

# **SMARTDRIVE™ CANALOGGER**

## **DATA LOGGER**

T E C H N I C A L C A T A L O G

**PH**  
POCLAIN HYDRAULICS

 **Poclain**



This document is provided to machine manufacturers . 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.

In accordance with its policy of continuous improvement, Poclain Hydraulics reserves the right to modify the specifications of all products described herein without prior notice.

The illustrations are not contractual.  
©Poclain Hydraulics Industrie 2006.

This document is the property of Poclain Hydraulics Industrie  
This document is the property of Poclain Hydraulics Industrie. It is strictly confidential. It must not be used, duplicated, copied or disclosed to a third party in full or in part without our prior written consent.  
The trademark Poclain Hydraulics is the property of Poclain Hydraulics S.A.



# CONTENT



## FOREWORD

**4**

Introduction	4
Canalogger general characteristics	5
SmartDrive Canalogger input / output characteristics	7
Component identification	13

Hardware

## CANALOGGER EXPLORER SOFTWARE

**14**

PC Canalogger Explorer software combined with Canalogger	14
Canalogger set-up	14
Installation and initial use	14
Inputs set-up via the Canalogger Explorer software	15
Set-up with hand held terminal	56
Navigation principles	57
Main and function menus tree structure	57
Formulation of menus and sub-menus	58
Error codes	60

Software



# FOREWORD

## Introduction

Poclain Hydraulics has created and developed SmartDrive Canalogger, a system that allows collecting various data like frequencies, temperatures, pressures, etc.

It has been designed to resist to hard environments such as agriculture and forestry, construction, etc.

It includes a Canalogger that collects various signals such as temperature, speed and pressure through sensors.

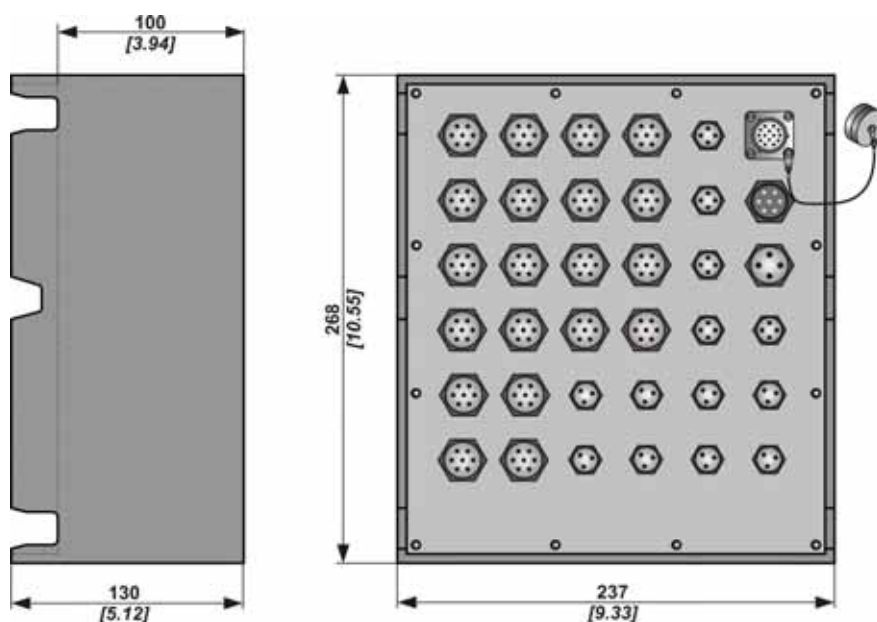
The Canalogger Explorer software is used to set up the Canalogger.



## Canalogger general characteristics

Description	Characteristics
Model code	Canalogger
Inputs	<ul style="list-style-type: none"> <li>• 12 analog inputs</li> <li>• 8 temperature inputs</li> <li>• 8 digital inputs</li> <li>• 5 frequency inputs</li> <li>• 1 supply input (power)</li> <li>• 1 CAN/COM plug</li> <li>• 1 DIAG plug</li> </ul>
Supply voltage	10 to 30 V
Operating temperature	- 20°C to 70°C [- 68°F to 158°F]
Overall dimensions	See below
Material	Polycarbonate
Mass	3.85 kg [8.47 lb]
Canalogger protection index with its connectors	IP 65
Canalogger set-up	Set-up with a PC using the Canalogger Explorer software application and the serial link or using the hand held terminal
Sample frequency	<ul style="list-style-type: none"> <li>• Up to 350 Hz for analog, frequency and digital inputs</li> <li>• Up to 25 Hz for temperature inputs</li> <li>• Up to 1 Mbit/sec for the CAN bus</li> </ul>
Saving	64 MB Compact Flash Card inserted in a Compact Flash/PCMCIA adapter (supplied)
Communication	Serial link RS 232

## Overall dimensions



Conformity: **CE** according to the standards:

- EN 61000-6-2 Edition 2001
- EN 55022 Edition 1998 / A2 Edition 1998
- ISO 14982 Edition 1998
- EN 13309 Edition 2000
- EN 12895 Edition 2000

Mechanical resistance :

- Vibrations : 0.05 g<sup>2</sup>/Hz from 10 to 200 Hz then -3 dB / octave until 500 Hz according IEC 68-2-64
- Shocks : 50 g during 11 ms according IEC 68-2-27

These standards are the relevant standards for the intended purpose of the product: data acquisition on construction machinery, agricultural and forestry machines and industrial trucks.

Hardware

Software



### Canalogger front panel

The Canalogger front panel displays a trap door that protects the memory card and 4 leds.



Place your thumbs under the trap door and push up to open.



### Memory card

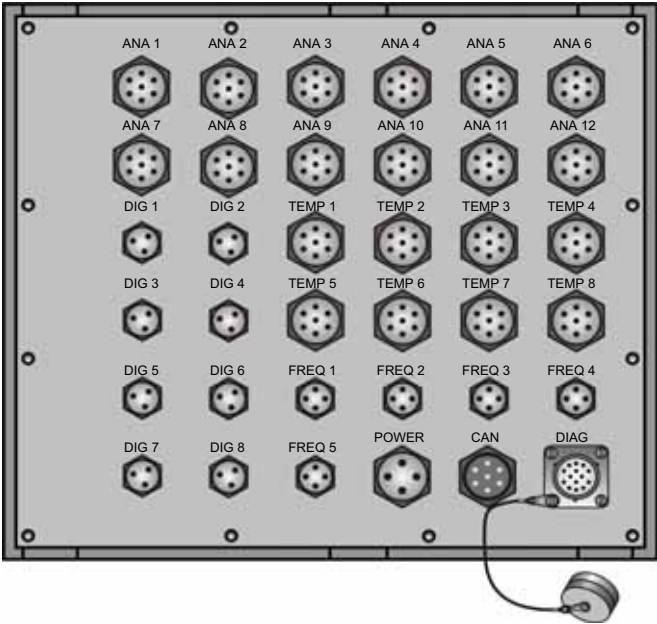
The Canalogger data are saved on a Compact Flash Memory card.

### Description of the leds

Leds	Function
Green	On / Off
Blue	Record
Orange	<ul style="list-style-type: none"><li>• Permanent: storage capacity &lt; 10%</li><li>• Flashing: storage capacity = 0%</li></ul>
Red	Flashing: error



SmartDrive Canalogger input / output characteristics



Description	Inputs
Frequency inputs	FREQ 1
	FREQ 2
	FREQ 3
	FREQ 4
	FREQ 5
Digital inputs	DIG 1
	DIG 2
	DIG 3
	DIG 4
	DIG 5
	DIG 6
	DIG 7
	DIG 8
Analog inputs	ANA 1
	ANA 2
	ANA 3
	ANA 4
	ANA 5
	ANA 6
	ANA 7
	ANA 8
	ANA 9
	ANA 10
	ANA 11
	ANA 12

Description	Inputs
Temperature inputs	TEMP 1
	TEMP 2
	TEMP 3
	TEMP 4
	TEMP 5
	TEMP 6
	TEMP 7
	TEMP 8
Supply (Power)	-
CAN/COMplug	-
DIAG plug	-

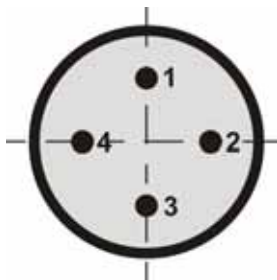
Hardware

Software



## Frequency inputs (FREQ 1 to FREQ 5)

The Canalogger includes 5 frequency inputs protected against short circuits to ground, battery, 5 V and 15 V.



4 pins frequency input sensor

Description	Characteristics
Sensor used	<ul style="list-style-type: none"><li>• Sensors with voltage output (all inputs, 0-15 V signal)</li><li>• Sensors with current output (inputs 1 to 4, 7-14 mA signal)</li><li>• Sensors with differential output (input 5 only)</li></ul>
Measured frequency range	From 0 to 8.5 KHz on each input. The sum of the frequencies simultaneously should not exceed 20KHz.

Components	JAEGER references
Female plug 4 pins 1 mm	530 801 006
Cable gland 4 pins 1 mm	769 907 006

Sensor	Pin	Function
Speed sensor / voltage or power signal	1	Voltage signal
	2	Current signal
	3	Ground
	4	+15 V
Speed sensor / voltage or differential signal	1	Differential (+)
	2	Differential (-)
	3	Ground
	4	+15 V

**Note:**

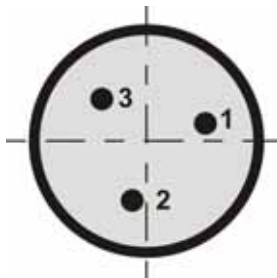
- Freq 5 can be used like differential or voltage;
- Freq 1, Freq 2, Freq 3 and Freq 4 can be used like voltage or current.





Digital inputs (DIG 1 to DIG 8)

The Canalogger includes 8 digital inputs with contact to ground or on +V batt.  
These inputs are protected against short circuits to ground, battery, 5 V and 15 V.



3 pins digital input sensor

Description		Characteristics	
Max. sample frequency		350 Hz	
Input		<ul style="list-style-type: none"><li>• Switches with contact to ground</li><li>• Contact on + vbatt (&gt;6V)</li></ul>	
Components		JAEGER references	
Female plug 3 pins 1 mm		530 232 006	
Cable gland 3 pins 1 mm		769 907 006	
Sensor	Pin	Function	
Sensor with contact to ground	1	Signal	
	3	GND	
Sensor with contact to battery (>6V)	2	Signal	

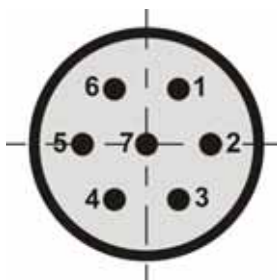
Hardware

Software



## Analog inputs (ANA 1 to ANA 12)

The Canalogger includes 12 analog inputs protected against short circuits to ground, battery, 5 V and 15 V.



7 pins analog input sensor

Description	Characteristics
Max. sample frequency	350 Hz
	5, 10 and 50 V 0-20 mA et 4-20 mA
Supply	5 and 15 V

Components	JAEGER references
Female plug 7 pins	530 272 006
Cable gland 7 pins 1 mm	769 919 006

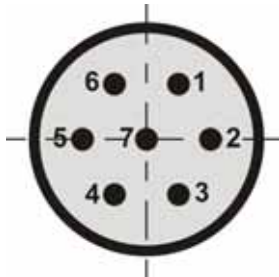
Sensor	Pin	Function
0-5 V sensor with +5 V or +15 V supply	1	+5 V
	2	+15 V
	6	Signal 0-5 V
	7	Ground
0-10 V sensor with +15 V supply	2	+15 V
	5	Signal 0-10 V
	7	Ground
0-50 V signal	4	Signal 0-50 V
	7	Ground
0-20 mA and 4-20 mA* sensors with +5 V or +15 V supply	1	+5 V
	2	+15 V
	3	Signal 0-20 mA
	7	Ground

\* Using 4-20 mA sensors is possible by configuring the 0-20 mA input and tuning 4 mA threshold for the «zero» of the sensor.



Temperature inputs (TEMP 1 to TEMP 8)

The Canalogger includes 8 temperature inputs protected against short circuits to ground, battery, 5 V and 15 V.



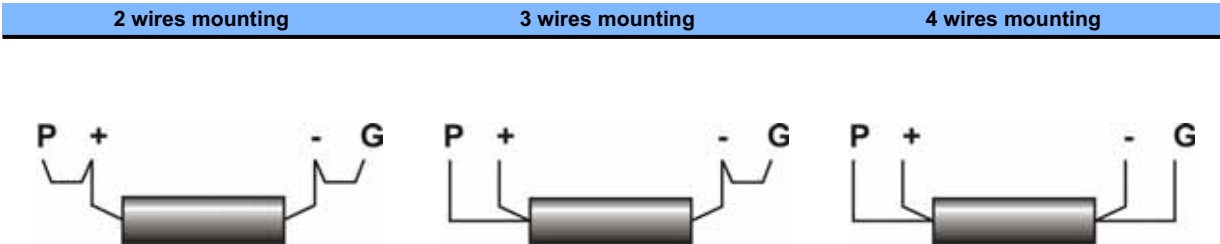
7 pins temperature input sensor

Description	Characteristics
Max. sample frequency	25 Hz
Sensor used	<ul style="list-style-type: none"><li>• Type «K» temperature sensors</li><li>• PT 100 sensors (2, 3 and 4 wires mounting)</li></ul>

Components	JAEGER references
Female plug 7 pins 1 mm key 2	530 912 636
Cable gland 7 pins 1 mm	769 919 006
Temperature sensors K 1 mm sockets (for plug)	530 351 006

Sensor	Pin	Function
Cable for «K» temperature	5	Thermo (-) (Alumel)
	6	Thermo (+) (Chromel)
Cable for PT 100	1	P
	2	+
	3	-
	4	G

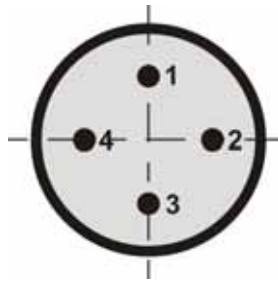
PT 100 cable mounting



Simultaneous combinations	Type K	PT 100
Number of simultaneous combinations	0 to 4	0 to 4
	0	0 to 8
	0 to 8	0

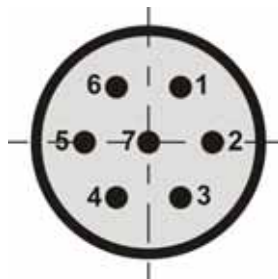
Hardware

Software

**Supply (Power)****4 pins supply connector**

Components	JAEGER references
Female plug 4 pins 1 mm	535 151 006
Cable gland 4 pins 1 mm	769 627 006

	Pin	Function
Supply cable	1 and 2	supply (+)
	3 and 4	supply (-)

**CAN/COM plug****7 pins CAN/COM plug**

Components	JAEGER references
Male plug 7 pins 1 mm	530 273 006
Cable gland 7 pins 1 mm	769 919 006

Sensor	Pin	Function
CAN connector	2	CAN_H
	6	CAN_L
	7	GND
Serial link connector to set time	1	RxD Pc (to pin 2 of the DB9 connector linked to the PC)
	3	CTS Pc (to pin 8 of the DB9 connector linked to the PC)
	4	RTS Pc (to pin 7 of the DB9 connector linked to the PC)
	5	TxD Pc (to pin 3 of the DB9 connector linked to the PC)
	7	GND (to pin 5 of the DB9 connector linked to the PC)



## DIAG plug

- Use the SD PC cable to communicate with the PC via RS 232.
- Use the SD HHT LT cable to communicate with the hand held terminal.

## Accuracy of acquisitions and recommendations concerning wiring

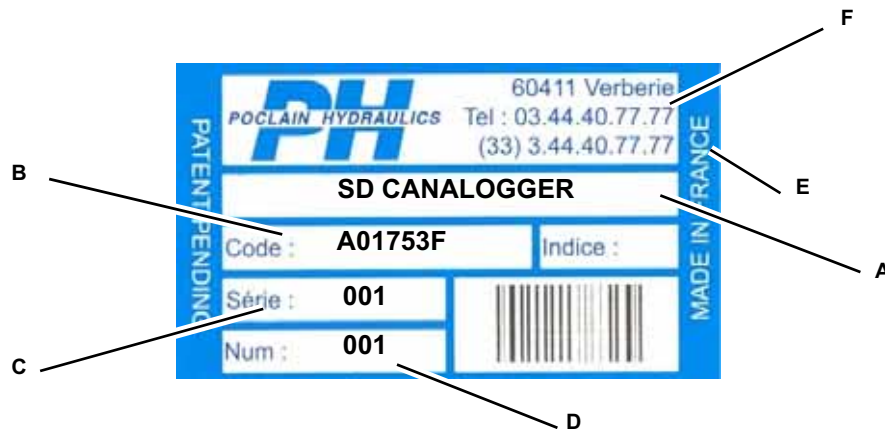
### Accuracy table

Kind of input	Accuracy
Analog inputs	+/-2% of full scale
Frequency inputs	<1%
Temperature inputs (using thermocouple)	+/-0.5°C
Temperature inputs (using PT 100)	+/-0.1°C

### Recommendations concerning wiring

In order to ensure the accuracy indicated above, it is necessary, for each sensor used, to connect the mass of the sensor directly to the pin of mass of the corresponding connector. Any connection of the mass of the sensor directly with the mass of the frame of the vehicle must also be avoided. These recommendations aim at removing any offset related to different potentials of mass between sensor and Canalogger.

### Component identification



- A : Model code:  
e.g. SD CANALOGGER
- B : Code (Part number):  
e.g. A01753F
- C : Serial number (Bath number):  
e.g. 001
- D : Number (Chronological number):  
e.g. 001
- E : Manufacturing country
- F : Manufacturing plant



# CANALOGGER EXPLORER SOFTWARE

## PC Canalogger Explorer software combined with Canalogger

Installed on a computer running a Windows OS and connected to a Canalogger via its serial port, the Canalogger Explorer software can be used to set up different inputs, to collect and save data (frequencies, temperatures, etc.)

The Canalogger Explorer software allows the user:

- to define and set up the inputs;
- to read in real time the inputs values;
- to record continuously or as soon as a particular event occurs (Trigger).

## Canalogger set-up

The Canalogger is set up using the Canalogger Explorer software application or the hand held terminal.

## Installation and initial use

### Required equipment

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

- PC type computer configured with:
  - Processor : 166 MHz min.;
  - Memory (RAM): 64 MB min.;
  - Hard disk: free space 20 MB min.;
  - Windows 98, 2000 or XP operating system;
  - CD-ROM drive;
  - Compact Flash card drive or PCMCIA;
  - Colour monitor with minimum resolution of 800 x 600 points;
  - RS 232 serial communication port;
- Installation CD-ROM for Canalogger Explorer software programs;
- Connection cable between the PC and the Canalogger (supplied).

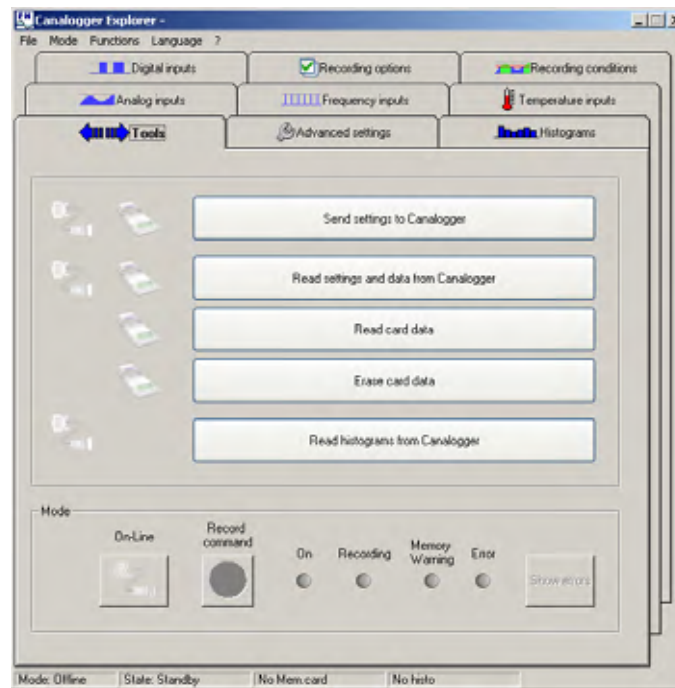
### Software installation

- 1 - Close all active programs and deactivate any antivirus that may be running on the PC. Only Windows must be running.
- 2 - Open the CD-ROM from Windows.
- 3 - Double-click on setup Canalogger Explorer™ to install the files required for the software and follow the on-screen instructions.



## Inputs set-up via the Canalogger Explorer software

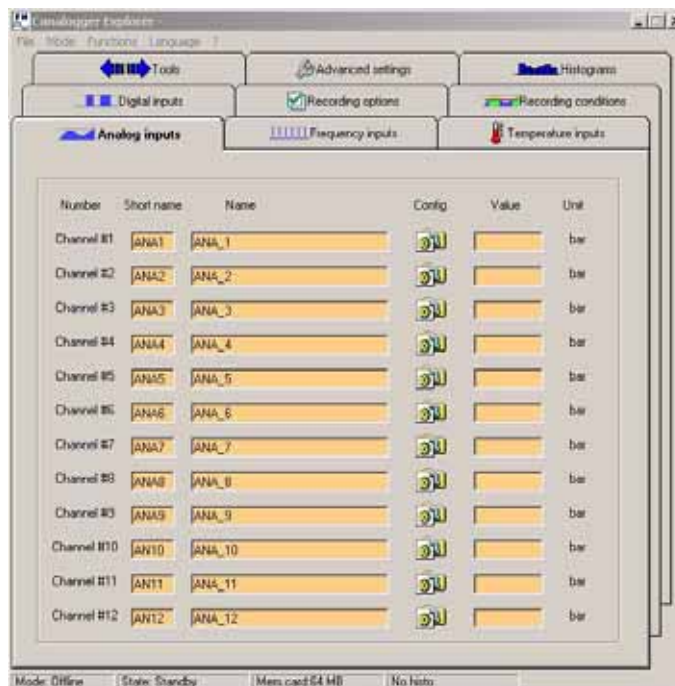
Launch the Canalogger Explorer application double-clicking on the  icon. The following screen is displayed:





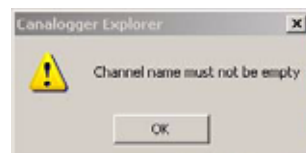
## Analog inputs set-up

1 - Click on **Analog inputs** tab. The following screen is displayed:



2 - In **Short Name** field, enter the short name of the input (this name will appear on the hand held terminal).

3 - In **Name** field, enter the whole name of the input. If no name is seized in the field, the following message is displayed:




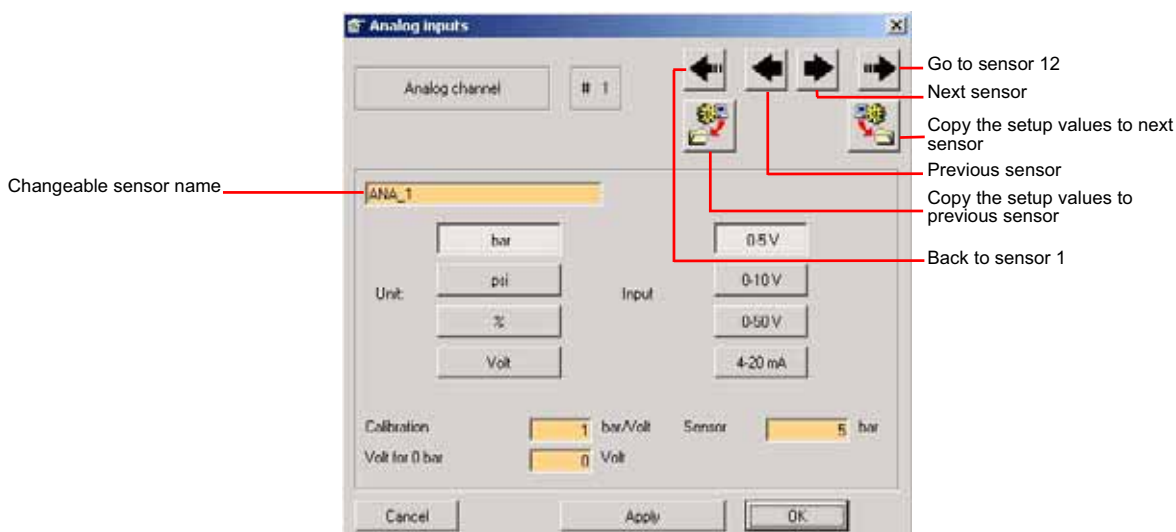
In the same way, the following message is displayed if the name you seized starts with a figure:







4 - To set up the input unit, click on the «Setup» icon . The following dialog box is displayed:



5 - Click on the value you want: bar, PSI, %, volt (or mA for the 0-20 mA input).

6 - Click on the type of input you want: 0-5 V, 0-10 V, 0-50 V or 0-20 mA (using 4-20 mA sensors is possible by configuring the 0-20 mA input and tuning a 4 mA threshold for the «zero» of the sensor).

7 - According to the unit and the type of input selected, various fields must be filled-up:

- The **Calibration** field corresponds to the resolution of the sensor used for measurement;
- The field located under the **Calibration** field corresponds to the set-up of the zero i.e. to the value according to the unit chosen for which the value of the selected sensor is null.

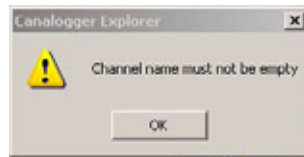
So, we have:

- If the **bar** unit has been selected, fill the **Calibration** field (unit: bar/volt or bar/mA) and the **Volt to 0 bar** or **mA to 0 bar** field;
- If the **psi** unit has been selected, fill the **Calibration** field (unit: psi/volt or psi/mA) and the **Volt to 0 psi** or **mA to 0 psi** field;
- If the **%** unit has been selected, fill the **Calibration** field (unit: %/volt or %/mA) and the **Volt to 0 %** or **mA to 0 %** field;
- If the **Volt** unit with 0-5V, 0-10V or 0-50V input has been selected, no field is to be filled;
- If the **mA** unit with 0-20mA input has been selected, no field is to be filled.

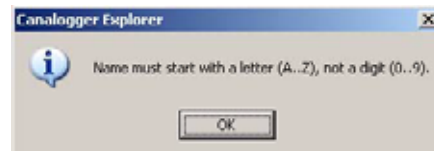
8 - Click on «Apply» to validate the settings.



The name of the input can be modified in the field of this screen. If no name is seized in the field, the following message is displayed:

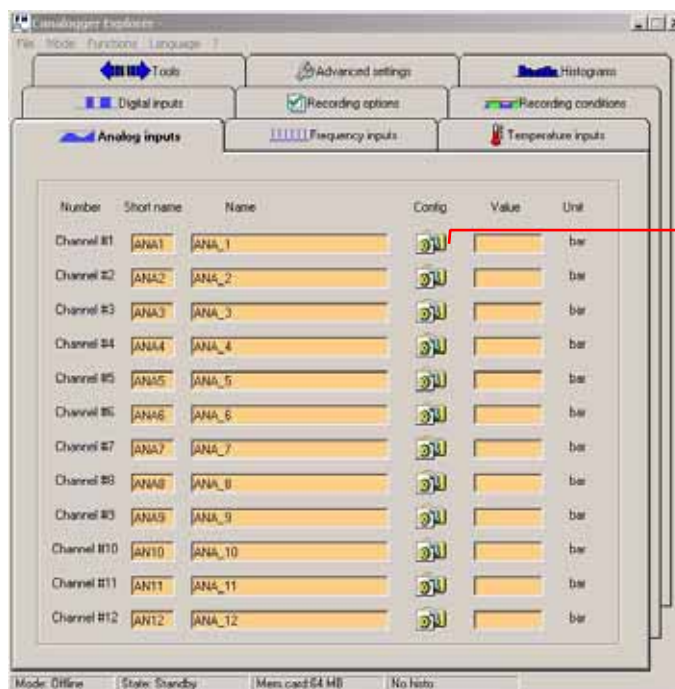


In the same way, the following message is displayed if the name you seized starts with a figure:



9 - Then, various options are possible:

- Click on «OK» to go back to the **Analog inputs** tab.
- Display the previous sensor by clicking on the icon or the next sensor by clicking on the icon: then, resume procedure from step 5.
- Display sensor 1 by clicking on the icon or sensor 12 by clicking on the icon.
- Copy the current setup values to previous sensor by clicking on the icon or to next sensor(s) by clicking on the icon.



To copy the setup values to next sensor(s), you can also click on this icon and make it slip on the next sensor icon(s).



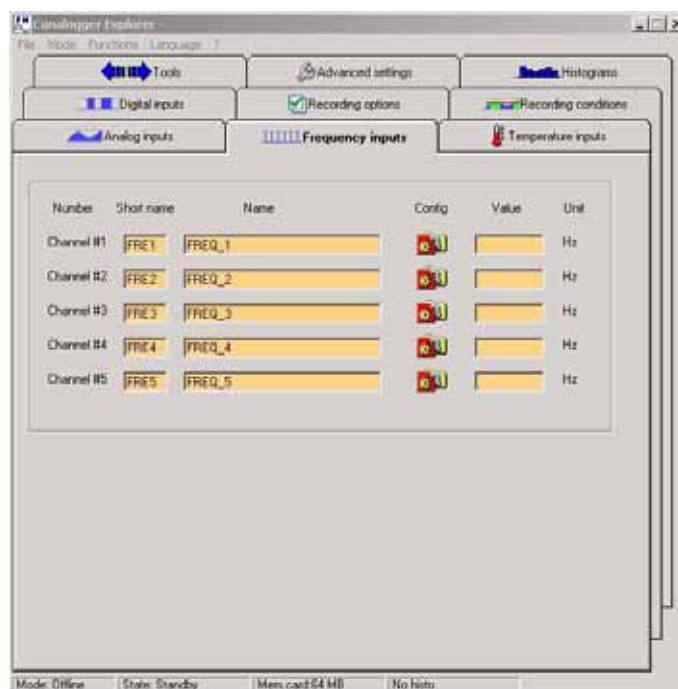
When you copy settings, all the parameters are copied, **THE CHANNEL NAME INCLUDED**. Remember to rename the channels in the «Name» field of the «Analog inputs» tab.

10 - Once all the sensors have been set up, click on «Apply» to validate the settings then click on «OK» to go back to the **Analog inputs** tab.



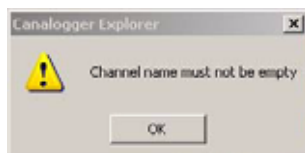
## Frequency inputs set-up

1 - Click on **Frequency inputs** tab. The following screen is displayed:



2 - In **Short Name** field, enter the short name of the input (this name will appear on the hand held terminal).

3 - In **Name** field, enter the whole name of the input. If no name is seized in the field, the following message is displayed:

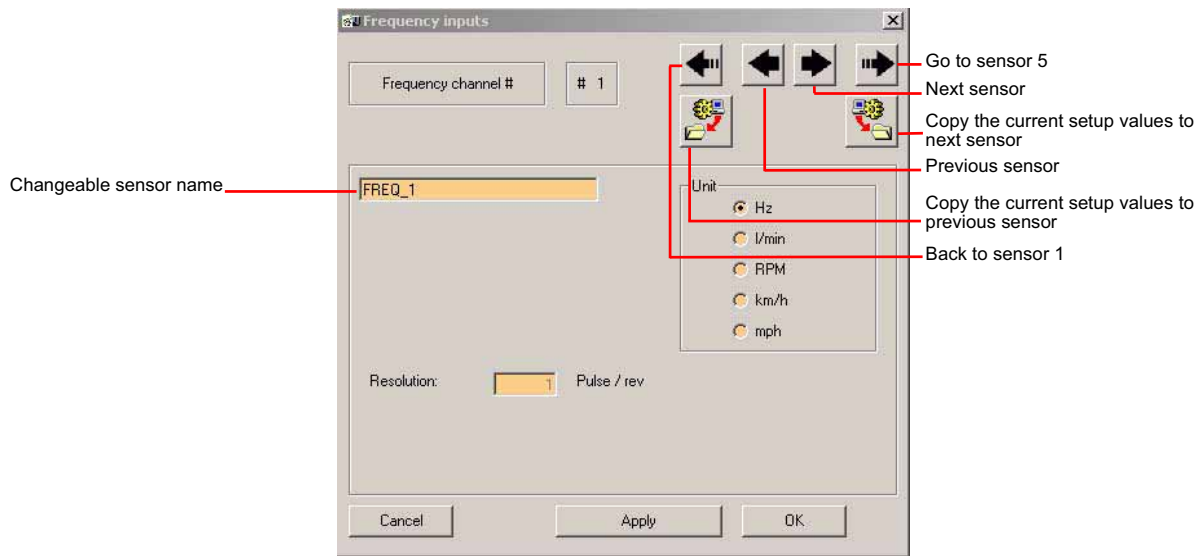


In the same way, the following message is displayed if the name you seized starts with a figure:





4 - To set up the units of the input, click on the «Setup» icon . The following dialog box is displayed:



5 - Click on the value you want: Hz, l/min, RPM, km/h or mph.

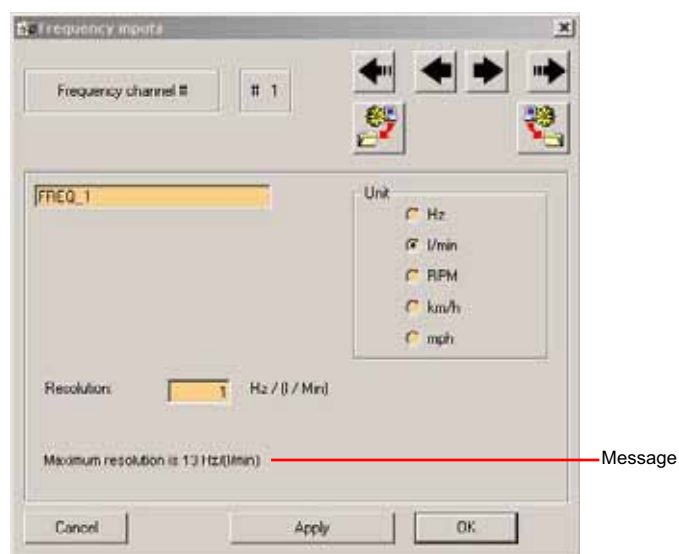
6 - According to the unit and the type of input selected, various fields must be filled:

- If l/min or RPM have been selected, fill the **Resolution** field;
- If km/h or mph have been selected, fill the **Resolution** and **Circonference** fields;
- If Hz has been selected, no field is to be filled.

Nota:

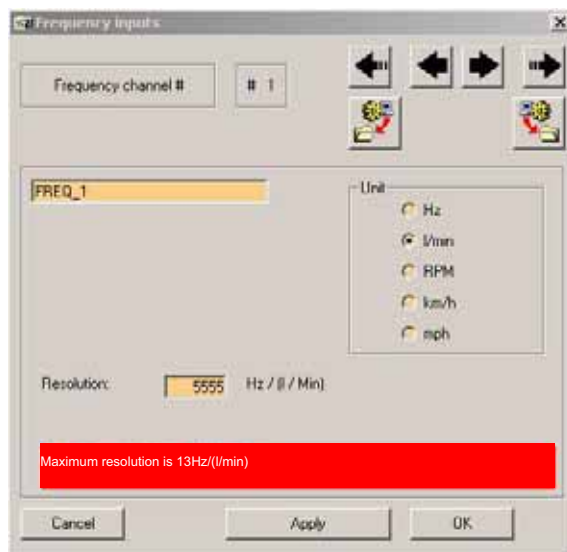
- When the l/min, RPM, km/h or mph units are selected, a message, specific to each unit, appears at the bottom of the dialog box:

**Example of message if the selected unit is l/min:**





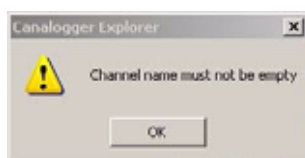
If an erroneous value is seized, this message appears in red:



7 - In this case, enter a correct value.

8 - Click on «Apply» to validate the settings.

The name of the input can be modified in the field of this screen. If no name is seized in the field, the following message is displayed:









In the same way, the following message is displayed if the name you seized starts with a figure:





9 - Then, various options are possible:

- Click on «OK» to go back to the **Frequency inputs** tab.
- Display the previous sensor by clicking on the  icon or the next sensor by clicking on the  icon: then, resume procedure from step 5.
- Display sensor 1 by clicking on the  icon or sensor 5 by clicking on the  icon.
- Copy the current setup values to previous sensor by clicking on the  icon or to next sensor(s) by clicking on the  icon.



To copy the setup values to next sensor(s), you can also click on this icon and make it slip on the next sensor icon(s).



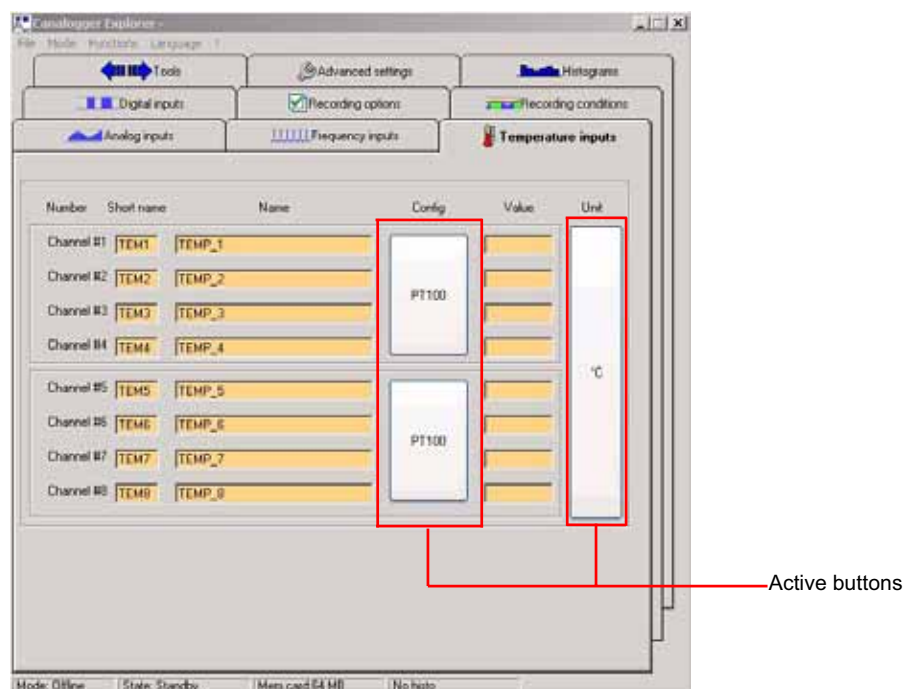
When you copy settings, all the parameters are copied, **THE CHANNEL NAME INCLUDED**. Remember to rename the channels in the «Name» field of the «Frequency inputs» tab.

10 - Once all the sensors have been set up, click on «Apply» to validate the settings then click on «OK» to go back to the **Frequency inputs** tab.



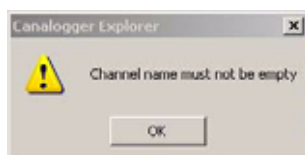
## Temperature inputs set-up

1 - Click on **Temperature inputs** tab. The following screen is displayed:

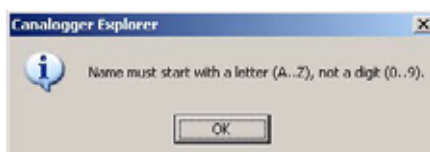


2 - In **Short Name** field, enter the short name of the input (this name will appear on the hand held terminal).

3 - In **Name** field, enter the whole name of the input. If no name is seized in the field, the following message is displayed:



In the same way, the following message is displayed if the name you seized starts with a figure:



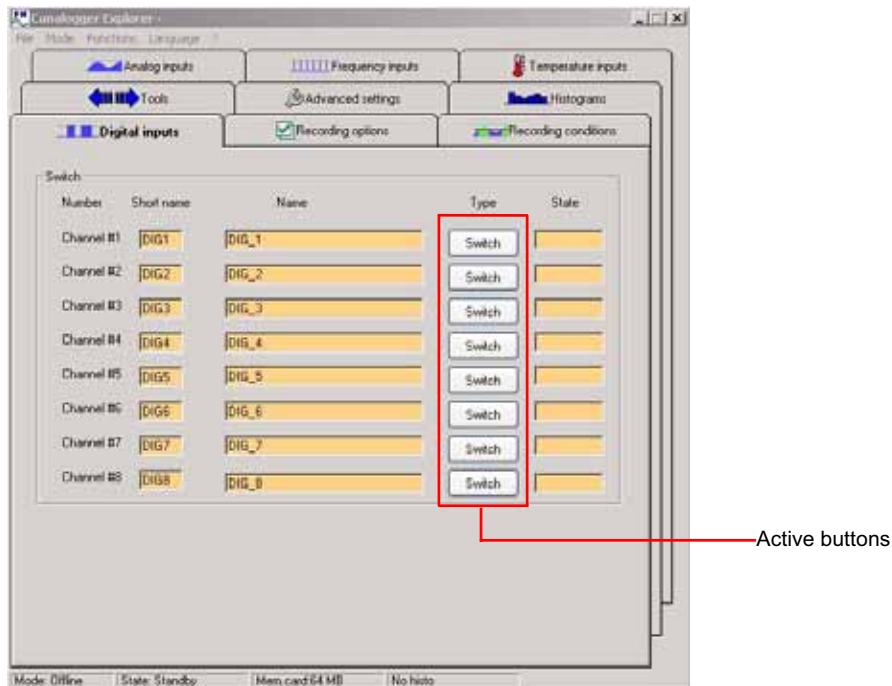
4 - In **Setup** column, click on the active buttons to select «Type K» or «PT 100» (set-up 4 by 4).

5 - In **Unit** column, click on the active button to select «C°» or «F°» (set-up for the 8 sensors).



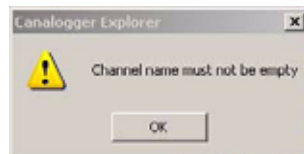
## Digital inputs set-up

1 - Click on **Digital inputs** tab. The following screen is displayed:



2 - In **Short Name** field, enter the short name of the input (this name will appear on the hand held terminal).

3 - In **Name** field, enter the whole name of the input. If no name is seized in the field, the following message is displayed:



In the same way, the following message is displayed if the name you seized starts with a figure:



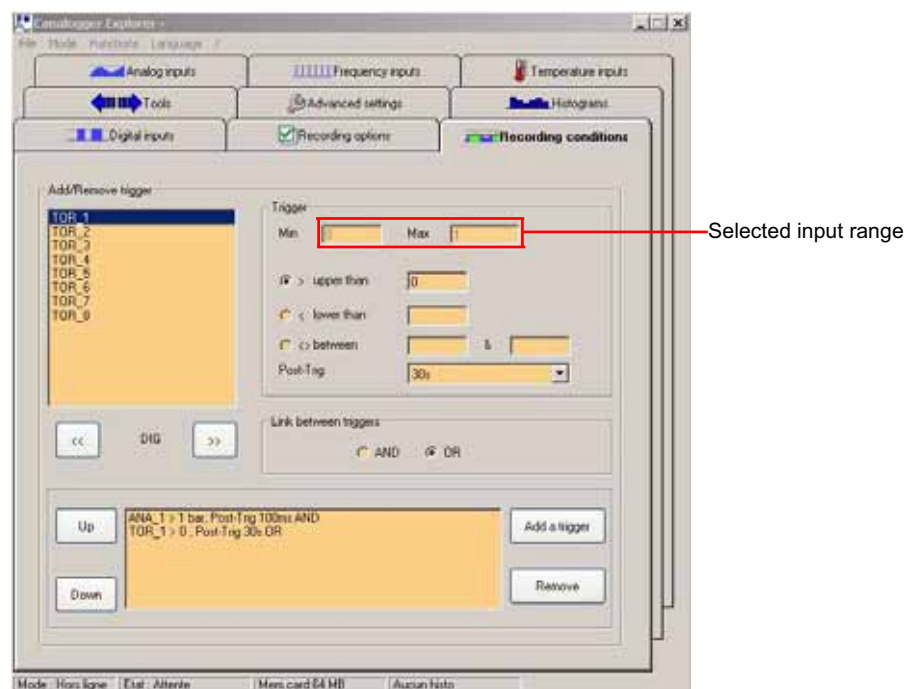
4 - In **Type** column, click on the active buttons to select «Switch» (contact to ground), or contact to the battery's positive terminal (" +12 V" or "+24V" according to battery voltage).





## Triggers set-up

1 - Triggers are conditions for automatic data record. Click on the **Triggers** tab. The following screen is displayed:



2 - Click on or on to select the type of input.

Nota: the analog, frequency, temperature and digital inputs appear in the list as well as the Bus CAN Machine database signals (if used).

3 - Click on the input you want to apply triggers to.

4 - Then, various options are possible:

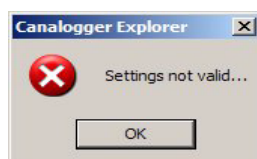
- Enter a value into the **> Upper than** field;
- Enter a value into the **< Lower than** field;
- Enter values into the **<> Between** field.

5 - Select a «Post-Trig» value in the scrolling menu. The «Post-Trig» value is the recording time after the detected value has become false.

6 - Select a link between triggers: **AND** or **OR**.

7 - Once these values have been chosen, click on the active button to validate the condition: a program line is displayed into the white rectangle. It is possible to eliminate a condition clicking on the active button when the line to eliminate has been selected.



In case of error (value seized out of the sensor range), the following message is displayed. In this case, click on «OK» to close the message and check the entered values.





The maximum number of triggers is 7. In the event of going beyond, the following message is displayed:



7 - The  and  active buttons select the triggers in the list.



If several conditions with different Post-Trig are bound by AND, the Post-Trig selected will be that of the event which will disappear the first.



## Recording options set-up

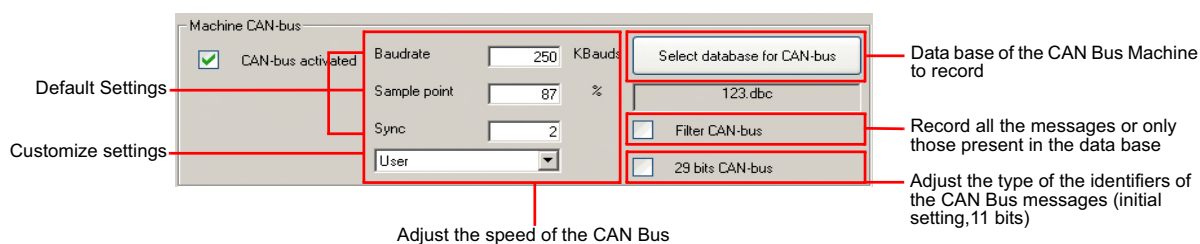
1 - Click on **Recording options** tab. The following screen is displayed:



### Machine CAN Bus

Proceed only if you use a CAN Bus.

1 - In the **Machine CAN bus** area, click on «Can-bus activated» box to display options.



2 - Tick the options and enter the values you want.



The CAN machine database contains the external signals to be recorded. Its extension is ".dbc".



## Record type

Record type

☒ Pretrig ☐ Circular memory

- 1 - Click on the «Pretrig» box to record what occurred before the record starts. The pretrig duration depends on the collecting speed and the CAN-bus charge.
- 2 - Click on the «Circular memory» box so that the Canalogger writes current measurements by crushing the oldest records when the memory card is saturated.

## General

This area covers the analog, frequency and digital inputs.

To define sample frequency and average, move the cursor on the line or enter the value you want. The final frequency is automatically calculated.

General

Number of measurements / second: Sample frequency (slider) 50 Hz

Number of points used to do a record: Average value on (slider) 1 points

Final frequency: 50 Hz

Result of the sample frequency and average combination

### Example of final frequency:

300 Hz = 300 measurements / second  
Average on 100 points  
Final frequency = 3 records / second



Sample frequency varies from 0 to 350 Hz (to 200 Hz in the event of request for histograms).

## Temperatures

The set-up of the sample frequency for temperatures is generally lower than for the analog, frequency and digital ones.

To define sample frequency, move the cursor on the line or enter the value you want.

Temperature

Sample frequency (slider) 50 mHz

0 ms

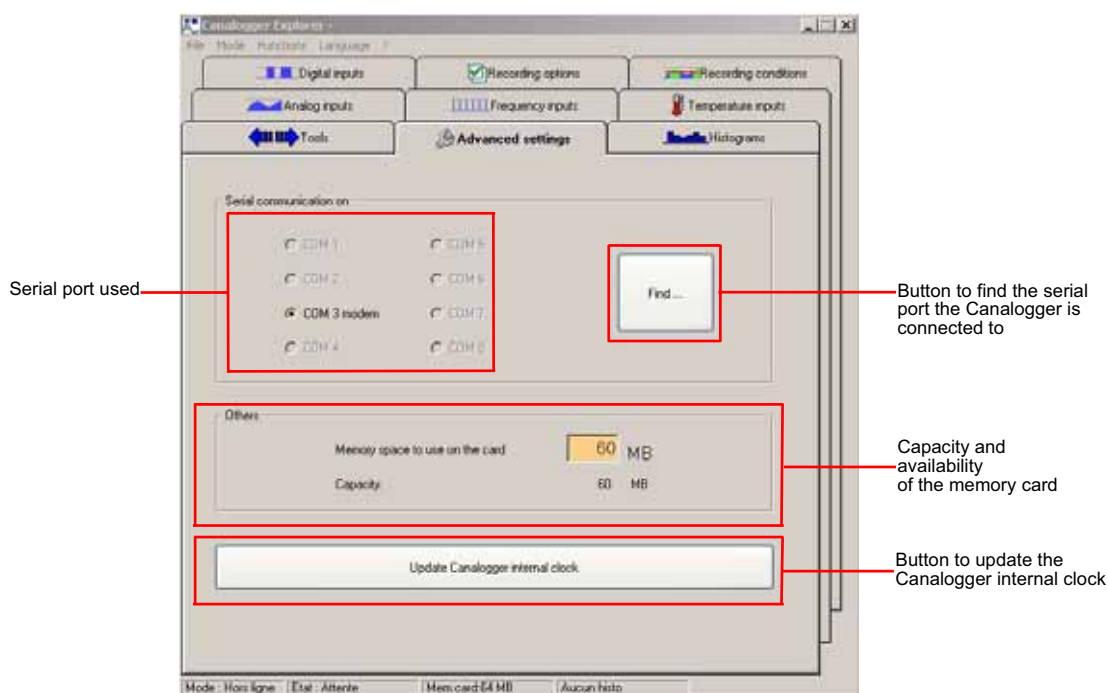


Frequency is set up in mHz (25 000 mHz max.)



## Advanced settings

1 - Click on **Advanced settings** tab. The following screen is displayed:



2 - In **Serial communication on** area, select the serial port to be used or click on «Find» to find one. The following dialog box is displayed:



3 - If the Canalogger is not connected to the PC, the following message is displayed:



4 - Click on «No» to abandon or on «Yes» to retry once you have checked the connections.

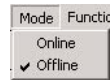


## Update Canalogger internal clock

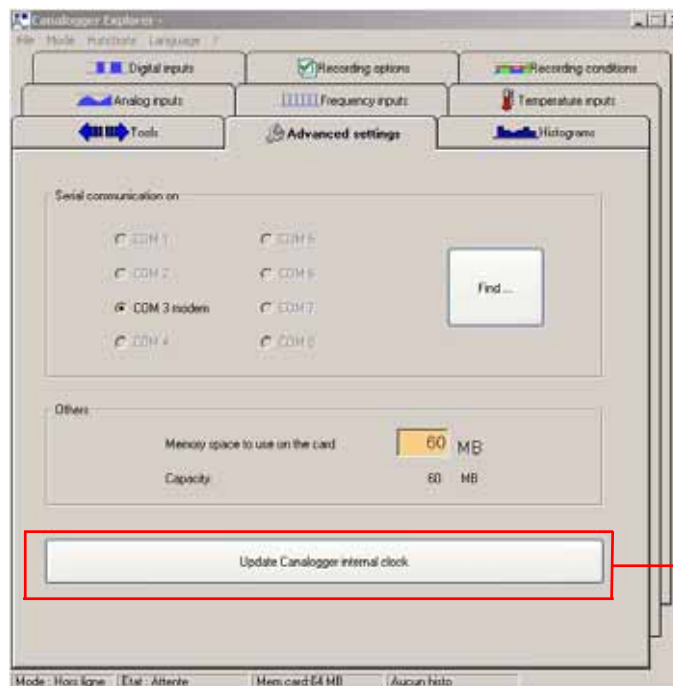


Imperatively use the clock update cable.

1 - In **Mode** menu, tick the «Offline» submenu.



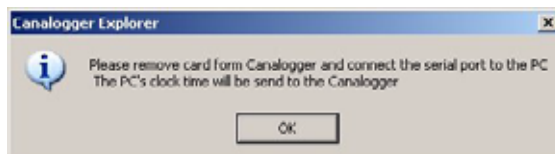
2 - In the **Advanced settings** tab, click on «Update Canalogger internal clock».



Button to update the  
Canalogger internal clock



The following dialog box is displayed:

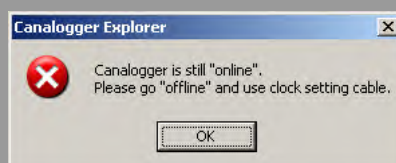


3 - Ensure that the memory card is not in the Canalogger and that the PC is properly set.

4 - Click on «OK».

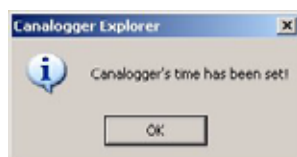


If the Canalogger is «Online», the following message is displayed:



Click on «OK», select the «Offline» option and chek that the RS232 cable is connected to the CAN/COM connector before resuming procedure.

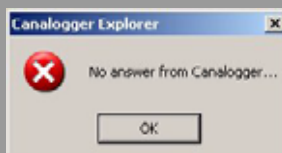
5 - Click on «OK». The following message is displayed:



6 - Click on «OK» to go back to **Tools** tab.



If the Canalogger is not connected or supplied, the following message is displayed:



Check connections.



## Histograms set-up

### Introduction

The histograms are a set of long lasting measurements that permit to obtain a global sight of a machine or a system operation. Thus, instead of obtaining a value of each sensor for each sample period (a graph value =  $f(\text{time})$ ) as a result, this Canalogger Explorer functionality permits to obtain an histogram representing the time spent in each interval of values (a graph duration =  $f(\text{interval of values})$ ).

In order to describe the functionalities related to the histograms, we are going to present an example of a real case.

Example:

The Canalogger is installed on a machine with Poclain Hydraulics hydraulic motors. We wish to know here the distribution in the time of certain parameters characterizing this machine such as:

- The pressure HP\_A (forward direction pump output pressure);
- The pressure HP\_B (reverse direction pump output pressure);
- The charge pressure of the pump;
- The speed of the vehicle;
- The temperature HP (temperature of the hydraulic system);
- The outside temperature.

The table below indicates for each state of the machine the histograms of the sensors we want to recover.

Sensor name	Input and unit	State of the machine			
		Forward direction	Reverse direction	When cold	When overpressure
HP_A	Analog (bar)	X		X	X
HP_B	Analog (bar)		X	X	X
Charge	Analog (bar)	X	X	X	X
Speed_vehicle	Frequency (km/h)	X		X	X
Temp_Ext	Temperature (°C)	X		X	X
Temp_HP	Temperature (°C)	X		X	X

Moreover, we want to know for each interval of pressure in forward direction the average speed of the vehicle.

Now it remains to characterize the various states of the machine, as follows:

- If the digital input of the Canalogger named FG is 1, the machine is in forward direction;
- If the digital input of the Canalogger named RG is 1, the machine is in reverse direction;
- If the Temp\_Ext input is lower than 5°C, the machine is cold;
- If the HP\_A or HP\_B input is higher than 350 bars, the machine is in overpressure (a virtual input will be used here).

These various states of the machine will represent the families of histograms which must be declared.

### Glossary:

- Histogram: group of 20 intervals.
- Interval: value, expressed as a percentage, describing the time spent by an input (analog, temperature, frequency) between a minimum value and a maximum value (terminals of the interval).
- Histograms families: set of histograms related to one or more update conditions.





## Histograms families

1 - Click on the **Histograms** tab. The following screen is displayed:

None or 20 intervals per histogram

Change first and last terminal: allows to concentrate the histogram on a zone of interest

Function and average inputs area

Add/delete an input in a family

Rename a family

Update conditions area

2 - For our example, four families, renamed in the **Histograms families** field, must be declared:

- Click on *Family 1* and rename it as *Forw\_dir* in the **Name** field;
- Click on *Family 2* and rename it as *Rev\_dir* in the **Name** field;
- Click on *Family 3* and rename it as *When\_Cold* in the **Name** field;
- Click on *Family 4* and rename it as *Overpressure* in the **Name** field.

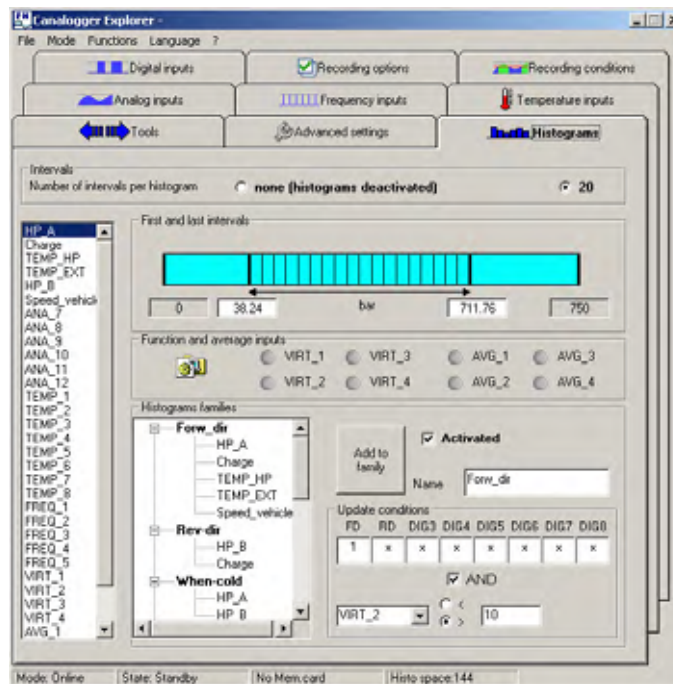
For each family, we add the inputs defined in the table of the previous page. Now, the virtual and average inputs must be defined as follows:

- Double-click on the input you want in the left-hand column: this one is automatically added under the family to be set up. Double-click on the added input to remove it.



Click on the input you want in the left-hand column and on the **Add** button: the input is automatically added under the family to be set up. Double-click on the added input to remove it.

So, we have:



The "Activated" box is automatically ticked since an input is added in the family. Tick this box off to deactivate a family: all the inputs are automatically deleted from the family.



## Virtual and average channels

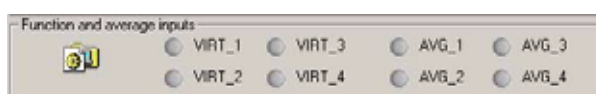
In addition to the 25 traditional inputs (12 analog inputs, 8 temperature inputs and 5 frequency inputs), 4 virtual channels (VIRT) are also available. They permit to make various operations (product, sum, difference, min, max) between 2 inputs. A coefficient a and an offset b can also be defined.

VirtualChannel1 (VIRT\_1) = a \* function (ChannelA, ChannelB) + b

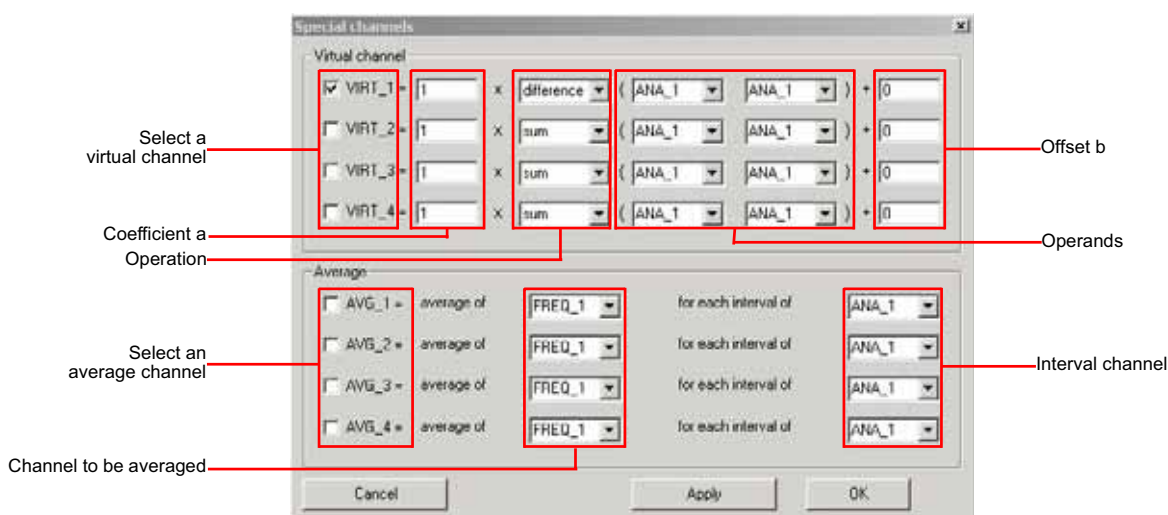
It is also necessary to define the first and the last terminal. These virtual channels are used to measure a power (for example, product between a flow and a pressure).

Four average channels (AVG) are also available. For each one, the user selects 2 channels. Thus, he defines which channel is averaged according to which other channel. For example, if the user selects a frequency input (for a speed) and an analog input (for a pressure), the average speed for each interval of pressure will be calculated by Canalogger Explorer. The average channels will be stored like an histogram. This histogram will be balanced by averages and not by the time spent in each interval. So, it is not necessary to define first and last terminal for these channels.

1 - In the **Function and average inputs** area, click on the input to be set up or on .



The following dialog box is displayed:



For our example, we declare a virtual channel that permit to indicate the max between the analog inputs HP\_A and HP\_B. We also declare an average channel of speed of vehicle for each interval of pressure HP\_A:

- VIRT\_1 = 1 \* max (HP\_A, HP\_B) + 0
- AVG\_1 = average of (Speed\_Vehicle) for each interval of (HP\_A)

Then, we add the virtual channel 1 to the *Overpressure* family and the average channel 1 to the *Front\_Gear* family. When all the channels have been added to each family, it is necessary to indicate the update condition for each of them.



When a virtual or average channel is added to a family, it is also necessary to add the inputs that compose that input (example for the VIRT\_1 channel, it is necessary to add the inputs HP\_A and HP\_B to the Overpressure family).



## Update conditions

The update of the histograms composing a family can be conditioned on the state of one or several digital inputs. Moreover, a condition can be added on one of the channel (higher or lower than a threshold).

2 - In the **Update conditions** area, for each signal, enter:

- 0: the family histograms are updated if the digital input = 0;
- 1: the family histograms are updated if the digital input = 1;
- x: the family histograms are updated whatever the value of the digital input.

For our example, the update conditions of each family are as follows:

Family	Update conditions
Forw_Dir	Digital input FD = 1
Reverse_Dir	Digital input RD = 1
When_Cold	All digital inputs = X AND Temp_Ext < 5°C
Overpressure	All digital inputs = X AND VIRT_1 > 350

These names correspond to the short names of the digital inputs

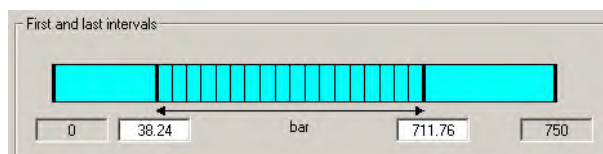
Scrolling menu

Value



### First and last intervals

It is also possible to dimension the intervals in the **First and last intervals** area (it is not necessary to define terminals for the average inputs since those are already defined in the input set-up).



### Intervals

Click on *None (histograms deactivated)* to go up to a 350 Hz sample frequency. If not, click on *20 (activated histograms)*. The sample frequency will then be limited to 200 Hz.

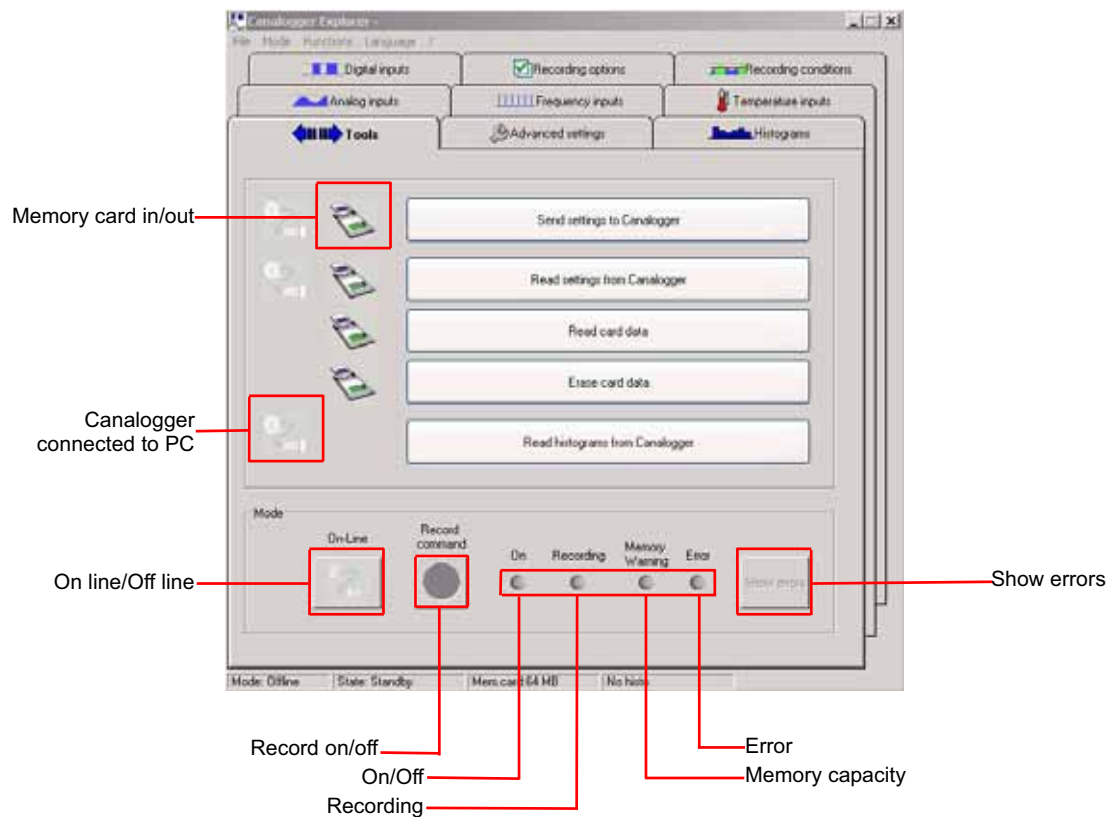


The histograms set-up is done and will be transmitted to Canalogger Explorer as one of the configuration properties according to the procedure defined in chapter “Send settings to Canalogger”, page 40.



## Tools

1 - Click on **Tools** tab. The following screen is displayed:




Icon	Description
<b>Memory card icon grayed</b>	Memory card out of PC
<b>Memory card icon active</b>	The memory card is in and recognized by the PC (the card is automatically detected by the software)
<b>Cable icon grayed</b>	The Canalogger is not connected to the PC by the serial cable or is not powered
<b>Cable icon active</b>	The Canalogger is connected to the PC by the serial cable To determine the serial port to which the Canalogger is connected, click on the «Find» button in the <b>Advanced settings</b> tab.
<b>On line/Off line button</b>	If the Canalogger is connected to the PC with the serial cable, this button becomes active. We can see in real time the values of the Canalogger inputs and launch a manual recording.





### Manual data recording

1 - Put the compact flash card into the Canalogger.

- 2 - In **Mode** area, click on  button to be online:
- The «Record command» button becomes active;
  - The green led lights up;
  - The red led flashes (if error).



- 3 - Click on  button to start recording: the blue led lights up.
- 4 - Click on  button again to stop recording: the blue led turns off.
- 5 - To read the recorded data, put the compact flash card into the PC.
- 6 - Follow the procedure "Read card data", page 44.



### Send settings to Canalogger

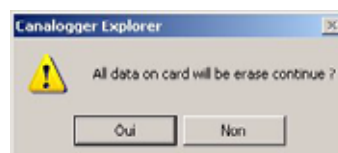
- 1 - Put the compact flash card into the PC and connect the Canalogger to the PC.
- 2 - Click on «Send settings to Canalogger». The following dialog box is displayed:



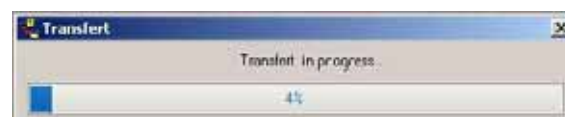
- 3 - Click on «Validate» to send the settings or on «Cancel» to go back to the **Tools** tab.
- 4 - Once action has been validated, the following dialog box is displayed:



- 5 - Select destination directory for settings file, enter file name and click on «Save». A message is displayed:



- 6 - Click on «No» to cancel and go back to the **Tools** tab or «Yes» to go on. In that case, transfer is launched:



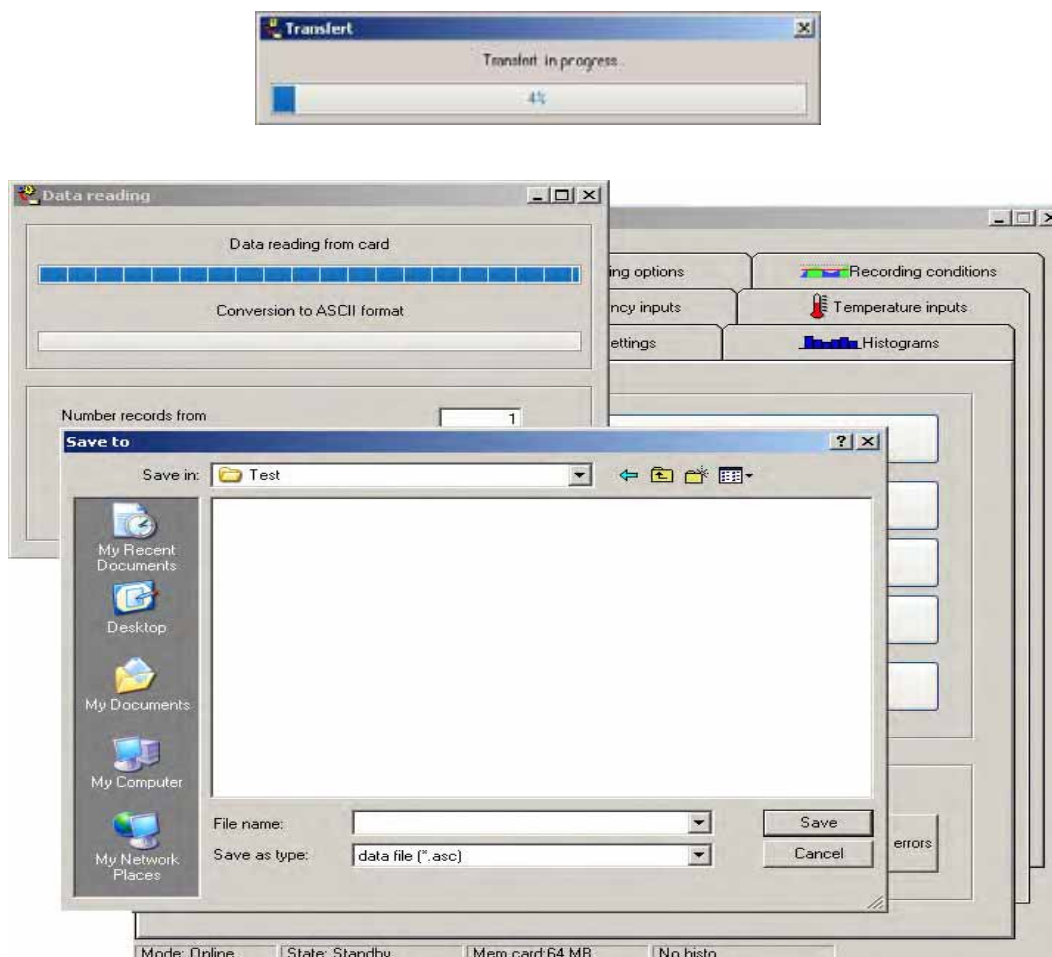




### Read settings data from Canalogger

This function allows updating inputs tabs with short names and triggers but not the bus CAN machine database (if used). To obtain whole names, use the "Open file...", page 53 function.

- 1 - Put the compact flash card into the PC and connect the Canalogger to the PC.
- 2 - Click on «Read settings from Canalogger». The Canalogger Explorer gets the settings from the Canalogger, the following dialog box is displayed:

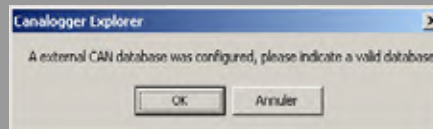


- 3 - Select destination directory for settings file, enter file name and click on «Save». Transfer is launched:



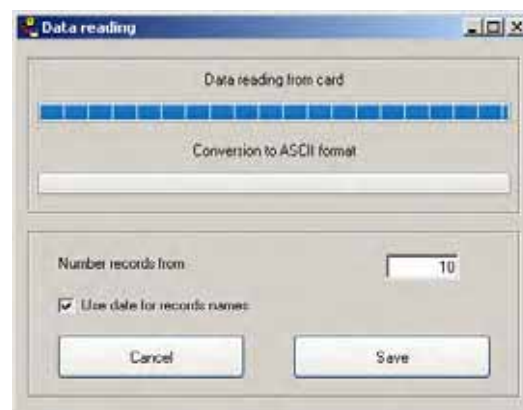


If a bus CAN machine is detected, the following message is displayed. Click on «OK» and specify the CAN machine database used.



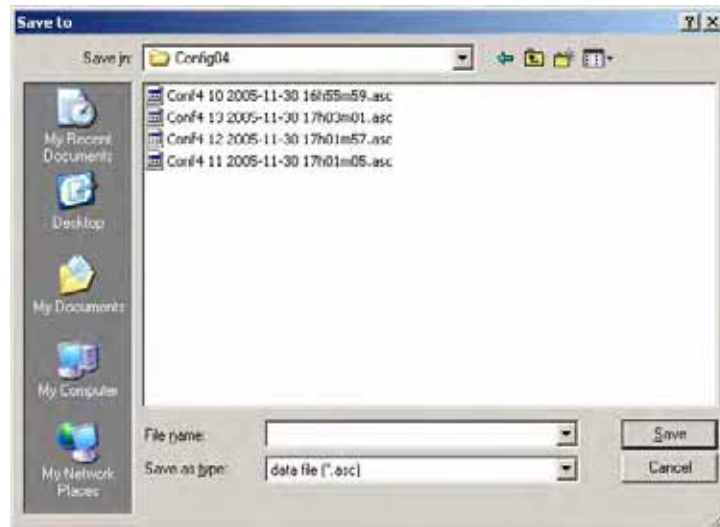
4 - When the reading of the records of the memory card is finished, it is possible to number and date the records:

- In the field «Number records from», enter the number from which to begin the numbering of the records.
- Tick the box «Dating records» so that the name of the file which will be recorded comprises the date of record.





- 5 - Click on «Save». In the dialog box, enter the name of the file and click on «Save»: the date of record is automatically added in the name of the file.



- 6 - Then, the file is converted to the asc format.



- 7 - When the conversion is finished, it is possible to erase the records of the memory card:

- Tick the box and click on «OK» to erase the records.
- Click on «No» to keep them.

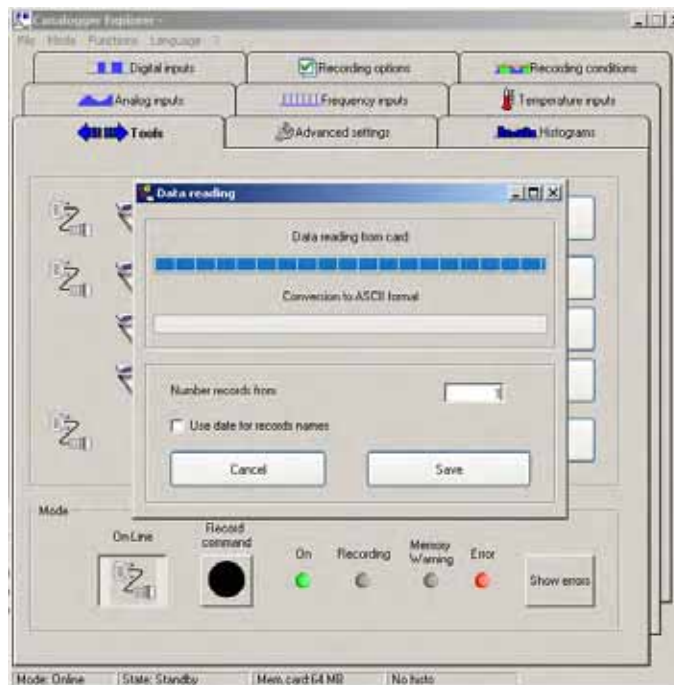


To read the records, refer at step 7 of chapter «Read card data».



### Read card data

- 1 - Put the compact flash card into the PC
- 2 - In the **Tools** tab, click on «Read card data». The following dialog box is displayed:



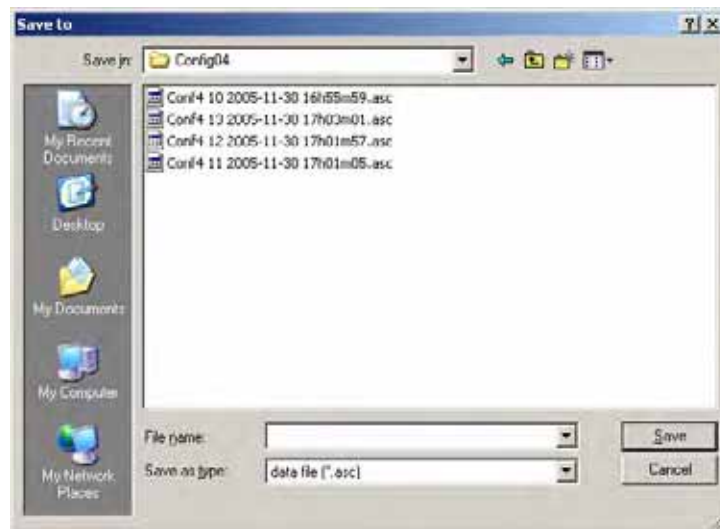
- 3 - When the reading of the records of the memory card is finished, it is possible to number and date the records:

- In the field «Number records from», enter the number from which to begin the numbering of the records.
- Tick the box «Dating records» so that the name of the file which will be recorded comprises the date of record.





- 4 - Click on «Save». In the dialog box, enter the name of the file and click on «Save»: the date of record is automatically added in the name of the file.



- 5 - Then, the file is converted to the asc format.



- 6 - When the conversion is finished, it is possible to erase the records of the memory card:

- Tick the box and click on «OK» to erase the records.
- Click on «No» to keep them.

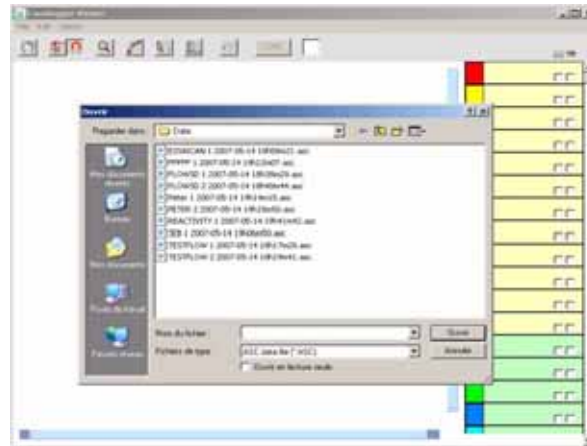




## 7 - Open software Canalogger Viewer by clicking on its icon:

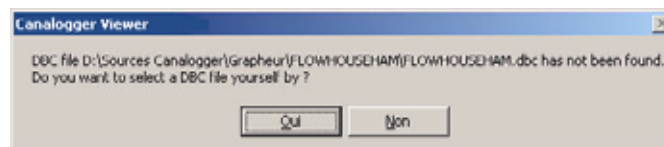


The following screen is displayed and it is automatically proposed to open an ASC file:

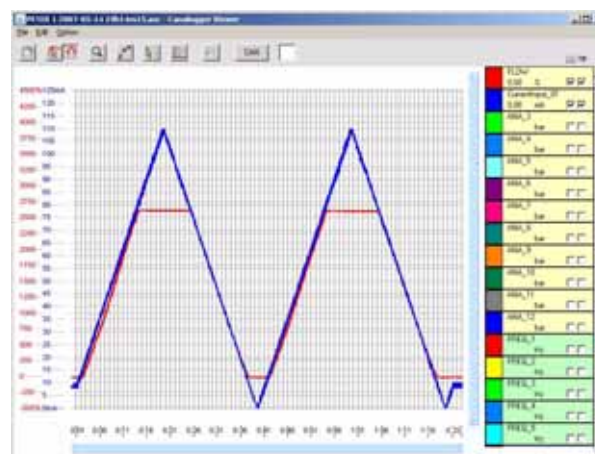


Navigate in folders tree and select the ASC file you want to read.

**Note:** ASC files are containing data for graphics. This data is not usable without a DBC file which describes the structure of this data. Each time it is possible, Canalogger Viewer automatically selects the appropriate DBC file in same folder than selected ASC file. If Canalogger Viewer does not find the appropriate DBC file, it will ask you to select it:





## 8 - Canalogger Viewer reads the ASC file and orders the signals on the right side to have used channels on top of the list:



Unused channels (with default names set by Canalogger Explorer like "ANA\_1") are put at the bottom of the list.

Each channel block contains the name of the channel, the current value with its unit, color block and two check boxes:

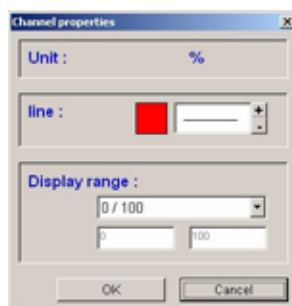


- When clicking on color block, you can modify the color of associated curve.
- Right check box  allows you to display or not the curve.
- Left check box  allows you to display or not the scale of the curve. This is useful when several channels are using the same scale. You can display only one scale for several channels.

You can modify the channel order by clicking on a channel and moving it to desired position.

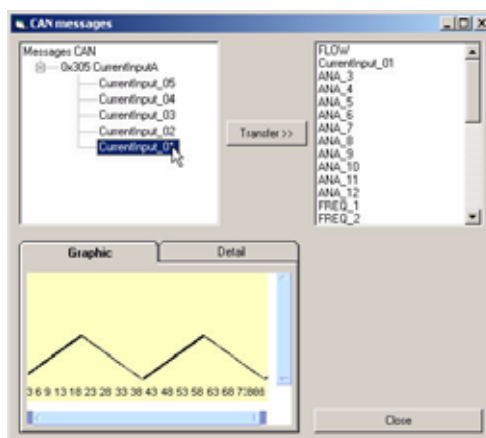


Double-click on channel allows to display and modify the channel properties.



It is possible to change curve color, line width (1, 2 or 3 pixels) and to define scale range for this channel: Automatic, manual (with mini. and max. input) or predefined (0/5, 0/50, 0/100 or 0/500).

- 9 - **If data has been recorded from machine CAN bus**, the button "CAN" in tool bar is enabled. When clicking on CAN button, a window is displayed, with on left part the CAN message(s), below information about selected CAN signal, and on the right, the list of all available channels:

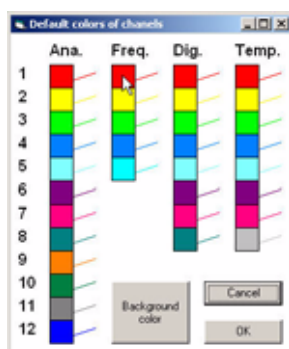


To get the curve from a CAN signal, select on the left part a CAN message. If needed, clic on small "+" at the beginning of the line, then select the desired CAN signal.

Each time you select a CAN signal, a preview of the curve is displayed below. You can also click on Detail tab to get information about selected CAN signal.

Select on the right side the channel you want to use to view the curve from CAN signal, then click on "Transfer". Main window now displays the CAN signal's curve in selected channel.

- 10 - **Each time you close a graphic** (when closing Canalogger Viewer or opening a new ASC file), Canalogger Viewer proposes you to save the graphic configuration for other ASC files in same folder. This will allow you to find back the same configuration (colors, channels order in the list, curves position in graphic) when opening another ASC file. The zoom is also saved with each ASC file, allowing the software to restore the previous zoom each time you open back an ASC file.
- 11 - **You can print the graphic** as you see it on screen (color, zoom...). Just select menu File / Print.
- 12 - **You can copy the graphic** to the clipboard using menu Edit / Copy. You can paste the graphic in word, Excel...
- 13 - **You can choose the default colors** used for next graphics using the menu Option / Default colors:



All of the 33 channels of Canalogger is shown as a color block. You can modify the default color of a channel by clicking on its color block and selecting the desired color.

Selected colors will be applied to future graphics. After validating, software proposes you to apply these colors to current graphic.





- 14 - You can choose the default range for each unit using the function **Options/Default ranges**. Defined range will be applied to future graphics. You can also directly apply a range by pressing corresponding "Apply" button. After validating, software proposes you to apply all the defined ranges to current graphic.

Unit	Min	Max	Unit	Min	Max
V	0	5	RPM	0	4000
mA	0	1000	km/h	0	45
Hz	0	1000	MPH	0	40
bar	0	450	°C	0	150
psi	0	500	°F	0	200
%	0	100	l/min	0	100

- 15 - You can choose the language of Canalogger Viewer by selecting the menu "Option/Language". This choice will be saved for next session of Canalogger Viewer.

- 16 - Tool bar proposes you several options. Here are these options:



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 scrollers (it is not necessary to select the hand tool to use the scrollers).



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. If Control key is pressed while moving a curve, all curves with same unit are following the moved curve. This function is useful to organize the position of the curves and thus facilitate their interpretation.



The **Time scale tool** allows to select the horizontal time scale. Possible choices are: no scale, automatic scale, every second, every 2, 5 or 10 seconds.



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 **Scrollers** 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 scroller, or to modify only one tip of the scroller. Then, you obtain a zoom effect. Double-click on a scroller to give it its maxima values. This ensures that all the vertical or horizontal range is displayed.



The **Undo tool** allows to cancel latest zoom or scrolled change, and consequently to restore previous view. Latest 50 changes on zoom and scrollers are saved.





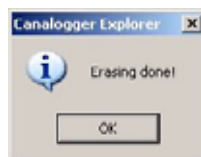
### Erase card data

1 - Put the compact flash card into the PC.

2 - Click on «Erase card data». The following message is displayed:



3 - Tick the box «Yes! I want to erase data on card!» and click on «OK». The following message is displayed:



4 - Click on «OK» to go back to the **Tools** tab.



### Read histograms from Canalogger

1 - Connect the Canalogger to the PC.

2 - In the **Tools** tab, click on «Read histograms from Canalogger». The following dialog box is displayed. Select a directory to put the histograms into.

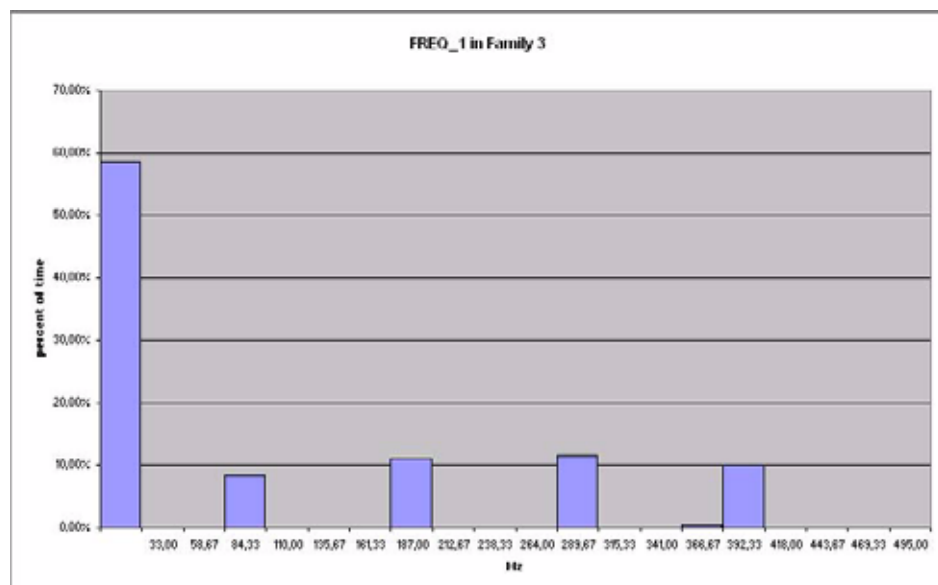


To read the histograms from the Canalogger, it is necessary to open the configuration containing the settings of the histograms you want to read.



3 - Open the Excel file:

Family 3															
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13	ANA_7 (bar)	0,04	0,98	1,92	2,86	3,80	4,75	5,69	6,63	7,57	8,51	9,45	10,39	11,33	12,27
14	% time	71,50%	0,00%	0,00%	0,00%	4,74%	0,00%	0,00%	0,00%	0,00%	7,51%	0,00%	0,00%	0,00%	8,70%
15	time	0,14 h	0,00 h	0,00 h	0,00 h	0,01 h	0,00 h	0,00 h	0,00 h	0,00 h	0,01 h	0,00 h	0,00 h	0,00 h	0,02 h
16															
17	ANA_8 (bar)	0,04	0,98	1,92	2,86	3,80	4,75	5,69	6,63	7,57	8,51	9,45	10,39	11,33	12,27
18	% time	73,41%	0,00%	0,00%	0,00%	6,36%	0,00%	0,00%	0,00%	0,00%	5,96%	0,00%	0,00%	0,00%	6,36%
19	time	0,15 h	0,00 h	0,00 h	0,00 h	0,01 h	0,00 h	0,00 h	0,00 h	0,00 h	0,01 h	0,00 h	0,00 h	0,00 h	0,01 h
20															
21	FREQ_1 (Hz)	33,00	58,67	84,33	110,00	135,67	161,33	187,00	212,67	238,33	264,00	289,67	315,33	341,00	366,67
22	% time	50,57%	0,00%	0,00%	0,37%	0,00%	0,00%	0,00%	11,90%	0,00%	0,00%	0,00%	11,55%	0,00%	0,40%
23	time	0,32 h	0,00 h	0,00 h	0,02 h	0,00 h	0,00 h	0,00 h	0,02 h	0,00 h	0,00 h	0,00 h	0,02 h	0,00 h	0,00 h
24															
25	FREQ_2 (Hz)	33,00	58,67	84,33	110,00	135,67	161,33	187,00	212,67	238,33	264,00	289,67	315,33	341,00	366,67
26	% time	60,32%	0,00%	0,00%	10,53%	0,00%	0,00%	0,00%	3,31%	0,00%	0,00%	0,00%	9,72%	0,40%	0,00%
27	time	0,32 h	0,00 h	0,00 h	0,02 h	0,00 h	0,00 h	0,00 h	0,02 h	0,00 h	0,00 h	0,00 h	0,02 h	0,00 h	0,00 h
28															
29	VIRT_2 ()	0,00	388,89	777,78	1166,67	1555,56	1944,44	2333,33	2722,22	3111,11	3500,00	3888,89	4277,78	4666,67	5055,56
30	% time	48,60%	8,80%	0,00%	8,40%	0,00%	0,40%	10,80%	0,00%	11,60%	0,00%	0,80%	8,60%	0,00%	0,00%
31	time	0,30 h	0,02 h	0,00 h	0,02 h	0,00 h	0,00 h	0,02 h	0,00 h	0,02 h	0,00 h	0,00 h	0,02 h	0,00 h	0,00 h
32															
33	ANA_7 (bar)	0,04	0,98	1,92	2,86	3,80	4,75	5,69	6,63	7,57	8,51	9,45	10,39	11,33	12,27
34	FREQ_1 (Hz)	42,06	0,00	0,00	0,00	38,22	0,00	0,00	0,00	0,00	201,49	0,00	0,00	0,00	384,76
35															
36															
37	ANA_8 (bar)	0,04	0,98	1,92	2,86	3,80	4,75	5,69	6,63	7,57	8,51	9,45	10,39	11,33	12,27
38	FREQ_2 (Hz)	40,25	0,00	0,00	0,00	90,22	0,00	0,00	0,00	0,00	201,49	0,00	0,00	0,00	290,33
39															
40															
41															
42															





### Show errors

In the **Tools** tab, click on «Show errors». The following screen is displayed:





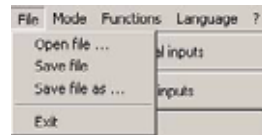
## Canalogger Explorer toolbar

This is the Canalogger Explorer toolbar:



### «File» menu

The **File** menu consists of 4 sub-menus:



Function	Description
Open file...	Open a saved file of settings: 1 - Click on «File» and «Open file...». 2 - In the displayed dialog box, click on the file of settings you want to open and click on «Open».
Save file	Save the current settings.
Save file as...	Save the current settings: 1 - Click on «File» and «Save file as...». 2 - In the displayed dialog box, select the destination directory for the settings file, enter the file name and click on «Save».
Exit	See below.

#### • Exit

When you quit Canalogger Explorer software, the following dialog box is displayed:



Function	Description
Save	This option is automatically selected to avoid forgetting to record. It is possible to tick this option off.
Send	To send the settings to the Canalogger (see "Send settings to Canalogger", page 40).
Exit	To quit Canalogger Explorer software.
Validate	To validate the selected options.
Cancel	To close dialog box and go back to the interface.

### «Mode» menu

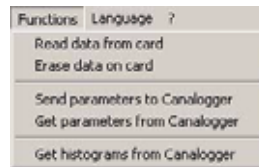
The **Mode** menu consists of 2 sub-menus:



Function	Description
On line	If the Canalogger is connected to the PC with the serial cable, the «On line» mode permits to see in real time the values of the Canalogger inputs and to start a manual record.
Off line	Select this option when the Canalogger is not connected to the PC.

**«Functions» menu**

The **Functions** menu consists of 5 sub-menus that correspond to the functions of the **Tools** tab.



Function	Description
Send settings to Canalogger	See "Send settings to Canalogger", page 40.
Read settings from Canalogger	See "Read settings data from Canalogger", page 41.
Erase card data	See "Erase card data", page 49.
Read card data	See "Read card data", page 44.
Read histograms from Canalogger	See "Read histograms from Canalogger", page 50.

**«Language» menu**

This menu allows selecting the interface language.



Function	Description
English	Select English.
Français	Select French.

**«?» menu**

The «?» menu consists of 1 sub-menu called «About...».

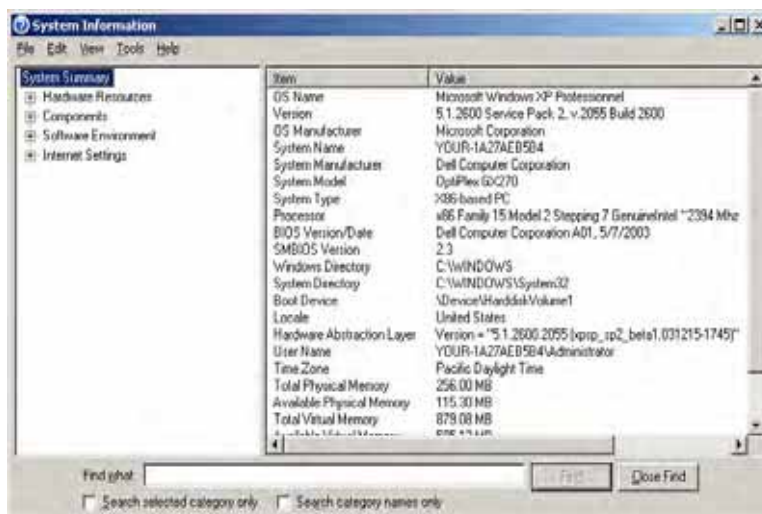


1 - Click on «About...»: the following dialog box is displayed, that indicates the Canalogger Explorer software reference.





- 2 - Click on «OK» to close the dialog box and go back to the interface or click on «Sys info...» to obtain further information: the following screen is displayed.



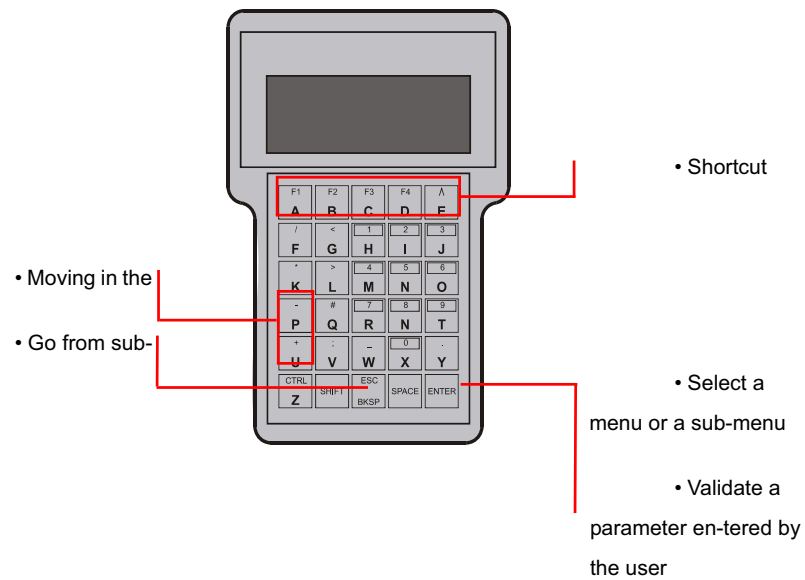


## Set-up with hand held terminal

The hand held terminal is used only to modify the settings directly in the Canalogger. There is no way of saving a configuration file.

Connect the Canalogger to the hand held terminal with the CABLE SD HHT LT cable.

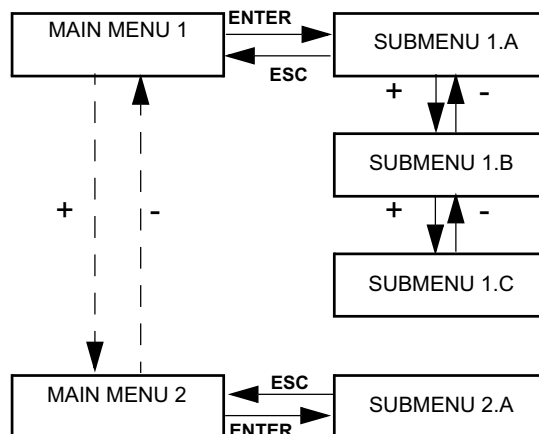
### User interface



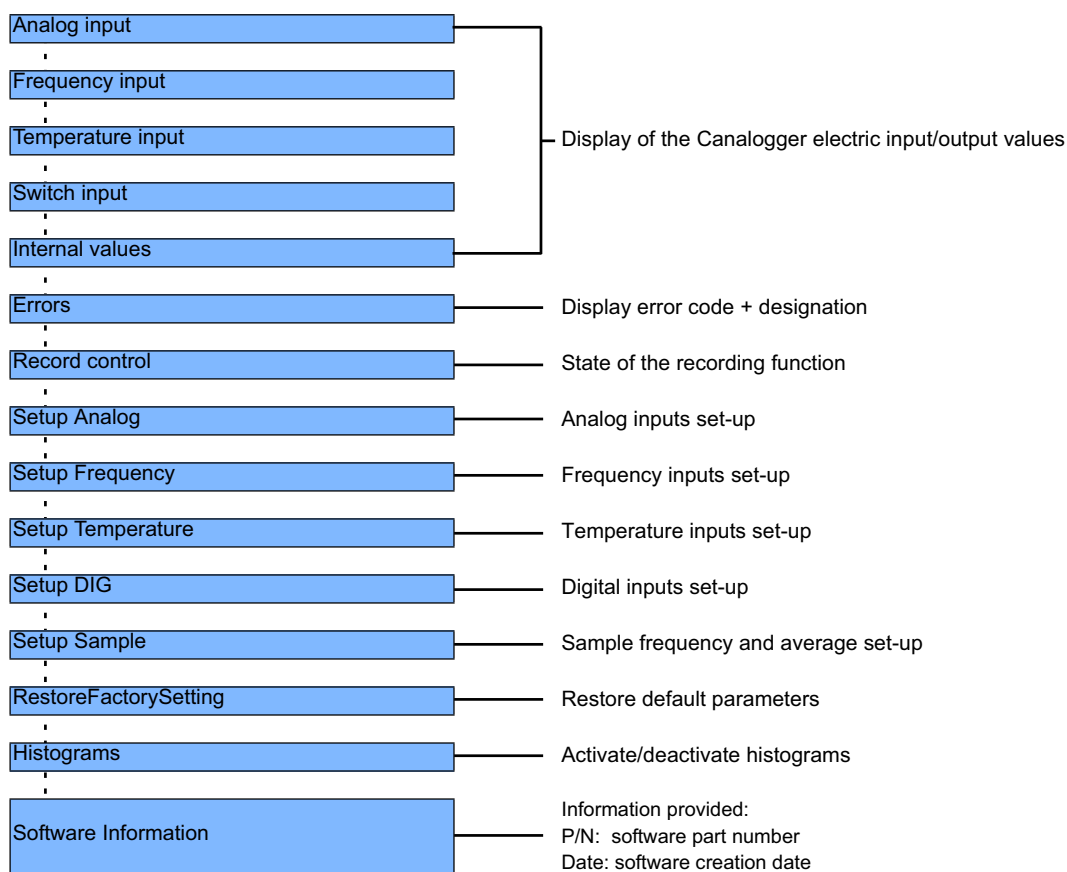




## Navigation principles



## Main and function menus tree structure

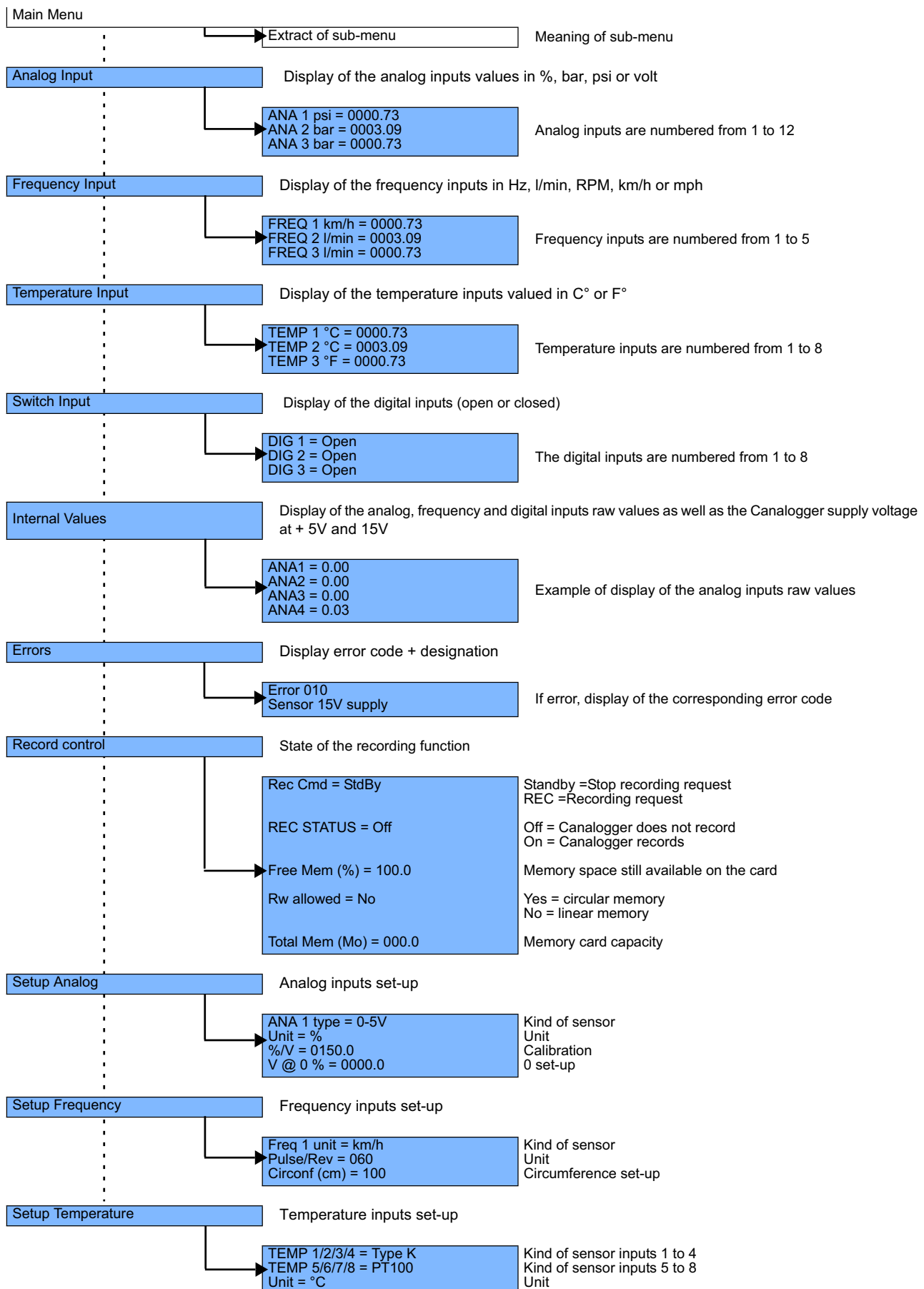


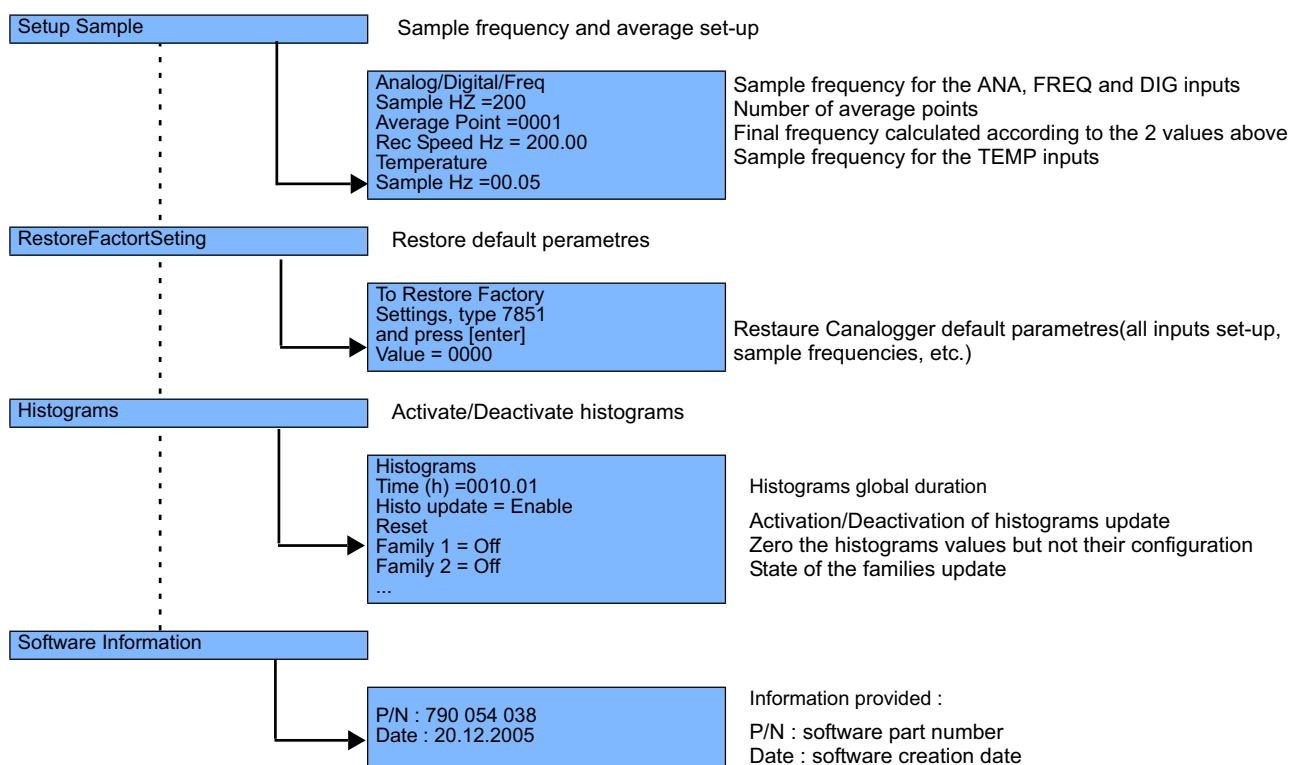
Hardware

Software



## Formulation of menus and sub-menus





Hardware

Software



## Error codes

Codes	Description
1	Battery overload
2	Battery underload
3	15V SD too low, internal problem
4	5V SD too low, internal problem
5	Too many set-up histograms, reduce the number of histograms
10	15V sensors too low
11	5V sensors too low
16	Error of a parameter checksum
17	Error of a parameter min/max
18	Error E2prom
30	Error temperature module #1, 2, 3 et 4: no communication
31	Error temperature module #5, 6, 7 et 8: no communication
32	No communication with the recorder: memory card out
33	90% of the memory card capacity are used
34	100% of the memory card capacity are used



Hardware
Software

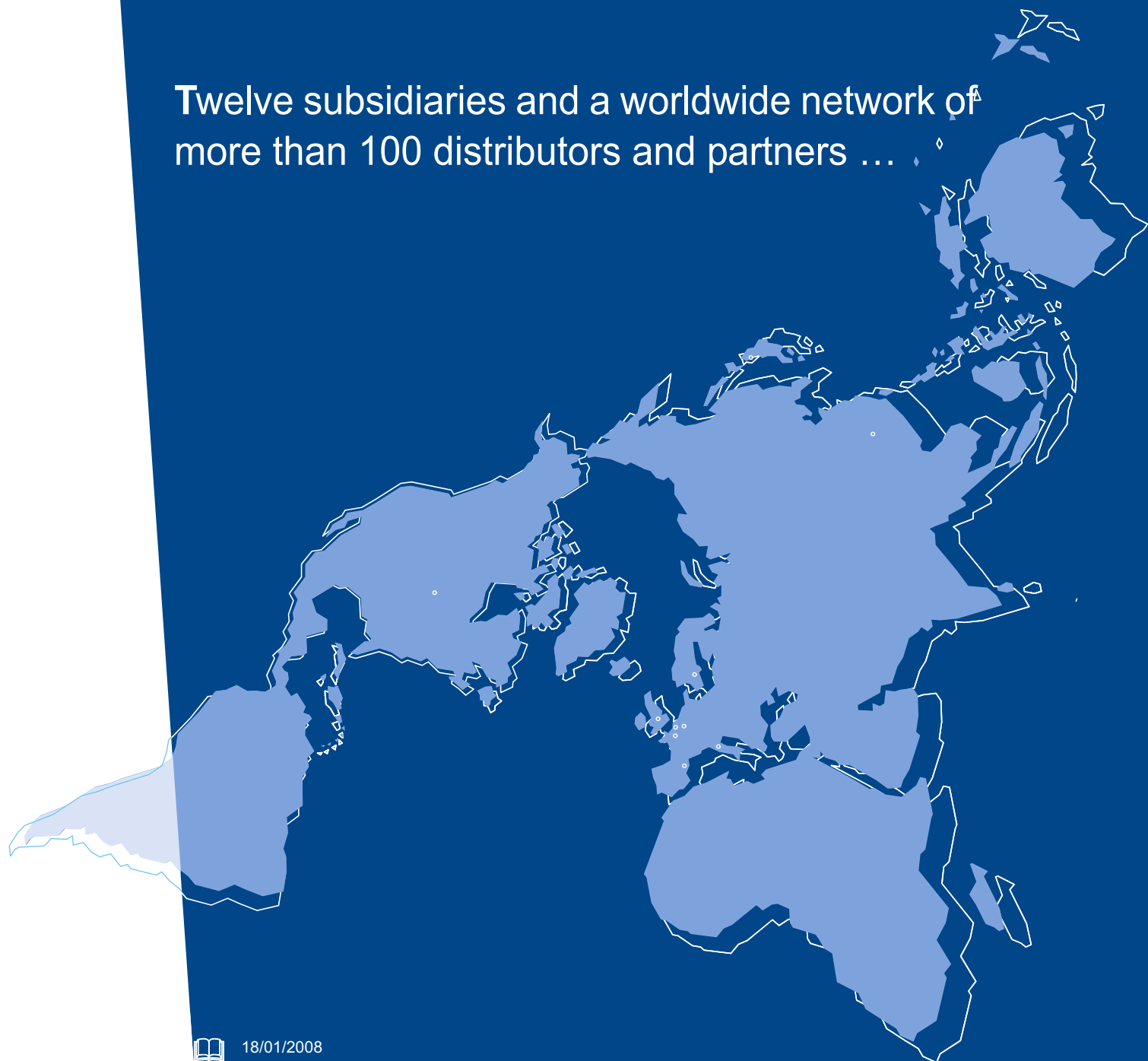




Hardware

Software

Twelve subsidiaries and a worldwide network of more than 100 distributors and partners ...



 18/01/2008

 A05693N

 A06260E



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

*Illustrations are not binding.*

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



More information on

