td>
<td>A48371C</td>
</tr>
<tr>
<td>DC power supply</td>
<td>9 to 60 V</td>
<td>9 to 36 V</td>
</tr>
<tr>
<td>Program flash memory</td>
<td>96 kB</td>
<td>512 MB</td>
</tr>
<tr>
<td>Data flash memory</td>
<td>64 kB</td>
<td>32 kB</td>
</tr>
<tr>
<td>SRAM memory</td>
<td>3.3 kB</td>
<td>128 MB</td>
</tr>
<tr>
<td>Current @ 24V</td>
<td>&lt; 100 mA</td>
<td>210 mA when on</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40 mA when contact off less than 2 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.3 mA when contact off more than 2 hours</td>
</tr>
<tr>
<td>Display</td>
<td>Back-litted</td>
<td></td>
</tr>
<tr>
<td>Display type</td>
<td>LCD monochrome, 2x8 characters</td>
<td>4.3&quot; colour TFT</td>
</tr>
<tr>
<td>Keys</td>
<td>3 (highlighted)</td>
<td>11 (highlighted)</td>
</tr>
<tr>
<td>Rotating button</td>
<td>No</td>
<td>1 (highlighted)</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-20°C to +70°C [-4°F to +158°F]</td>
<td>-30°C to +65°C [-22°F to +149°F]</td>
</tr>
<tr>
<td>Weight</td>
<td>63 g [0.14 lb]</td>
<td>430 g [0.95 lb]</td>
</tr>
<tr>
<td>Fixing</td>
<td>Mounting hole Ø53mm [dia. 2.10 in]</td>
<td>Mounting hole or RAM-Mount 60x60</td>
</tr>
<tr>
<td>IP</td>
<td>IP65 on the front; IP54 on the back</td>
<td>IP65</td>
</tr>
<tr>
<td>CAN</td>
<td>1 (ISO11898, 2.0B)</td>
<td>Yes</td>
</tr>
<tr>
<td>Layer2, CANopen, J1939</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See technical catalogue N°A25522R for further informations.
Dimension

SD-DISPLAY 1.5

View A

5-pin M12 connector

SD-DISPLAY 4.3C
DISPLAY 1.5 CABLE

Accessory

<table>
<thead>
<tr>
<th>Cable with connector</th>
<th>2 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial name</td>
<td>CABLE-M12-180°-2000-5PT</td>
</tr>
<tr>
<td>Part number</td>
<td>A19974L</td>
</tr>
</tbody>
</table>

Pin Function Colour

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ground</td>
<td>Brown</td>
</tr>
<tr>
<td>2</td>
<td>Vcc</td>
<td>White</td>
</tr>
<tr>
<td>3</td>
<td>Not used</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>CAN H</td>
<td>Black</td>
</tr>
<tr>
<td>5</td>
<td>CAN L</td>
<td>Grey or Green/Yellow</td>
</tr>
</tbody>
</table>

See technical catalogue N°A25522R for further informations.
CAN BUS CABLE (120 OHM)

Commercial name
CABLE-COM-M12-CAN-120
Part number
A25657N
Function
120 ohm termination resistor for CAN bus
Compatibility
Display 1.5

Features
Length of cable
0.3 m
Material
PUR
Number of wires
5
Sections of wires
0.34 mm²
Protection
IP67

Layout

Connector Mounting
Securely hand tighten the cable’s ring to sensor connector M12.
DISPLAY 4.3C MAIN CONNECTOR

Characteristics

<table>
<thead>
<tr>
<th>Component</th>
<th>AMP reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector</td>
<td>3-1437290-7</td>
</tr>
<tr>
<td>Sockets</td>
<td>3-1447221-3</td>
</tr>
<tr>
<td>Stoppers</td>
<td>4-1437284-3</td>
</tr>
</tbody>
</table>

Wire section: 0.75 to 1.25 mm² [0.00116 to 0.00194 in²]
Insulation diameter: 1.6 to 2.4 mm [0.063 to 0.094 in]
Operating temperature: -40°C to 85°C [-40°F to 185°F]
Ingress Protection: IP67

Overall dimensions

Connector: 3-1437290-7
Socket: 3-1447221-3
Stopper: 4-1437284-3
ONBOARD SOFTWARE

The SmartDrive Easy Plus is supplied without Onboard software.

Onboard software design

This task needs to use PC software PHASES Easy Design (A04904F). If you do not have PHASES Easy design, please contact your Poclain Hydraulics application engineer.

1. Install PHASES Easy Design (A04904F).
2. Install Easy Design CDM database (A49556Q).
3. Launch PHASES and click on SmartDrive Easy Design.
4. Click on "Start a new design".
5. Select "select your pump", then select "One pump", desired voltage, "Use a SmartDrive Easy" or "Use a Creep Drive Box" (CreepDrive Box will need to also include "Display 1.5 management"). Validate your choices and click on "Next >>".

6. In functions screen:
   • Select "CreepDrive management" and all sub functions matching your application.
   • Select "Driving mode" and all sub functions matching your application.
   • Select "Pressure limitation (flow cancellation)" and all sub functions matching your application.
   • Select other functions accordingly to your application.
   • Click on Next to view your choices list.
   • Click on Next to view the wiring drawing. You can print it as wiring reference.
   • Click on Next and save your design.
   • Click on Next to download the application. Log-in with ID and password provided in PHASES Easy Design package. Download the software into the folder in which you saved your design.

Control unit initialization

1. Connect the PHASES communication cable to the control unit.
2. Launch PHASES and click on "Send / Receive / Open".
3. Click on "Send Program file" and select your design.
4. When PHASES asks for it, switch on the control unit and wait for the end of downloading.

If you already have a parameter file provided by your Poclain Hydraulics Application engineer:
   • Click on "Send parameter file" and select the file.
   • When PHASES asks for it, switch on the control unit and wait for the end of downloading.

If you do not have a parameter file:
   • Switch off the control unit and go back to PHASES's home page.
   • Switch on the control unit: PHASES connects to the control unit.
   • Access the "Customize" screen. Click on "Restore factory settings" and follow the procedure.
   • Browse to different parameters categories and adjust parameters values accordingly to your application. Warning: Access to parameters is protected by a password. Please contact your Poclain Hydraulics Application Engineer to access these parameters.

Joystick calibration

Joystick calibration enables characterizing the joystick.
1. With control unit powered, in PHASES, click on Calibration and Joystick.
2. Follow the procedure.
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