SMARTDRIVE PHASES

SOFTWARE

POCLAIN HYDRAULICS

PH

This document is provided to machine manufacturers integrating POCLAIN-HYDRAULICS hydrostatic transmission systems driven by our SmartDrive^{TM} ECUs. It suggests the processes that manufacturers can implement in order to customize these systems.

It is recommended that all operations be performed by properly trained engineers. The engineers should read and understand the information given in this document and be authorized by the machine manufacturer.
It is essential that the engineers comply with safety instructions to prevent injury.

POCLAIN HYDRAULICS designs products that are integrated by its customers in the machines they design. Subsequently POCLAIN HYDRAULICS disclaims liability for consequences of improper integration of its products and of improper set-up of adjustable devices. In the same way, POCLAIN HYDRAULICS may not be liable for incomplete or improper operating and maintenance instructions provided to the end user by the machine manufacturer nor for failures resulting from operations performed by any person using these suggested procedures.

A re-certification of the machine may be required for every change in set-up of adjustable devices.
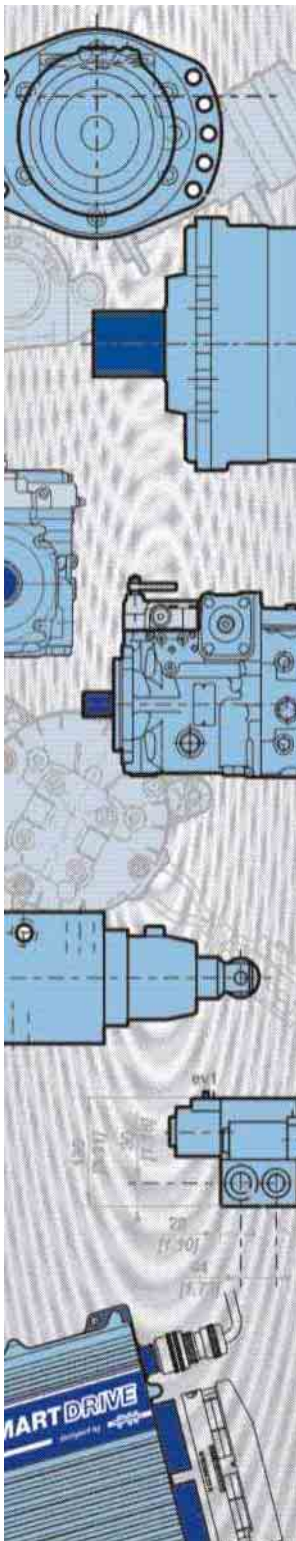
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FUNCTIONAL DESCRIPTION

The PHASES Off-road™, PHASES Master™, PHASES Premier™, PHASES Easy™ et PHASES Easy Design™software are components of the SMARTDRIVE^TM hydrostatic transmission control system developed by **POCLAIN HYDRAULICS** (see brochure CAR F Elloder).

Installed on a computer running a Windows OS and connected to a SD ECU (Electronic Control Unit) via its serial port or USB thanks to the USB/Serial adapter, the PHASES software can be used to carry out configuration, optimization and maintenance operations for the SMARTDRIVE hydrostatic transmission systems in the best possible ergonomic conditions.

In particular, it allows the user:

1 - to update the embedded software loaded in the SD ECUs via downloads;

2 - to adjust and control the operating parameters of the SD ECU;

3 - to calibrate and to check the functioning of the sensors connected to the SD ECU;

4 - to diagnose the possible malfunctions of the hydrostatic transmission by displaying the logical error log memorized by the SD ECU;

5 - to define the software loaded for the Easy Design option.

Using the PHASES application requires the previous acquisition of an operating license from **POCLAIN HYDRAULICS**. The validity of this license is monitored by a hardware key (dongle) to be installed on the parallel port of the PC.
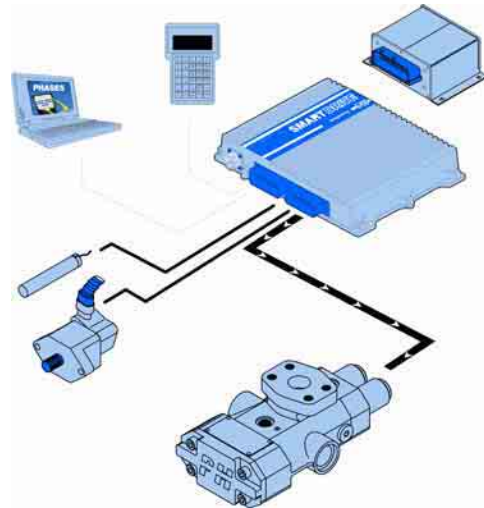
USER INTERFACE

The user interface provides a simple and intuitive access to the functions.

The screen is divided into two areas, which group together:

• menus to access the functions of the software or data edit grids in the upper area;
• user interface commands in the lower area.

In the example below, the screen was visually changed to show both display types:

Upper area
(data grids)

Upper area
(function buttons)

Lower area
(command icons)

Save

Return to previous menu

Print screen

Previous screen

Next screen

Upper area

This contains one of the two following types of feature:

• The **function selection buttons** of the PHASES software programs. These buttons are grouped together on several screens, access to which is hierarchized depending on the usual logic used to access the different functions of the software programs (send, receive & open file, customization, calibration, diagnostic).

• The edit **data grids**, each line of which represents a parameter used by the SD ECU to command the hydrostatic transmission and the traction control system. These parameters are recorded in the SD ECU memory or in a PC file. Depending on the grid, the information describes the parameter, the value read in the SD ECU memory and the units. The values that can be changed by the user can be edited directly in the grid cells as is done with a spreadsheet.

Lower area

This groups together the user interface commands:

Save the displayed data in a user-specified file. By clicking with the mouse, and if the SD ECU is connected, the inputs/outputs, display and current errors will be read, then the file selection dialogue box is displayed. All active values and known PHASES parameters are then saved.

Print the information displayed, by clicking with the mouse, a window appears prompting the entry of a comment, which will be printed, followed by a second window enabling the selection of the target printer.

Display the previous page.

Display the next page.

Return to the previous menu.

Display the top of the page.

Display the bottom of the page.

Sensitivity to working context

The user interface automatically adapts to the working context by changing its command menus and data edit grids according to:

• the SD ECU type to which the software is connected (Off-road, Master, Premier, Easy Design);

• on-board software within the SD ECU (can be specific to the vehicle);

• the status of the connection to the SD ECU:
  - **On-line** mode providing direct access to SD ECU parameters;
  - **Off-line** mode providing access to parameters that were previously downloaded into a file on the PC;

• the operating level selected from the following three options:
  - **Service**: Access restricted to the functions used by the manufacturer after-sales department engineers;
  - **Manufacturer**: Access to the functions used by the manufacturer development departments (password);
  - **Expert**: Access restricted to Poclain Hydraulics experts (password).

User actions

In this document, the current actions of the user are specified in the following way:

• Click on a button located in the upper area of the screen:
  "Click on **[Button title]**" (example "Click on **[PHASES Configuration]**").

• Click on an icon in the lower area of the screen:
  "Click on **{Icon name}**" (example "Click on **{Record}**").

• Press a keyboard key on the PC:
  "Press **<Key>**"(example: Press **<Return>**).

• Press two keyboard keys on the PC at the same time:
  "Press **<Key 1><Key 2>**"(example: Press **<Ctrl><A>**).

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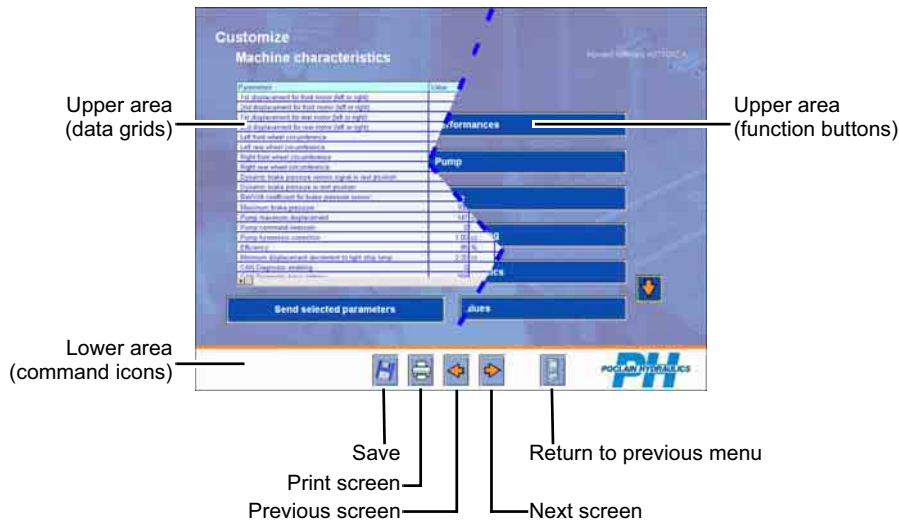PHASES
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INSTALLATION AND INITIAL USE

Required elements

Before proceeding to installation, ensure that you have the following items:

• PC type computer configured with:
   - Processor: 600 MHz minimum;
   - Memory (RAM): 128 Mb minimum;
   - Hard disk: free space 20 Mb;
   - Windows 98-SE, 2000 or XP operating system;
   - CD Romdrive;
   - Colour monitor with minimum resolution of 1024 x 768 points, 256 colors;
   - RS 232, serial communication port.

• Installation CD-ROM for PHASES software programs;

• Operating license;

• License validation key (USB dongle);

• Connection cable between the PC and SD ECU (ref. 006142212S).

N.B.: Windows ME is not supported.

Installation of software

Proceed as follows:

• Close all active programs and deactivate any antivirus that may be running on the PC. Only Windows must be running.

• Open the CD-ROM from Windows.

• Double click on **setup xxxx xxx xxx.exe** to install the files required for the software and follow the on-screen instructions.

N.B.: in the setup file name, **xxxx xxx xxx** corresponds to the P/N number for the PHASES executable version.
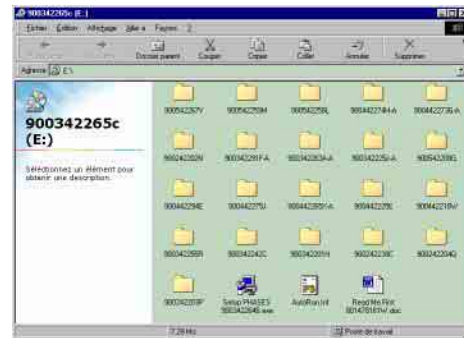
SD ECU connection

With the SD ECU installed on the vehicle and connected to the hydrostatic transmission system sensors and actuators, proceed as follows:

• Connect the PC computer serial port (1) to the SD ECU using cable ref. 006142212S;

• For Easy Design and Easy only, connect the serial port of the PC (1) to the SD ECU via 2 cables ref. 006142212S (4) and A05362D;

• If necessary, disconnect the printer cable (4);

• Insert the license validation key (3) into the Sub-D 25 F printer connector (2) and, if applicable, reconnect the printer cable (4) to the validation key connector (3).
•

N.B.: The key will be recognized whatever its position on one of the LPT1, 2, 3, 4 parallel port or USB port

Initial launch of the PHASES application

Proceed as follows:

• In succession, select **Start > Programs > PHASES xxxx xxx xxx** and **PHASES xxxx xxx xxx** (xxxx xxx xxx being the P/N number).

• The main screen will be displayed (see opposite).

The greyed-out items displayed correspond to functions that cannot be accessed owing to the working context.

If you have the Easy Design option, an additional button appears in the main screen. This button allows access to the design module (see page 25).

Selecting the dialog language

Proceed as follows:

• In the PHASES Main menu, click on **[PHASES Configuration]** and then on **[Languages]**.

• Click on the relevant button for the desired language.

• Once the corresponding files have been loaded, PHASES will automatically return to the main menu. The language will now be as selected.

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Selecting the serial communication port

Proceed as follows:

• From the Main menu, click on **[PHASES Configuration]**
  and then on **[Communication port]**.

• Select the serial communication port used and then return to
  the Main menu.

Note on the configuration files
During initial access to SD ECU data (by opening a PHS
parameters file or direct connection to an SD ECU), PHASES
opens a window requesting the designation of a source file
containing the configuration required for operation. After
designation of the source, usually the CD Rom, PHASES
copies the configuration from the source to the hard disc,
then loads the data to the memory.
When this data is accessed again, PHASES will load the
configuration automatically and directly from the data saved
to the hard disc.

USUAL OPERATIONS

After installing the software and selecting the dialog language and serial communication port using the SD ECU (please see previous section), it is possible to access its various functions.

N.B.: The menus and data edit screens can vary depending on the SD ECU type to which the PHASES software is connected (Off-road, Master, Premier or Easy), the status of the connection to the SD ECU (On-line or Off-line modes) and the operating level selected: Service, Manufacturer, Expert (see [Configuration] [User level]).

The greyed-out features displayed correspond to functions that cannot be accessed owing to the fact that the relevant data has not yet been fully downloaded.

Sending a new version of the on-board software to the SD ECU

This procedure updates the on-board software within the SD ECU by transferring a new version from the PC to the SD ECU.

Proceed as follows:

• Check that the SD ECU is correctly connected to the PC (cable ref. 006142212S and cable A05362D for an Easy ECU).

• Check that the SD ECU is not connected to the power supply (ignition key off).

• In the Main menu, click on **[Send/Receive/Open]**.

N.B.: The SD ECU will be switched on during the downloading procedure.

• Click on **[Send a program file]**.

• **Case of PHASES Off Road, Premier & Master**
   -In the open window, select the **H86** extension file that corresponds to the version of the on-board software to be sent and then click on **[Open]**.

• **Case of PHASES Easy or Easy Design**
   - In the open window, select the file with the **EAS** extension that corresponds to the software version loaded to be sent and click on **[Open]**.

• Follow the procedure displayed on the screen.

• To return to the main menu, click on **{Return to previous menu}**.

Receiving the parameters

Receiving a file from the SD ECU to the PC

This procedure copies the SD ECU parameters in a PC file for subsequent consultation or modification.

Proceed as follows:

• Check that the SD ECU is correctly connected to the PC;

• Check that the SD ECU is not connected to the power supply (ignition key off);

• From the main menu, click on **[Send/Receive/Open]**.
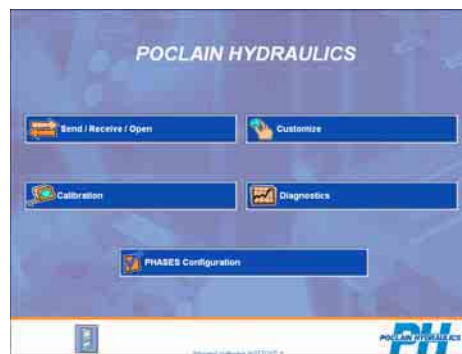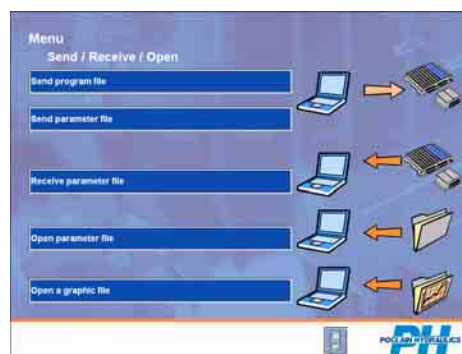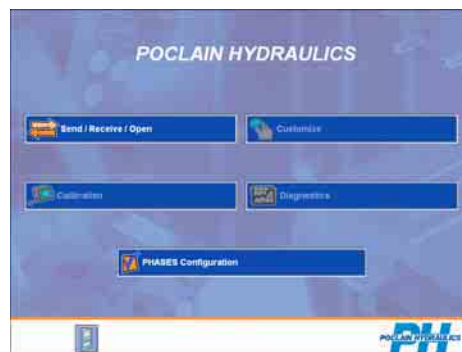
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• Click on **[Receive a parameters file]**.

• In the open window, enter the name of the file that is to be saved (extension **PHS** for Off-Road, Premier or Master, extension **PHE** for Easy Design and Easy imposed by the software), select the folder where the file is to be stored and then click on **[Save]**.

• Follow the instructions on the screen. Click on {Return to previous menu} to return to main menu. The received file can then be consulted (see "Consulting a parameters file", page 13).
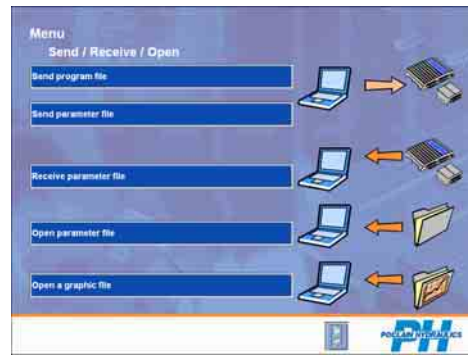

> **N.B.:** 'Receive parameters' allows the exact content of the parameters memory to be copied to a file. This includes parameters, calibration values , the error log and the time counter . The file created does not contain the input/output values , nor the displays, nor the list of current errors.

Send a PC parameters file to the SD ECU

This procedure sends a parameters file that is created or backed up on the PC to the SD ECU (see "Receiving a file from the SD ECU to the PC", page 11 or "Modifying a parameters file", page 14).

Proceed as follows:

• Check that the SD ECU is correctly connected to the PC;

• From the main menu, click on **[Send/Receive/Open]**.

• Click on **[Send a parameters file]**.

• In the open window, select the PHS (for PHASES Off-Road, Master and Premier) or PHE extension file (for Easy and Easy Design) including the parameters to be sent, then click on **[Open]**.

• Follow the instructions on the screen. Click on **{Return to previous menu}** to return to main menu.
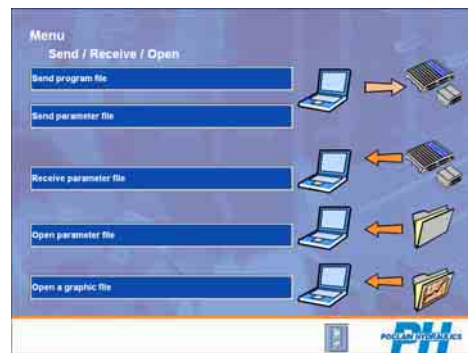
Managing the SD ECU parameters files

When the parameters have been transferred into a PC file (see section on 'Transferring parameters files'), you can view them, create a new parameters file or modify them.

Consulting a parameters file

This operation enables you to view a parameters file.

Proceed as follows:

• In the Main menu, click on **[Send/Receive/Open]**.

• Click on **[Open a parameters file]** (extension **PHS** for Off-Road, Premier or Master, extension **PHE** for Easy Design and Easy imposed by the software).

• In the open window, select a **PHS** or **PHE** extension file and click on **[Open]**.

• Click on **[OK]** once the file has loaded, then click on **{Return to previous menu}**.

• Click on **[Customize]** then on the desired category to view the corresponding parameters.

• The parameters table is displayed.
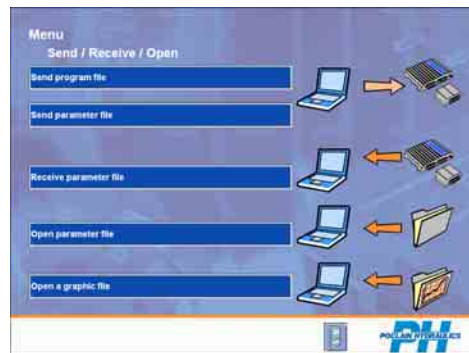
Modifying a parameters file

This operation is used to modify a parameters file already transferred to the PC (see section on 'Transferring a parameters file to the PC').

Proceed as follows:

• In the Main menu, select **[Send/Receive/Open]** (see the previous section for details).

• Click on **[Open a parameters file]**, select the file to be modified in the displayed window, click on **[Open] [OK]**. Click on **{Return to previous menu}** to return to the main menu.

• Click on **[Customize]** then on the button relating to the properties to be modified.

• In the displayed window click on the value to be changed, key in the new value and press **<Enter>**.

• To record the displayed values in a parameters file, click on **{Save to PC}** and/or click on **{Print}** to print them.

• Return to the Main menu by clicking on **{Return to previous menu}**.

N.B.: A specific file name and path may be assigned to the parameters file when saving the values through {Save to PC}.

Modifying and transferring the parameters directly with the SD ECU connected

This procedure enables you to receive SD ECU parameters, modify them and then send them straight back to the SD ECU.

Proceed as follows:

• Check that the SD ECU is correctly connected to the PC;

• From the Main menu, click **[Customize]**;

• Click the button corresponding to the desired category.

• Modify the parameters in the table by clicking on the **Value** column, then keying in the new value. After typing each new value, press the **<Enter>** key. The modified line remains highlighted in blue.

• To transfer these new values to the SD ECU (lines highlighted in blue), click on **[Send selected parameters]**.

• To record the displayed values in a parameters file, click on **{Save to PC}** and/or click on **{Print}** to print them.

• Return to the main menu by clicking on **{Return to previous menu}**.

Restoring original parameters

This procedure restores the SD ECU to its factory settings.

Proceed as follows:

• Check that the SD ECU is correctly connected to the PC.

• In the Main menu, click on **[Customize]**.

• Click on **[Restore factory configuration]**. The SD ECU restores its original parameters.

> **N.B.: Depending on the software loaded in the ECU, restoring the factory parameters may require the machine to be made safe, for example, by application of the parking brake.**

Performing diagnostics of the SD ECU

This procedure displays on the PC screen the status of the various SD ECU input and outputs, the corresponding calculated values regarding the hydrostatic transmission application (e.g. displacement, speed, etc.), the errors that are currently occurring and the error log.

Proceed as follows:

• Check that the SD ECU is switched on and correctly connected to the PC;

• In the main menu, click on **[Diagnostics]**.

• **Input/Output**: displays in real time the input and output data for the SD ECU in the correct electrical units (e.g.: Hz, mV, etc.) (see note).

• **Displays**: displays this data converted into user units (e.g. : km/h, %, etc.).

• **Error display**: displays the errors detected by the SD ECU and the time counter.

• **Graphics**: provides curves from the Input/Output signals and displays.

> **N.B.: in the input-output screen, moving the mouse over an item will display a floating box specifying the number of the contact pin corresponding to the input-output of the SD ECU. For an SD Premier, J1 corresponds to the 'Master' connector and J2 to the 'Off road' connector. For an SD Easy, only the number of the contact pin is mentioned.**

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Calibrating the hydrostatic system

The calibration function checks that the sensors are working correctly and stores their electrical response in the SD ECU from characteristic positions (beginning and end of run for example).

Proceed as follows:

• Check that the SD ECU is switched on and correctly connected to the PC.

• In the main menu, click on **[Calibration]**.

• Select the component to be calibrated (if the 'Automatic Sequencing of Calibrations' option has not been selected).

• The area on the right-hand side of the screen displays the actions to be carried out for each stage of the calibration procedure.

• The cursor displays the measurement read by the SD ECU and moves about a vertical axis depending on the value that is being measured.

DESCRIPTION OF FUNCTIONS

The main menu

Automatically displayed after the software's start-up, the main menu displays the buttons that let you access the various functions of the software.

Send/Receive/Open

This menu accesses the data transfer functions between the SD ECU and the PC.

• **Send a program**: this function, used to update the on-board software, opens a window that lets you select the program file on the PC (extension **H86** or **EAS**)(see page 11).

• **Send a parameters file**: this function, used to update the parameters in the SD ECU's memory, opens a window that lets you select parameters files on the PC (extension **PHS** or **PHE**)(see page 12).
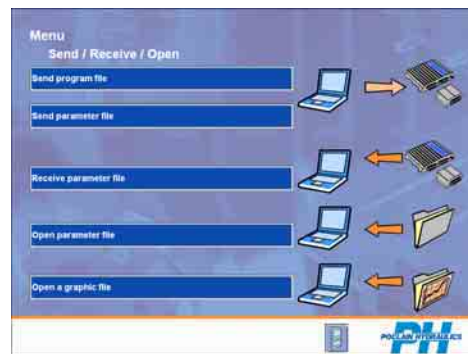
> **N.B.: 'Send a parameters file' allows the SD ECU parameters to be modified. The calibration values , error log and the time counter, which is information specific to each machine, will not be modified by this procedure.**

• **Receive a parameters file**: this function, used to transfer the parameters saved to the SD ECU memory to the PC, opens a window that allows the user to select the file to be received (extension **PHS** or **PHE**)(see page 11).

> **N.B.: "Receive parameters' allows the exact content of the parameters memory to be copied to a file. This includes parameters, calibration values , the error log and the time counter . The file created does not contain the input/output values , nor the displays, nor the list of current errors.**

• **Open a parameters file**: this function, used to open the parameters file from the PC, displays a window that lets you select the file to be modified (extension **PHS** or **PHE**)(see page 13).

Customize

This menu is only accessible when an SD ECU has been connected or a parameters file has been loaded using **[Send/Receive/Open]** & **[Receive a parameters file]** or **[Open a parameters file]**.

N.B.: the access menus to functions and data edit screens may vary according to the type of SD ECU connected, the status of the connection to the SD ECU (On-line and Off-line modes) and the user level selected: Service, Manufacturer, Expert (see [Configuration] [User Level]).

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Machine characteristics

This screen displays parameters relating to the properties of the machine, and allows you to modify them. You can:

• **View** the parameters ('**Value**' column), the corresponding units ('**Unit**' column), the minimum and maximum authorized limits ('**Min/Max**' column) and the default values ('**Default value**' column).

• **Modify** the parameters in the grid by clicking on the value, then keying in the new values. Validate each new value using the **<Enter>** key.

N.B.: The lines modified during the working session are highlighted blue. Values entered off limit values are corrected (default values) and displayed in red.

• **Send** the modified parameters to the SD ECU (lines highlighted blue) by clicking **[Send selected parameters]**.

• **Receive** the parameters of one or more lines of the grid from the SD ECU by clicking successively on the corresponding lines and then **[Receive selected parameters]**.

• **Save** the values of the parameters in a PC file by clicking **{save to PC}**.

• **Print** the grid on the default printer connected to the PC by clicking **{print}**.

• **Close** the window by clicking **{Return to previous menu}**.

Calibration values

This screen displays the sensor settings and allows you to modify them.

> ⚠️ **The modification of these values should be carried out by a qualified individual only.**

It is used in the same way as the screen displaying the machine characteristics.

Restoring original configuration

This function restores the SD ECU to its factory parameters.

Calibration

The calibration function lets you check the sensors are working correctly, and stores their electronic reply in the SD ECU's memory from characteristic positions (the beginning and end of travel for instance).

Proceed as follows:

• Check that the SD ECU is correctly connected to the PC.

• From the main menu, click **[Calibration]**.

• Select the component for calibration (if automatic sequencing is not available).

• The right-hand zone of the screen displays the actions to be performed by the user at each stage of the calibration procedure.

• The cursor displays the measurement read by the SD ECU and moves along the vertical axis according to the level of the measured value.

N.B.: This screen is only accessible when an SD ECU has been connected or a parameters file has been loaded (Main menu: **[Send/Receive/Open]** **[Receive a parameters file]** or **[Open a parameters file]**).

Diagnostic

The diagnostic functions assist troubleshooting by displaying the operating data of the SD ECU.

N.B.: This screen is only accessible when an SD ECU has been connected or a parameters file has been loaded (Main menu: **[Send/Receive/Open]** **[Receive a parameters file]** or **[Open a parameters file]**).

Input/Output

This screen displays in real time the input and output data of the SD ECU in electrical units (e.g.: Hz, mV, etc.).
The data in this grid cannot not be modified.

Click on {Save to PC} to save all known PHASES values in a **PHS** or **PHE** file, including the displayed errors (see note on page 17).

Display

This screen displays these values converted into user units to allow a better understanding of the functioning of the hydrostatic transmission (e.g.: km/h, %, etc.).
The data in this grid cannot not be modified.

Click on **{Save to PC}** to save all known PHASES values in a **PHS** or **PHE** file, including the displayed errors (see note on page 17).
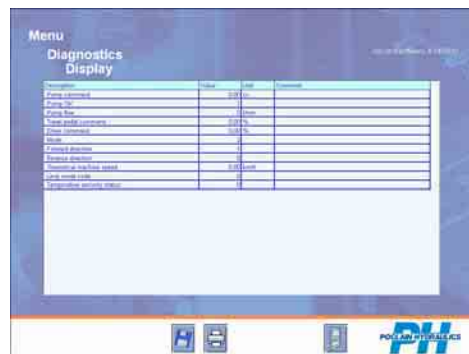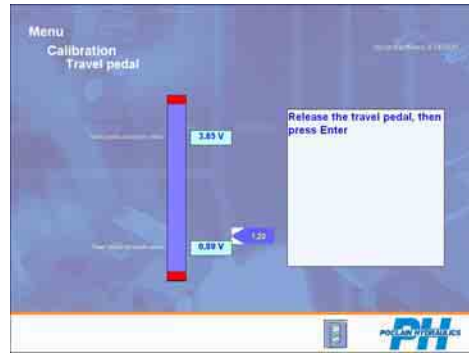
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Error display

This screen displays current errors in tabular form (upper grid) and the error log (lower grid) from the ECU since it was last purged by clicking on **[Purge error log].**
The data in this grid cannot not be modified.

Each line in the grid reflects a particular error event identified by its error code, time counter and description.

Double clicking an error line then **[Help on error]** brings up the errors dedicated on-line help, which describes the error, consequences and probable cause.
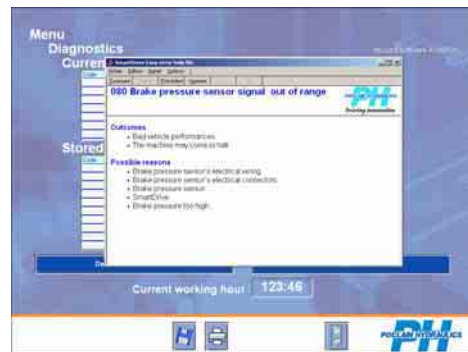
Help regarding hydraulic faults is also available (select 'Contents' in the errors dedicated on-line help).

Click on **{Save to PC}** to save all known PHASES values in a PHS or PHE file, including the displayed errors (see note below).

> **N.B.: by clicking on Save to PC, if an SD ECU is connected, PHASES reads the input/output values, the displays and the current errors, and then displays the file selection dialogue box. All values measured or calculated by the application loaded and all known PHASES parameters are then saved.**

Graphics

The Graphic function enables to visualize the evolution in the time of the Input/Output signals connected to SmartDrive and of the displays.
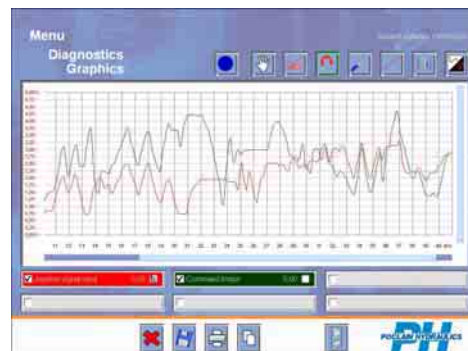
Six channels are available. It enables to plot from one to six signals simultaneously with a sampling frequency from 2 to 10 Hz.

Each channel is represented by a block at the bottom of the screen. By default, the channels are not affected and the blocks are in grey.

Click on one of the six grey blocks at the bottom of the screen. A window is displayed.

This window contains on its left-hand part the list of the signals available (Input/Output and displays). On the right-hand side, it is possible to choose the color of the curve associated with the signal chosen, and to select the display range of the curve. Predefined display ranges are proposed by default (0.5 V for an analogical input, 0..100% for a display whose unit is the percentage...).
However, it is possible to choose another display range. It is also possible to type in the desired display range.

Once your choices are made, you can click on OK to return to the graphics screen.

The block which was grey is now the same color than the curve you have just chosen, and you can read the name of the selected signal there.

The check marck on the left of the block allows to display (or not) the curve. This function is useful when several curves are simultaneously displayed on screen, and when you want to focus on one or some of these curves.

The check mark on the right of the block allows to display the scale for the selected channel. If two channels (or more) use the same unit and the same range of display, it is thus possible to display only one scale for these different channels.

To start the curves record, you just need to push the **Record** button.
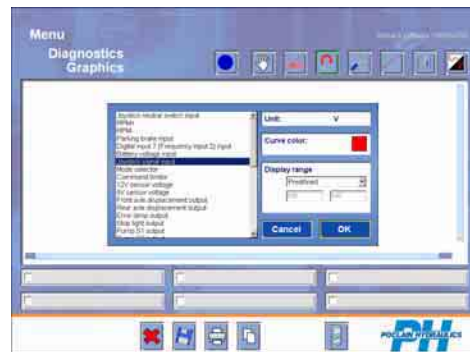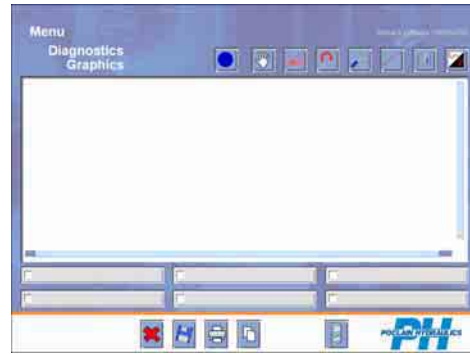
Command buttons

This button allows you to start and stop data recording. During the recording, the curve slips towards the left. Later on, you will be able to visualize the whole curve.

With the **Hand tool** you can browse in the curve. Click on the curve and make it slip horizontally and/or vertically. You can also browse in the curve by using the vertical and horizontal scrowlers (it is not necessary to select the hand tool to use the scrowlers).

The **Cursor tool** displays on the curve a cross (a cursor) which follows the mouse. When the mouse moves, the cursor displays the value you pass on. While clicking then moving the mouse, a second cursor is displayed with its values. The difference between these two cursors is also displayed.
The cursor takes the color of the nearest curve.

The **Magnet tool** (selected by default) enables the **Cursor tool** to cling to the nearest curve. When the **Magnet tool** is selected, you are sure that the displayed value is the curve's one.
When the cursor is positioned on a real point (corresponding with a sample), the cursor highlights this point, enabling you to make the difference with an interpolated point (between two sampled points).
When the **Magnet tool** is not selected, the cursor moves freely under the mouse.

The **Zoom tool** allows to zoom on the curve.
Select this tool, then click on the curve and move the mouse while maintaining the button pressed to define the new displaying window. As soon as you release the button of the mouse, the curve is displayed again according to the new defined window.

The **Sample tool** displays a small square on each sampled point. This function is useful to differentiate the sampled points from the interpolated points (between two sampled points).

The **Position tool** displays, on the left-hand part, a vertical segment for each curve displayed. Click on the tip of one of these segments, and then move it, to define the height of the curve concerned.
Click on the middle of one of these segments, and then move it, to define the vertical position of the curve concerned.
This function is useful to organize the position of the curves and thus facilitate their interpretation.

The **Background color tool** allows to choose the background color of the curves. This function allows to make curves more readable according to the lighting conditions (outside, in particular).

The scrowlers at the right and at the bottom allows to browse in the curve.
It is possible to move in the curve by clicking on the middle of a scrowler, or to modify only one tip of the scrowler. Then, you obtain a zoom effect.
Double-click on a scrowler to give it its maxima values. This ensures that all the vertical or horizontal range is displayed.

The **Floppy disk tool** allows to save the curves displayed on this screen.
The file obtained has a GPH extension.
A non visible curve (which visibility check mark is not selected) is also saved.
Information from the other screens such as parameters, for example, are not saved.
If a zoom is applied, the points non visible on screen will be also saved.
When opening the file, the zoom window will be restored. This is useful to highlight a phenomenon, before saving the file and sending it to an expert.
It is not necessary to have the configuration associated with the software to open a GPH file again.

The **Printer tool** allows to print the curve.
If a zoom is selected, the printed curve will consider this zoom.

The **Copy tool** allows to copy the curve such as displayed on screen in the clipboard.
If a zoom is selected, the curve copied in the clipboard will consider this zoom. Then, you can paste the curve in any software accepting the "metafile" clipboard format.

Button **Erase curves** allows to reset curve's data. Chanels configurations remain unchanged.
After erasing curves, it is possible to start a new recording immediately. The scale of time sets out again to zero. A nonvisible curve is also erased.
This command does not erase any file.

PHASES CONFIGURATION

This screen allows you to access the configuration sub-menus of the PHASES software.

N.B.: At 'Expert' level, all of the functions are accessible, whereas at 'Manufacturer' and 'Service' levels several functions are not displayed.
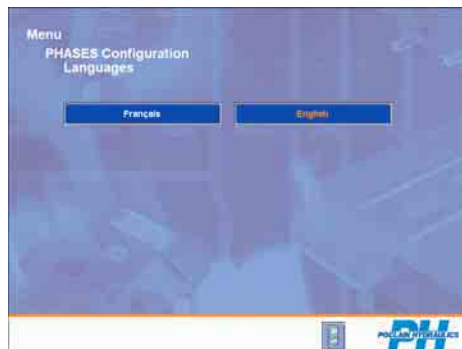
User level

This screen selects the user access level. The text of the currently selected user level appears in red.

Access to 'Manufacturer' and 'Expert' levels is password-protected. Depending on the level selected, PHASES adapts the data displayed to the various functionalities.

Language

This screen selects the display language. When it is selected, the Main menu is displayed again in the language selected after the configuration file has been loaded. The currently selected language appears in red.

Password

This screen lets you change the access password for 'Manufacturer' and 'Expert' user levels.

• **Manufacturer level**: lets you change the access password to ' Manufacturer' level. Enter the current password and then the new password, and confirm in the field 'Confirm new password' and click **[OK]**.

• **Expert level**: allows you to change the access password to both 'Manufacturer' and 'Expert' levels by selecting the corresponding button. Enter the current password, then the new password, and confirm in the field 'Confirm new password' and click **[OK]**.

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Advanced options

• **Automatic calibration sequencing**
If this option is set to 'yes' (default setting), the calibrations will be performed one after the other. This option is useful when all of the sensors have to be calibrated.
If this option is set to 'no', the **[Calibrate]** menu will let you select the sensor(s) to be calibrated.

• **Reading of all the variables**
If this option is set to 'Yes', all the parameters and input-outputs on the SD ECU will be displayed in the edit grids, whether they are used by the on-board software or not.
If this option is set to 'No' (the default status), only the parameters used by the on-board software will be displayed in the grids.
This option is preferable for diagnostic of possible cabling faults on the vehicle. This option is only available at 'Expert' level.
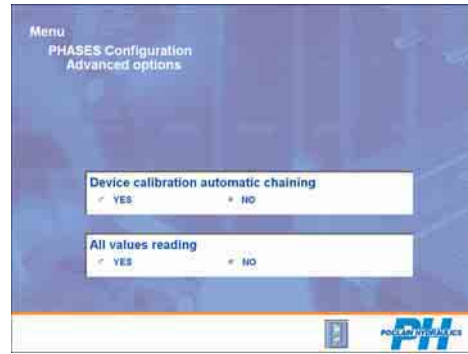
Communication port

This screen lets you define the serial communication port that will be used to connect the PC to the SD ECU.

N.B.: Port Com1 may not be available as the mouse for the PC may be connected to it.

About

Displays a window showing:

• The Part/Number of the PHASES executable;
• The Part/Number of the configuration loaded;
• The Part/Number of the CD Rom used to install PHASES.

Click on **[OK]** to close the window.

N.B.: The P/N (article code) of the software loaded is shown the top right of each configuration window.

For any query relating to the functioning of this software, it is essential to provide us with all information displayed in this window.

EASY DESIGN

| ⚠ | **For use with the SD Easy ECU only.** |

Access to the design module Easy Design is subject to the purchase of a specific PHASES licence. Please contact your Poclain Hydraulics sales centre for further information.

Design

Design module

When designing a machine, you will first need to define its characteristics:
• Number of wheels;
• Type of pump;
• Type of joystick or pedal;
• …

Then you will need to select the functions you wish to implement:
• Speed control;
• Power limitation;
• Control of the parking brake;
• …

The **design module** will help you to choose the functions you require.

Database of available functions

The database of available functions (updates available on the website www.poclain-hydraulics.com/sdeasy) allows the user to choose the functions he/she requires.

Design file

At the end of the design phase, you must save your work (your various choices) in a design file.
This design file describes the selections you have made and contains coded information allowing you to obtain the software from the Poclain Hydraulics Internet server.
This downloaded software can then be sent to a SmartDrive^TM Easy using PHASES.

You will also be able to open your design file to view it.

Processes

Updating the design database (BCD)

When you access the design module, the first screen offers you the option to update your **design database** via "Internet Update".
By updating your design database, you can ensure you have access to the latest available options.
To carry out the Internet update, your PC must be connected to the Internet and configured correctly.
The "Internet Update" button opens the default Web browser and connects to the SmartDrive Easy Web server.

You must identify yourself using the confidential information provide in the PHASES software package (user ID & password).
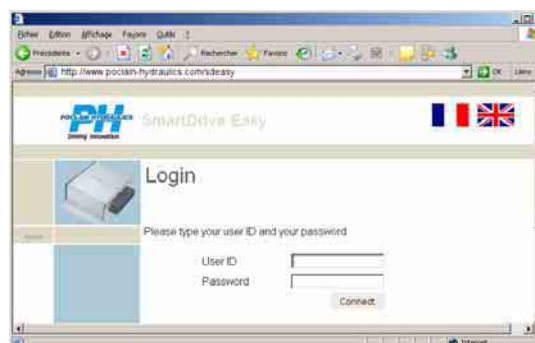
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Design

During the design phase, you will move from one screen to another.
Each screen gives you choices that you can select.

⚠️ **The screenshots that follow have been created using a version of the design database that may be different to the version you are running. The lists of options shown on these screenshots may therefore differ from the options available to you.**

The qestion mark next to each option leads to a function description.
After selecting all options (all choices) that you need, building-up continues by clicking on "Next" button.
The "Previous" button allows you to return to the previous screen.
The "Summarize" button opens a window summarizing your selections for all screens.
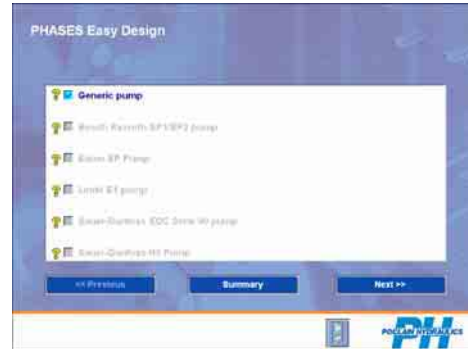
Some options are in grey because they can't mix with other choices already made.
After each function selection, choices are sorted to show the disabled functions at the bottom of the list. Available choices are located at the top of the list.

The selections you make will thus affect the list of available selections you will encounter later on. As a consequence, deleting a selection will affect all selections you have made after the deleted choice. If you deselect a choice (a function), PHASES will inform you that all selections made for this screen and for subsequent screens will be deleted. You can confirm or cancel deletion of the selection.
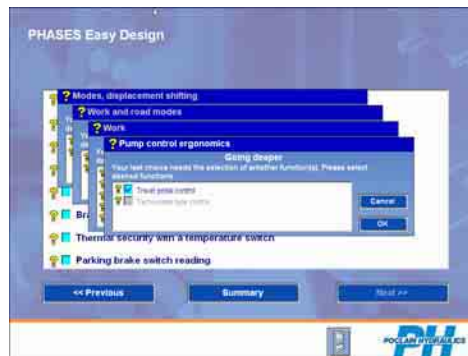

Summary of choices made

After making your choices, PHASES displays the list of all the choices you have made.
This list is a mini specification of your application.
At this point you should ensure that there are no omissions and that all selections made are correct.

Wiring plan

The wiring plan contains all the information that will allow you to electrically connect the SmartDriveTM Easy to the various components in your system.
You can zoom in on this plan and print it out by clicking on the Print button at the bottom of the screen.
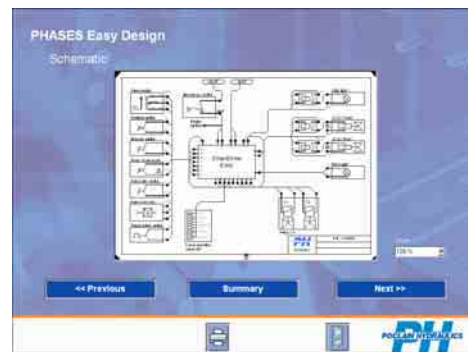
Saving your design

Once your design is complete, you are prompted to save it
(extension **.EAS**).
The file created will contain all the selections you have just
made.
This file will be used to program and configure your SD Easy
ECU. When you put your machine into service, you must
ensure that you are using the correct design file.

> ⚠ **In the event of confusion between different design files,
> the machine will not function according to your
> expectations and may be dangerous. Therefore care must
> be taken with the file name that you intend to use to save
> your design and to program your SD Easy ECU.**

Downloading the software from the Internet

The software download from the Internet allows you to copy
the software version for the SD Easy ECU to your PC.
The "Download Software" button opens the default Web
browser and connects to the WEB SmartDrive Easy server.

You must then identify yourself using the confidential
information provided with the PHASES software package.

Go to the "On-board Software" page, and then select your
design file (extension "EAS").
 Click on the "Download" button - the Web server will then
send you the on-board software for SmartDrive Easy
(extension **.S2**) that corresponds to your application. Save file
(extension .S2) in the same folder (extension .EAS)
previously selected.
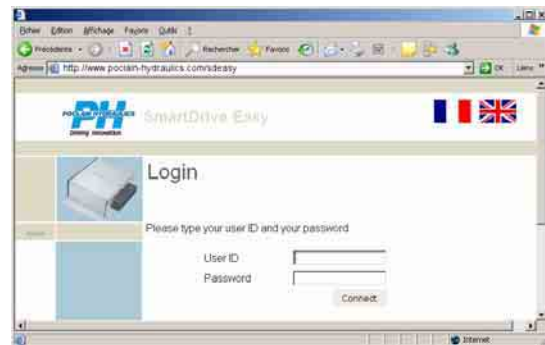
N.B.: After clicking on the " Download " button, a window opens. **Make sure you save the S2 file in the same folder as the EAS file, so
that when you open the EAS file, PHASES will know where to locate the corresponding S2 file.**

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⚠ **Do not modify the file name S2 or its extension.**

Programming the SmartDrive^{TM} Easy

Programming the SmartDriveTM Easy allows information corresponding to the choices you made during the design phase to be sent to the SD memories.
In the main screen of PHASES, click on "Send / Receive/ Open". In the Send screen, click on "Send a programme to SmartDrive".
In the file selection window, select your design file (EAS), then OK.

Follow the instructions on the screen. PHASES will open a dialogue for programming the SmartDrive^{TM} Easy.
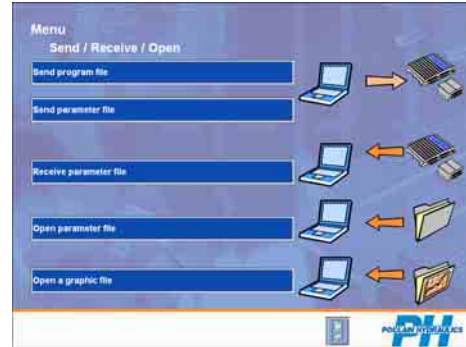
GLOSSARY

Advanced options	Special options for certain functions of the PHASES software.
Part number	Product identifier. The article code of the PHASES software and the article code of the configuration must be stated in all communication relating to the functioning of the software.
Automatic sequencing	Set to 'Yes', calibrations will take place in succession. This option is useful when all sensors must be calibrated. Set to 'No', only the sensor(s) selected will be calibrated. This selection is preferable where one or several sensors only must be calibrated.
Calibrate (the sensors)	Ensures that the sensors are working properly and stores their electronic reply in the SD ECU's memory from characteristic positions (beginning and end of travel for example).
COM 1 to COM 8	The eight serial communication ports on the PC. The SD ECU must be connected to one of these ports. If a USB/Serial adapter is used, this adapter will be seen by PHASES like a standard communication port.
Comment	Text box containing comments on a parameter, an input-output etc. This information is not taken into account either by the PHASES software, or the on-board SD ECU software.
Communication port	Serial communication connector (COM 1 to COM 8) on the PC, to which the SD ECU is connected. If a USB/Serial adapter is used, this adapter will be seen by PHASES like a standard communication port.
Configuration	Settings that define the operating mode of the PHASES software.
Customize	Entry or modification of the data required for operation of the SD ECU.
Delete stored errors	Erase the list of errors from the SD ECU's memory.
Download/Upload	Transfer of files selected by the user, either from the SD ECU to the PC or vice-versa.
Error code	Reference number of an error detected by the SD ECU.
Expert (Level)	User level above 'Service' and 'Manufacturer' levels. This level, which is reserved for Poclain Hydraulics experts, enables some internal properties of the PHASES software and the on-board SD ECU software to be modified.
Factory configuration	All standard values of the parameters defined by the manufacturer. These parameters can be restored by the SD ECU using the function 'restore factory settings'.
Input (Inputs/Outputs)	Information read by the SD ECU on the sensors (speed, position, etc.) that are fitted on the hydrostatic transmission.
Languages	Language used by the PHASES software user interface.
Log	List of errors in the SD ECU's memory.
Manufacturer (Level)	Access level above service level, which is dedicated to development departments of manufacturers.
Off-line	The SD ECU is not connected to the PC. The data displayed can only come from a file saved on the PC.
On-line	The SD ECU is connected to the PC and the power switched on. The data displayed comes directly from the SD ECU or from a file saved on the PC.
Output	Information sent from the SD ECU to the peripheral units (motors, LEDS, relays, etc.).

Parameters	Data required for the SD ECU to function.
Parameters file	The parameters are used by the SD ECU to regulate the hydrostatic transmission. These parameters are saved in the SD ECU's memory or in a PC file.
Part-number	Product identifier. The part number of the PHASES software as well as the part number of the configuration must be mentioned in any communication regarding the PHASES software.
P/N	Part/Number (Poclain Hydraulics identification number).
Password	Code that enables access to 'Manufacturer' and 'Expert' levels.
Purge log	Deletes the list of errors saved to the memory by the SD ECU
Reading of variables	When set to 'Yes', all the variables and inputs/outputs from the SD ECU will be read and transferred to grids, including those not used on the machine. When set to 'No', only the parameters used by the on-board software will be read and transferred to grids.
Receive	Transfers data (file or parameters) from the SD ECU to the PC
SD	SmartDrive
Send	Transfers the data (file or parameters) from the PC to the SD ECU.
Service (Level)	User level that gives access to information and functions used by the machine manufacturer's after-sales department engineers.
Customize	The customization functions enable the operating capabilities of the hydrostatic transmission and the traction control system to be optimized.
Unit	Unit of measurement of the displayed value.
User level	Some information may be displayed, modified or non-accessible, depending on the user level (Service, Manufacturer and Expert). In the same way, some of the software's functions can only be accessed from specific user levels. Access to the 'Manufacturer' and 'Expert' levels requires entry of a password.
Value	Data keyed into the PC by the user or displayed by the PHASES software, from the SD ECU.

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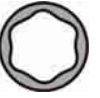
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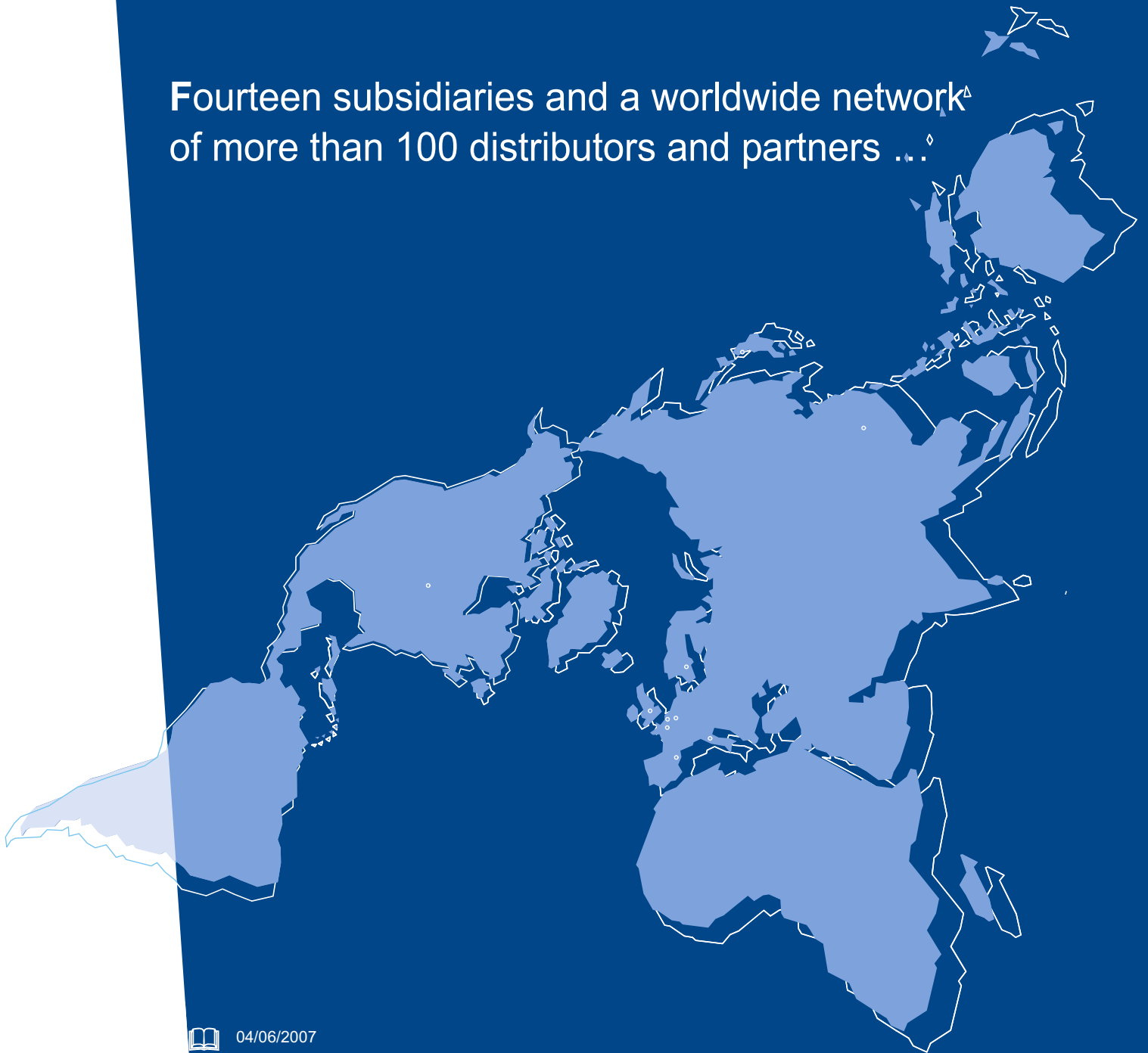
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