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DT/JT Commander

Version 1.20

Operating Manual

Revision 1.0

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1 Overview

The *DT/JT Commander* software supports the DT-100C and JT-100S portable fuel color analyzers and expands their possibilities to other fields of use.

- easy to use graphical user interface
- user management with passwords and right restrictions
- data can be saved in binary or EXCEL compatible ASCII format
- report generation with MS WORD or direct printout
- make your own calibrations for your applications!
- supports different calibration models
- possibility to transfer calibrations from the instrument to the PC or from the PC to the instrument!

2 Installation

IMPORTANT: Do not connect the hardwarekey before the installation!

2.1 Automatic Installation

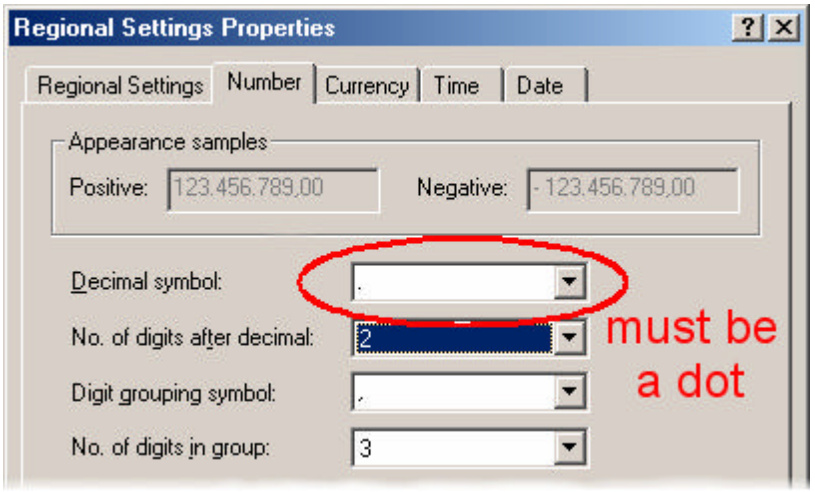
If autorun is enabled, the installation starts automatically after the CDROM is inserted.
Otherwise start "install.bat" in the root directory of the CDROM.

2.2 Manual Installation

To install *DT/JT Commander* start "setup.exe".
To install the LabVIEW Run Time Engine (required for *DT/JT Commander*) start "LVRunTimeEng.exe" in the "LVRunRimeEngine" folder.
To install hardwarekey driver start "setup.exe" in the "SentinelDriver"directory.

2.3 Known Problems

Sometimes, after installation you get only integer numbers from the instrument and result is always whole number. In most cases problem is with Windows definition of decimal symbol. For proper operation of *DT/JT Commander*, decimal symbol MUST be DOT (.) and NOT COMMA (,). To change this, go to:
Programs –> Settings –> Control panel –> Regional settings –> Number
and change “Decimal symbol” from comma (,) to dot (.) and also “Digit grouping symbol” from dot to comma.



If you do not receive any data from the unit and COM port is correct, check if you are using DT100-IS model with 6 calibrations. This model sends data to RS232 ONLY in calibration mode, what mean that you have to put a jumper between the two pins at the back of the unit.

3 Basic Operations

3.1 Login

After you start the software, you have to enter a username and password to login. If you login the first time, use “admin” as username and password. Please note that the username is not case sensitive, but the password is case sensitive!
How to create new user and how to change passwords will be described later in this manual.

3.2 Setup

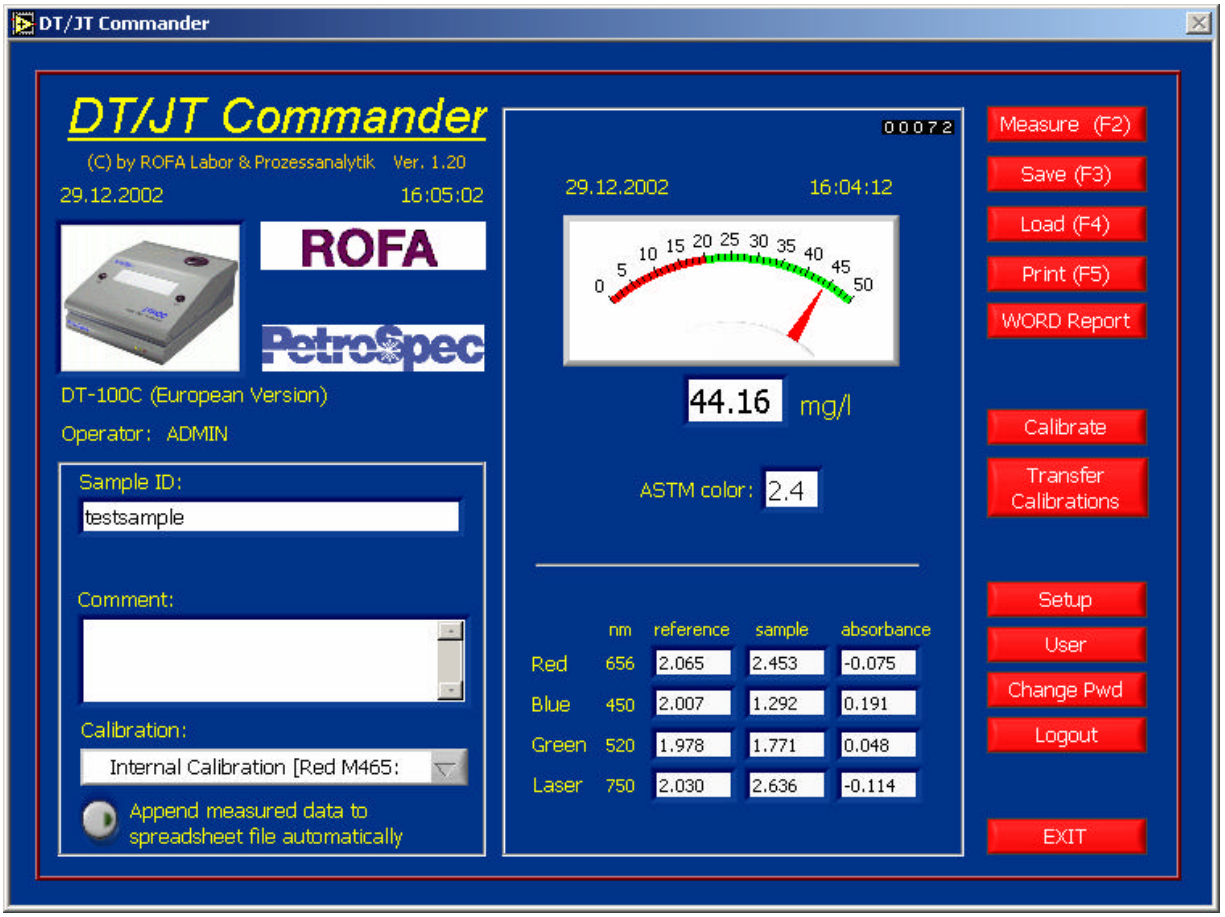
After you start the program the first time, the setup screen appears automatically. You can change the setup later by pressing the “SETUP” button on the main screen.

Type: The type of the used analyzer :

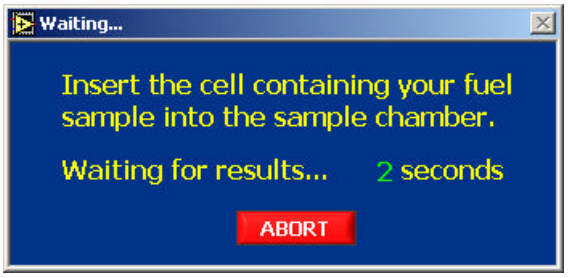
- DT-100C (EU)
- DT-100C (US)
- DT-100C-IS
- JT-100S

Port: The serial port to which the analyzer is connected.
Scale: The maximum of the displayed scale.
Limit: An optional limit. The scale from zero to the limit is show in red.
Unit: The physical unit of the analyzers result
Default path for data files: The default directory to which data are stored and from which data are loaded
Filename of spreadsheet-file (full path): The path and name of the spreadsheet file (refer to the section "save" later in this manual)
Demo mode: If the software is set to demo mode, it is possible to explore all functions of the software without an analyzer, because all inputs are simulated.

3.3 Analysis



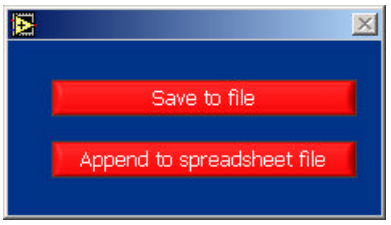
Before an analysis enter a Sample ID (mandatory), a Comment (optional) and select the calibration you want to use. The Calibration drop down list contains at least the item "Internal Calibration" that refers to the calibration used by the analyzer. For details about calibrations see the chapter calibration in this manual.



Pressing F2 or the "Measure" button shows a window that prompts you to insert the cell containing your sample into the sample chamber of the instrument. If done, the sample is analyzed, the window is closed automatically and the results are shown in the main window. Beside the calculated concentrations also the absorbances of the different wavelengths are shown.

3.4 Save

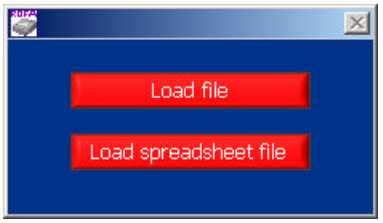
Results can be saved in two different formats. The first one is a binary file format that contains all data of one analysis and that can only be loaded by the *DT/JT Commander* software. The second one is ASCII file that contains the data of several measurements in separate lines and the data of one analysis are written into columns that are separated by tabulators. Pressing F3 or the "SAVE" button shows a window that allows you to select the file format. "Save to file" saves the results as a binary file and "Append to spreadsheet file" adds the results as an additional line to the ASCII file specified in the SETUP menu.



If the "Append measured data to spreadsheet file automatically" button on the main screen is pressed ,the results of each analysis are saved to the spreadsheet file automatically.

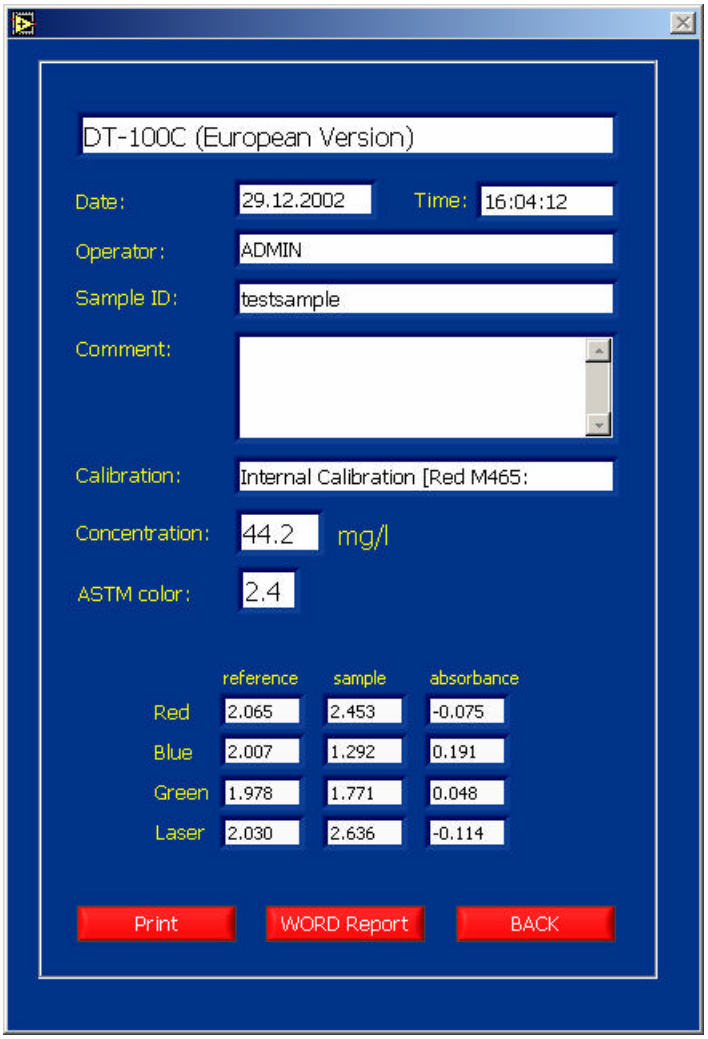
3.5 Load

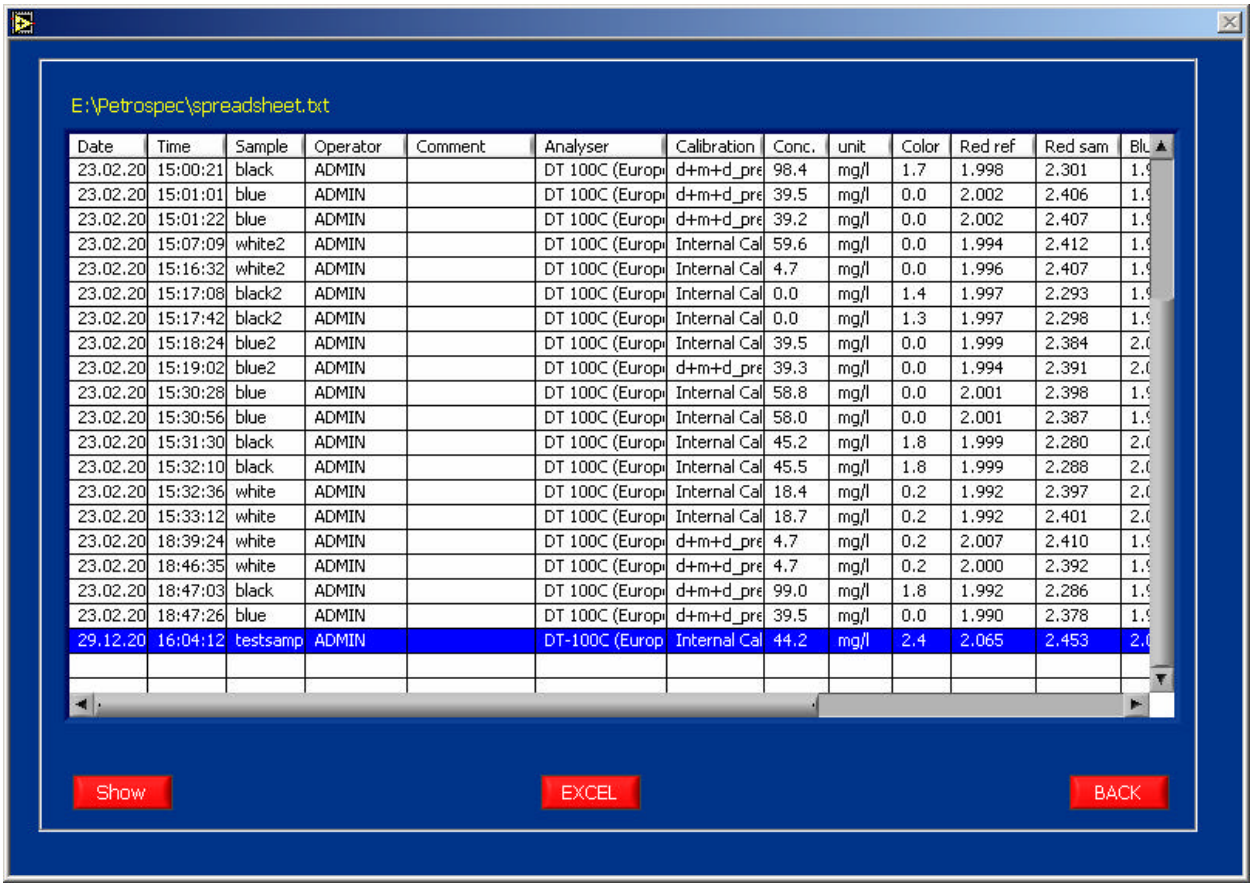
Pressing F4 or the "LOAD" button shows a window that allows you to select which file format you want to load.



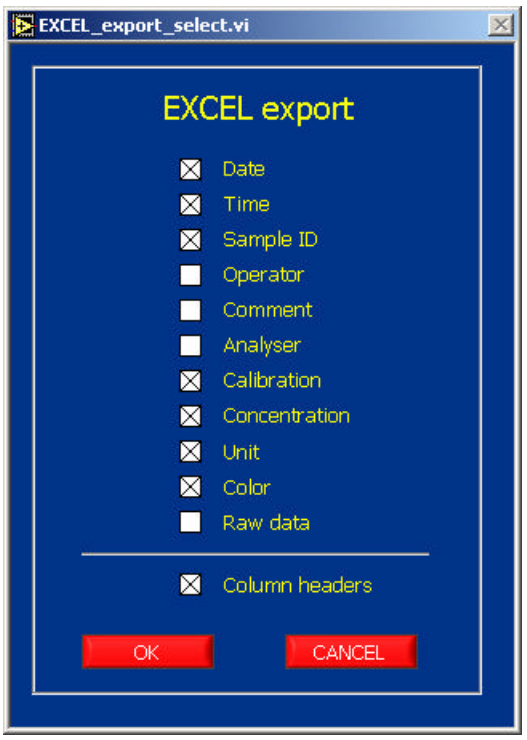
"Load file" loads a binary file and displays its data in a window. These data can be printed (see next sections of this manual)

"Load spreadsheet file" shows the ASCII file specified in SETUP menu. Selecting a line and pressing "Show" shows the data of the selected record in the same window as the content of a binary file.


DT-100C (European Version)
Date:
29.12.2002
Time:
16:04:12
Operator:
ADMIN
Sample ID:
testsample
Comment:
Calibration:
Internal Calibration [Red M465:
Concentration:
44.2
mg/l
ASTM color:
2.4
reference
sample
absorbance
Red
2.065
2.453
-0.075
Blue
2.007
1.292
0.191
Green
1.978
1.771
0.048
Laser
2.030
2.636
-0.114
Print
WORD Report
BACK


E:\Petrospec\spreadsheet.txt
Date Time Sample Operator Comment Analyser Calibration Conc. unit Color Red ref Red sam
23.02.20 15:00:21 black ADMIN DT 100C (Europ d+m+d_pre 98.4 mg/l 1.7 1.998 2.301
23.02.20 15:01:01 blue ADMIN DT 100C (Europ d+m+d_pre 39.5 mg/l 0.0 2.002 2.406
23.02.20 15:01:22 blue ADMIN DT 100C (Europ d+m+d_pre 39.2 mg/l 0.0 2.002 2.407
23.02.20 15:07:09 white2 ADMIN DT 100C (Europ Internal Cal 59.6 mg/l 0.0 1.994 2.412
23.02.20 15:16:32 white2 ADMIN DT 100C (Europ Internal Cal 4.7 mg/l 0.0 1.996 2.407
23.02.20 15:17:08 black2 ADMIN DT 100C (Europ Internal Cal 0.0 mg/l 1.4 1.997 2.293
23.02.20 15:17:42 black2 ADMIN DT 100C (Europ Internal Cal 0.0 mg/l 1.3 1.997 2.298
23.02.20 15:18:24 blue2 ADMIN DT 100C (Europ Internal Cal 39.5 mg/l 0.0 1.999 2.384
23.02.20 15:19:02 blue2 ADMIN DT 100C (Europ d+m+d_pre 39.3 mg/l 0.0 1.994 2.391
23.02.20 15:30:28 blue ADMIN DT 100C (Europ Internal Cal 58.8 mg/l 0.0 2.001 2.398
23.02.20 15:30:56 blue ADMIN DT 100C (Europ Internal Cal 58.0 mg/l 0.0 2.001 2.387
23.02.20 15:31:30 black ADMIN DT 100C (Europ Internal Cal 45.2 mg/l 1.8 1.999 2.280
23.02.20 15:32:10 black ADMIN DT 100C (Europ Internal Cal 45.5 mg/l 1.8 1.999 2.288
23.02.20 15:32:36 white ADMIN DT 100C (Europ Internal Cal 18.4 mg/l 0.2 1.992 2.397
23.02.20 15:33:12 white ADMIN DT 100C (Europ Internal Cal 18.7 mg/l 0.2 1.992 2.401
23.02.20 18:39:24 white ADMIN DT 100C (Europ d+m+d_pre 4.7 mg/l 0.2 2.007 2.410
23.02.20 18:46:35 white ADMIN DT 100C (Europ d+m+d_pre 4.7 mg/l 0.2 2.000 2.392
23.02.20 18:47:03 black ADMIN DT 100C (Europ d+m+d_pre 99.0 mg/l 1.8 1.992 2.286
23.02.20 18:47:26 blue ADMIN DT 100C (Europ d+m+d_pre 39.5 mg/l 0.0 1.990 2.378
29.12.20 16:04:12 testsamp ADMIN DT-100C (Europ Internal Cal 44.2 mg/l 2.4 2.065 2.453
Show
EXCEL
BACK

If Microsoft EXCEL is installed on your computer you can export this spreadsheet file to EXCEL directly. Pressing the EXCEL button shows a window that allows you to select which data (columns of the spreadsheet file) you want export. Closing this window with “OK”, starts EXCEL automatically and transfers the selected data.



Microsoft Excel - Mappe1

Datei Bearbeiten Ansicht Einfügen Format Extras Daten Fenster ?

Frage hier eingeben

A1 Date

	A	B	C	D	E	F	G
1	Date	Time	Sample	Calibration	Conc.	unit	Color
2	23.02.2002	11:59:48	testsample	Internal Calibration [Red M465: (Solvent Red 26std.)]	29.3	mg/l	0.8
3	23.02.2002	14:01:49	tt1	Internal Calibration [Red M465: (Solvent Red 26std.)]	12.8	mg/l	3.2
4	23.02.2002	14:02:07	tt2	Internal Calibration [Red M465: (Solvent Red 26std.)]	0.8	mg/l	2.9
5	23.02.2002	14:19:03	tt3	Internal Calibration [Red M465: (Solvent Red 26std.)]	5.5	mg/l	0.8
6	23.02.2002	14:19:22	tt3	Internal Calibration [Red M465: (Solvent Red 26std.)]	0.4	mg/l	2.4
7	23.02.2002	14:59:05	white	d+m+d_prep	4.7	mg/l	0.2
8	23.02.2002	14:59:26	white	d+m+d_prep	4.7	mg/l	0.2
9	23.02.2002	14:59:59	black	d+m+d_prep	99.2	mg/l	1.8
10	23.02.2002	15:00:21	black	d+m+d_prep	98.4	mg/l	1.7
11	23.02.2002	15:01:01	blue	d+m+d_prep	39.5	mg/l	0
12	23.02.2002	15:01:22	blue	d+m+d_prep	39.2	mg/l	0
13	23.02.2002	15:07:09	white2	Internal Calibration [Red M465:]	59.6	mg/l	0
14	23.02.2002	15:16:32	white2	Internal Calibration [Red M465:]	4.7	mg/l	0
15	23.02.2002	15:17:08	black2	Internal Calibration []	0	mg/l	1.4
16	23.02.2002	15:17:42	black2	Internal Calibration []	0	mg/l	1.3
17	23.02.2002	15:18:24	blue2	Internal Calibration [Red M465:]	39.5	mg/l	0
18	23.02.2002	15:19:02	blue2	d+m+d_prep	39.3	mg/l	0
19	23.02.2002	15:30:28	blue	Internal Calibration [Red M465:]	58.8	mg/l	0
20	23.02.2002	15:30:56	blue	Internal Calibration [Red M465:]	58	mg/l	0
21	23.02.2002	15:31:30	black	Internal Calibration [Red M465:]	45.2	mg/l	1.8
22	23.02.2002	15:32:10	black	Internal Calibration [Red M465:]	45.5	mg/l	1.8
23	23.02.2002	15:32:36	white	Internal Calibration [Red M465:]	18.4	mg/l	0.2
24	23.02.2002	15:33:12	white	Internal Calibration [Red M465:]	18.7	mg/l	0.2
25	23.02.2002	18:39:24	white	d+m+d_prep	4.7	mg/l	0.2
26	23.02.2002	18:46:35	white	d+m+d_prep	4.7	mg/l	0.2
27	23.02.2002	18:47:03	black	d+m+d_prep	99	mg/l	1.8
28	23.02.2002	18:47:26	blue	d+m+d_prep	39.5	mg/l	0
29	29.12.2002	16:04:12	testsample	Internal Calibration [Red M465: (Solvent Red 26std.)]	44.2	mg/l	2.4
30							

Tabelle1 Tabelle2 Tabelle3

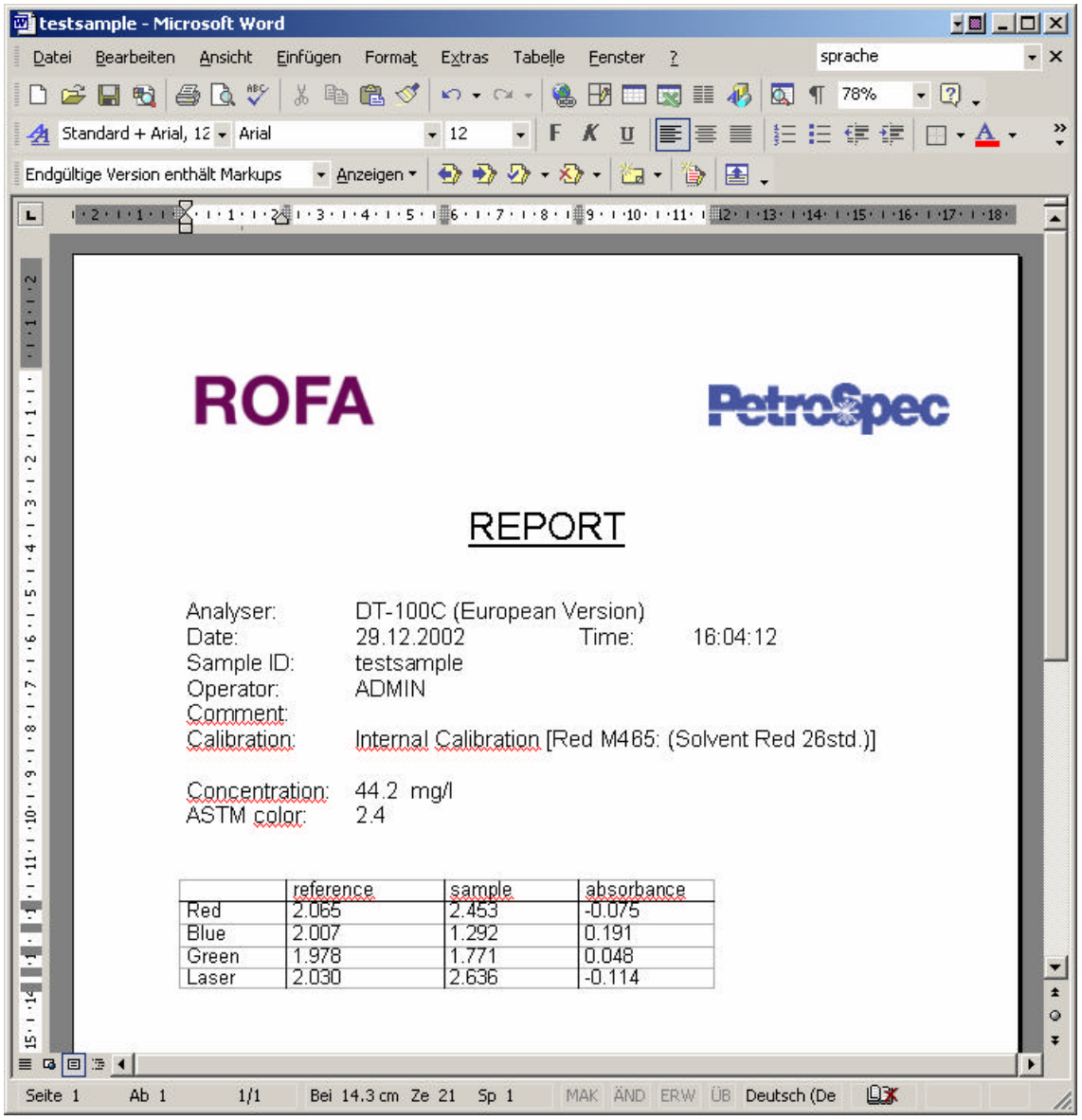
Bereit NF

3.6 Print

Pressing F5 or the "Print" button prints the results of an analysis. An example of a printout can be found at the end of this manual.

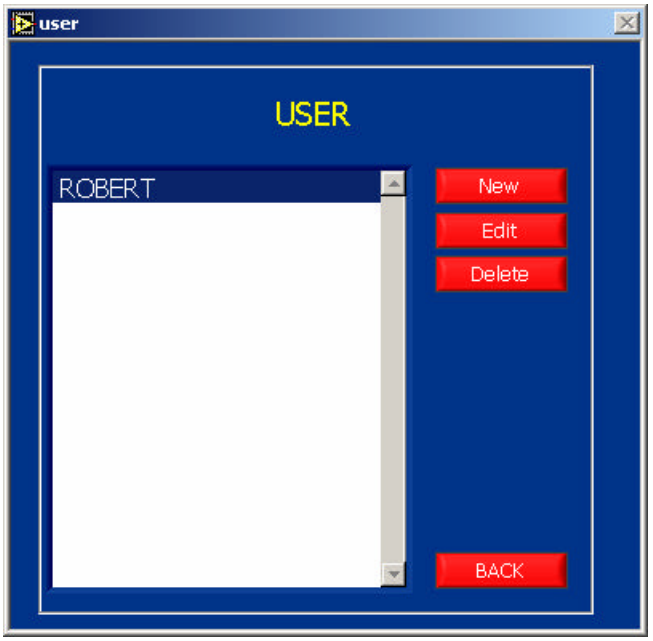
3.7 WORD Report

If you have installed Microsoft WORD on your computer it is possible to generate a report that can be printed and/or saved. Pressing "WORD Report" opens Microsoft WORD, loads a template file (`result_template.doc`) and transfers all results into this document. The layout of this report can be adapted easily by changing the template file.

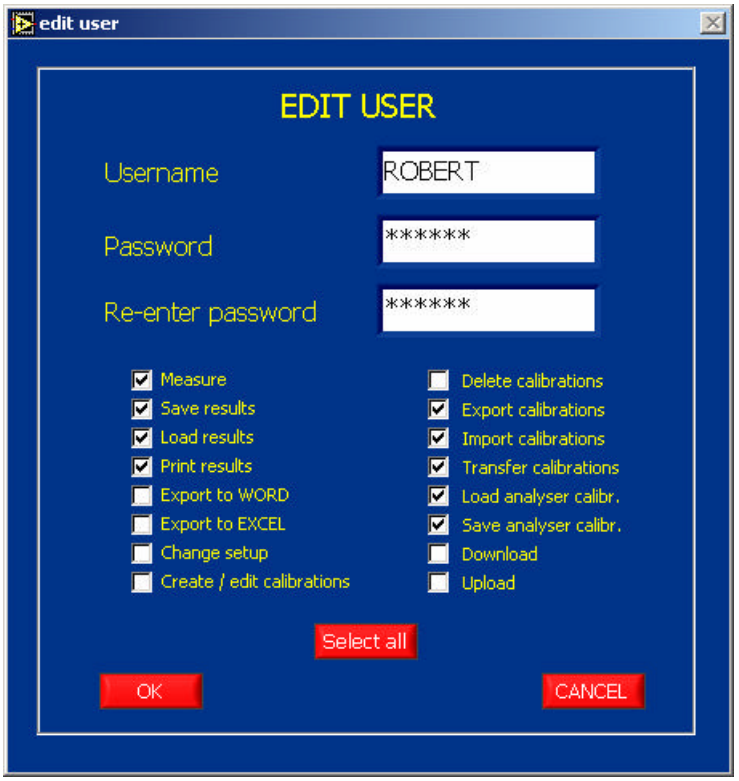


3.8 User

Pressing the “USER” button opens a window for user administration. Note that only the administrator, logged in as “admin”, has access to this window.



If you create a user you have to enter his username, his password and which parts of the software he is allowed to use.



3.9 Change Password

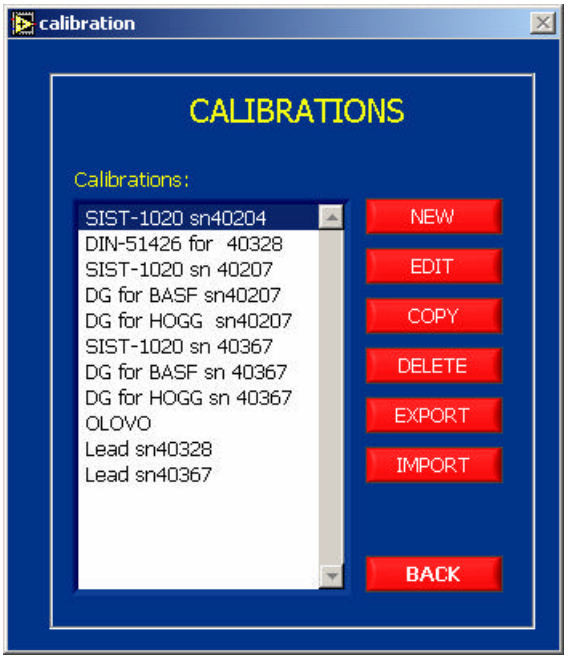
Pressing "Change Pwd" allows you to enter a new password.

3.10 Logout

Pressing "Logout" shows the login window again to login as a new user.

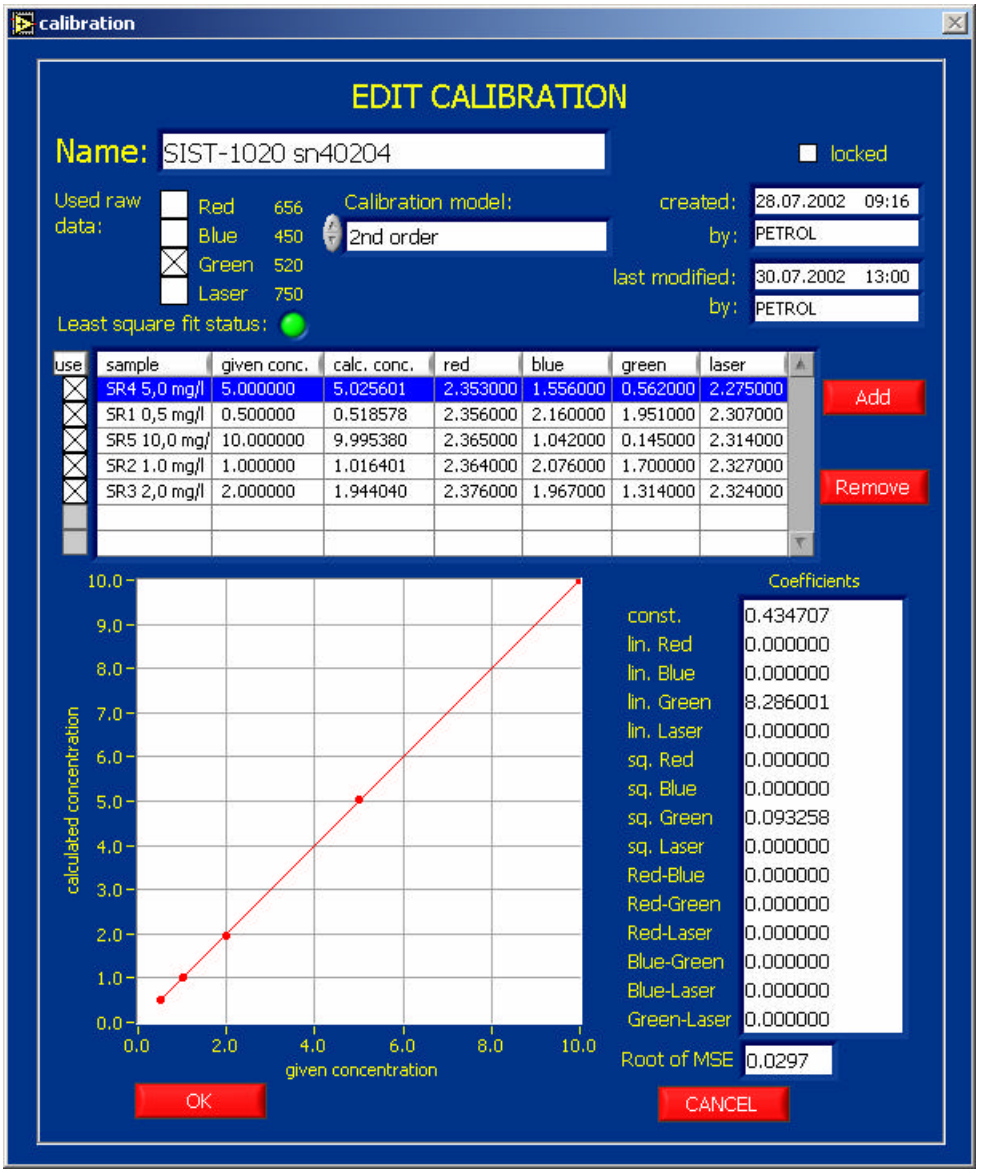
4 Calibrations

The DT-100 / JT-100 instruments measure the absorbances of light of four (JT100: three) different wavelengths. These absorbances, together with a calibration, that contains a mathematical model and a number of constants, are used to calculate the dye concentration that is shown on the display of the instrument after an analysis. The *DT/JT Commander* software does not only allow to display the results calculated by the instruments with its internal calibrations, but also makes it possible to create new calibrations that can be used to calculate concentrations of different dyes.
If the "Calibration" button on the main screen is pressed, a list of all available calibrations is shown.



NEW	Creates a new calibration (see next section)
EDIT	Edit the selected calibration (see next section)
COPY	Copies the selected calibration to a new one
DELETE	Deletes the selected calibration
EXPORT	Exports the selected calibration to a binary file (with the default extension cal), that can be used to transfer a calibration to another system
IMPORT	Imports a calibration from a binary file created with the EXPORT function

4.1 Create and edit calibrations



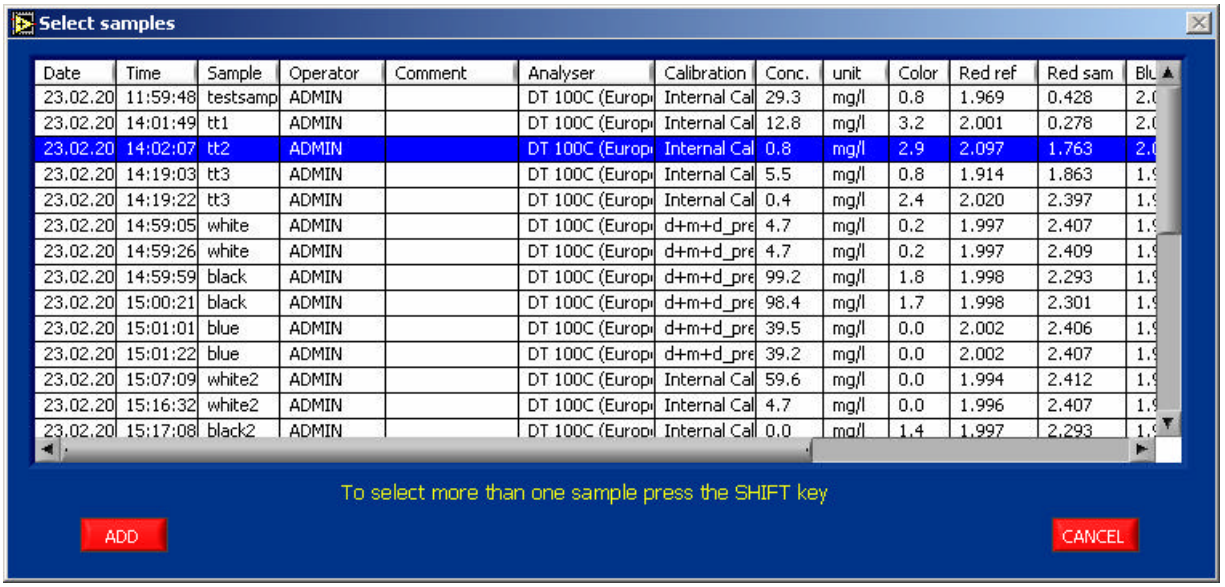
To create a calibration, first of all you have to analyse your calibration standards under "Internal calibration", giving every sample its own name to distinguish them later and follow these steps:

1) Enter a calibration name.
2) Select the calibration model you want to use:
   (C is the calculated concentration, R,G,B,L are the absorbances of red, green, blue and laser light, c1,c2,… are coefficients)

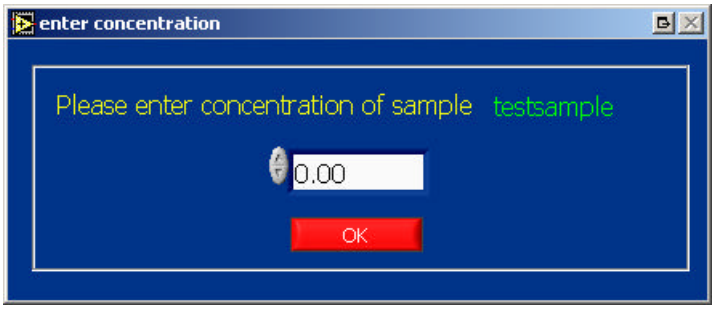
Calibration model	**Regression model**	**Number of coefficients**	**Used by**
Manual	C=c0+c1*R+c2*B+c3*G+c4*L+ c5*R*R+c6*B*B+c7*G*G+c8*L*L+ c9*R*B+c10*R*G+c11*R*L+ c12*B*G+ c13*B*L+c14*G*L	15	All coefficients must be entered manually on the bottom right side of the window.
1st order	C=c0+c1*R+c2*B+c3*G+c4*L	5	
2nd order	C=c0+c1*R+c2*B+c3*G+c4*L+	15	DT-100C

	c5*R*R+c6*B*B+c7*G*G+c8*L*L+ c9*R*B+c10*R*G+c11*R*L+ c12*B*G+ c13*B*L+c14*G*L		JT-100S
2nd order (no cross terms)	C=c0+c1*R+c2*B+c3*G+c4*L+ c5*R*R+c6*B*B+c7*G*G+c8*L*L	9	DT-100C-IS
DIN 51426	C=c0+c1*(G-R)	2	

3) Select the wavelengths you want to use for the calibration, by clicking into the boxes in front of "Red", "Blue", "Green" and "Laser"
4) Select the standards that should be used to calculate the calibration coefficients. All standards must have been measured and their results must have been saved to a spreadsheet file (manually or automatically if the "Append measured data to spreadsheet file automatically" button is pressed) as described in the previous chapter. Pressing the "Add" button shows the spreadsheet file and one or more samples that should be used as standards can be selected.



Leaving the window by pressing "ADD", prompts the user to enter the known concentrations of each selected sample.



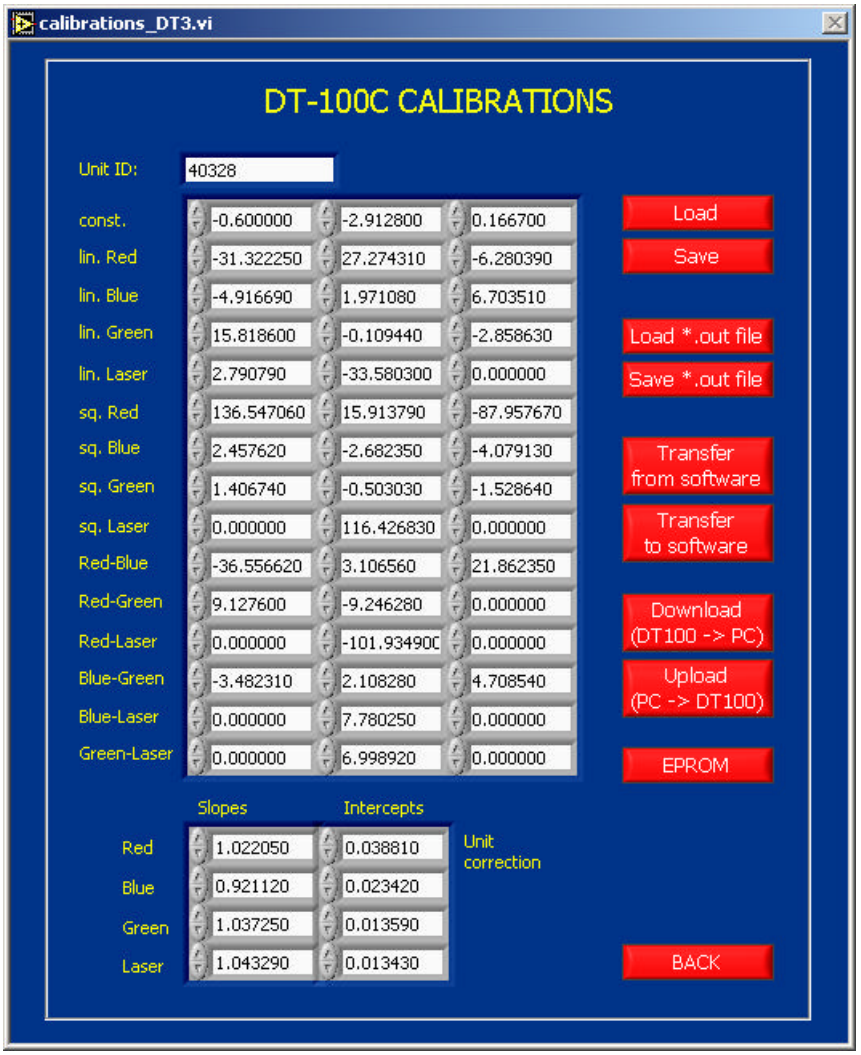
Note that the number of the used standards should be much greater than the number of the calibration coefficients of the used calibration model.
After all concentrations have been entered, the calibration coefficients are calculated automatically. If the calculation fails (most probably because of too few standards), the

"Least square fit status" indicator is red, otherwise it is green.
On the bottom left side of the window a graph shows the given concentrations versus the calculated concentrations and on the bottom right side of the window the calculated coefficients and the square root of the mean square error (Root of MSE) are shown.
By unselecting the "Use" field a standard can be excluded from the calculation of the coefficients. Selecting a standard and pressing the "REMOVE" button, removes it from the list.

Once one or more calibrations have been created, they can be used by selecting them in the "Calibration" drop down list of the main *DT/JT Commander* window. In this case the selected calibration together with the measured absorbances is used to calculate the concentration. Therefore the result will be different from the value shown on the display of the instrument.

5 Downloading and uploading calibrations

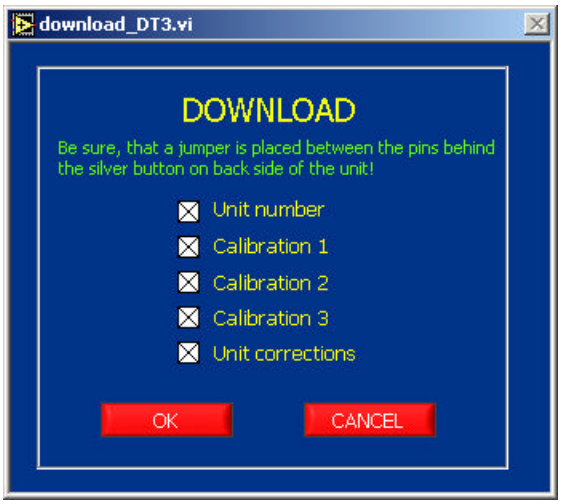
If the calibrations created with the *DT/JT Commander* software (see previous chapter) shall be used with the instrument but without the software, the calibration coefficients in the instruments EEPROM must be modified. This can be done with the *DT/JT Commander* software by pressing the "Transfer Calibrations" button on the main screen.



Note: Because the DT-100C, DT-100C-IS and JT-100S support different numbers of calibrations and use different calibration models, the screens will be look a little bit different dependent on the selected type of instrument.

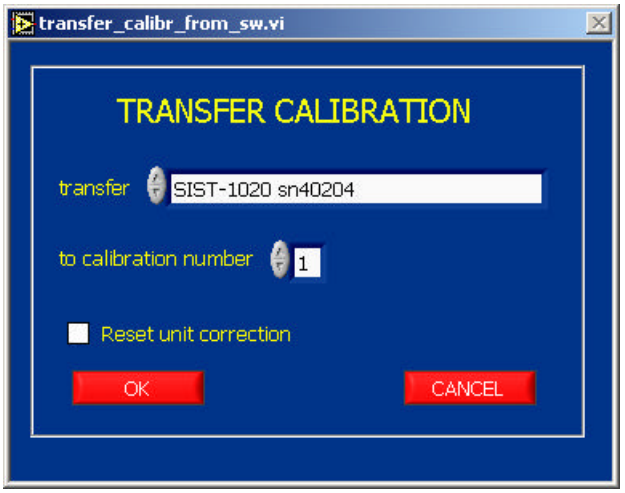
To transfer calibration data from the instrument to the PC or from the PC to the instrument, the instrument must be in calibration mode. If a jumper is placed between the two pins on the back side of the instrument and the instrument is switched on, it will be in calibration mode.

Before modifying any calibration of the instrument, they should be downloaded and saved. Press the "Download" button, select all items and press "OK". The unit ID, all calibrations and the unit corrections will be transferred to the PC and displayed.



Pressing the "Save" button saves all calibration data to a binary file that can be loaded later by pressing "Load". The "Save *.out file" and "Load *.out file" buttons do the same, but write and read ASCII files that are used by PETROSPEC. The advantage of the binary format is that the Unit ID, the calibrations and the unit corrections can be saved and loaded individually.

To transfer a calibration created with the *DT/JT Commander* software press the "Transfer from software" button and select the calibration you want to transfer and the number of the instruments calibration to which it should be transferred.

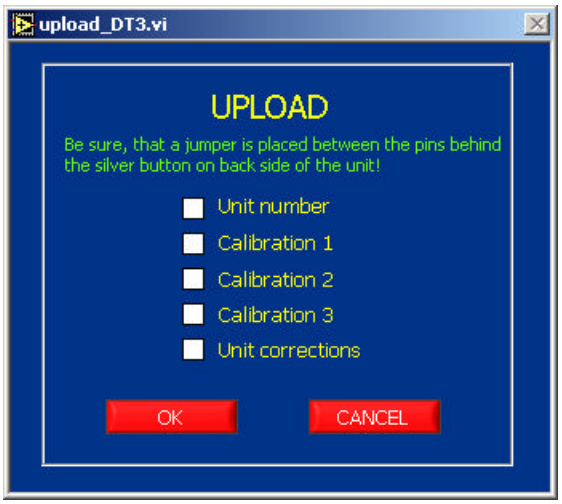


The "Reset unit correction" option should be used very carefully, because it sets the unit correction slopes to one and the unit correction intercepts to zero and therefore affects all calibrations!

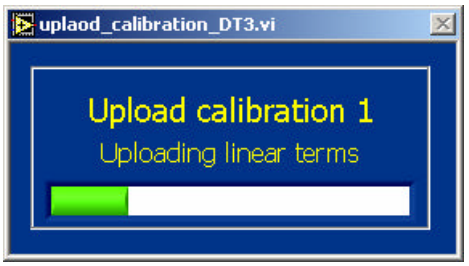
Calibrations can also be transferred into the other direction, that means from the instrument to the software, by pressing the "Transfer to software" button. In this case the number of the instruments calibration that shall be transferred and the name of the *DT/JT Commander* calibration to which it shall be transferred must be selected.

All calibration coefficients can also be edited manually.

To copy the unit ID, calibrations and unit corrections to the instruments EEPROM press the "Upload" button and select the items you want to transfer.



After pressing "OK" a window shows the progress of the upload.



After uploading the calibration do not forget to turn off the unit and REMOVE the jumper from the two pins on the back of the unit. Only DT-100C-IS model with 6 calibrations needs this jumper ALL TIME IN PLACE when working with *DT/JT Commander* software, to be able to send data to RS232.

Be aware that display on the DT100 will not be affected with the calibration transfer, what mean that you have to know witch calibration you have downloaded into the unit. It is advised that you write somewhere a name of the calibration for future use.

Every time you can press the F1 key for online help, where you will find short description of the actual screen and available menus.

ROFA PetroSpec

REPORT

Analyser: DT-100C (European Version)
Date: 29.12.2002 Time: 16:04:12
Sample ID: testsample
Operator: ADMIN
Comment:
Calibration: Internal Calibration [Red M465: (Solvent Red 26std.)]

Concentration: 44.2 mg/l
ASTM color: 2.4

	reference	sample	absorbance
Red	2.065	2.453	-0.075
Blue	2.007	1.292	0.191
Green	1.978	1.771	0.048
Laser	2.030	2.636	-0.114