

**D\_DSP**

1.20 Build 30926

**D\_SET**

1.20.00

**D\_TST**

1.00.09

**D\_DQC**

1.20.00

**Service Manual**

**CONFIDENTIAL**

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## 1 D\_DSP DISPENSER DRIVER

The **D\_DSP** dispenser software driver is designed to interface color-matching and formula book applications to an automatic dispenser.

**D\_DSP** is a Windows compatible GUI 32bit application and is accessed running [**D\_DSP.EXE**].

The driver takes care to handle all the machine low level communication, check and adjust the colorant levels, print labels and edit and correct formulations. In order to provide these services, **D\_DSP** must be configured to properly receive and parse formulas and to send feedback to the calling application about executed jobs and dispensed quantities.



### Associated files:

File	Type	Description
D_SET.CFG	Protected	Stores machine related colorant parameters and data (must be installed). This file is controlled by the D_SET utility.
D_SET.INI	ASCII	Stores program configuration parameters (must be installed).
D_DSP.CST	ASCII	Stores colorants' cost and currency information.
DISPENSER_TOT.CSV	StarCalc / Excel	Colorant consumption counter (generated automatically each time D_DSP is quitted).
[ FILE_IN ]	ASCII	Formula input file (generated by the color matching or formula book application). This file path and name is defined by the FILE_IN parameter contained in D_DSP.INI.
[ FILE_LOG ]	ASCII	LOG file (generated by D_DSP after each dispensing cycle). This file path and name is defined by the FILE_LOG parameter contained in D_DSP.INI.
DISPENSER_LOG.DBF	StarCalc / Excel	Dispenser history and log file. (generated automatically after each dispensing cycle).
LICENSE.TXT	ASCII	Contains the D_DSP and related utilities license agreement.
*.DLL	DLL	Application files used by D_DSP and related utilities.

All the above listed files must be installed in the same directory where **D\_DSP** is running. ASCII files containing **D\_DSP** configuration data ([**D\_DSP.INI**] and [**D\_DSP.CST**]) can be viewed and edited using any standard text editor or pressing the related **special key combination** while **D\_DSP** is running.

## 1.1. Special keys

To access specific functions and setup procedures, the application uses **special key combinations**. Many of these key combinations are not documented through the User's Manual and are reserved for maintenance personnel and setup technicians.

Key combination	Tab	Description
<b>F12</b>	All	Quits the application and returns to the OS.
<b>ALT + E</b>	All	Allows entering and editing the colorant costs. These values are stored in the <b>D_DSP.CST</b> file. This file can also be modified using a standard text editor.
<b>ALT + I</b>	All	Gives access to the configuration file <b>D_SET.INI</b> . This file can also be modified using a standard text editor.
<b>ALT + L</b>	All	Gives access to the dispenser LOG file as defined by the [FILE_LOG] parameter of the <b>D_SET.INI</b> file.
<b>ALT + Y</b>	All	Gives access to the formula input file as defined by the [FILE_IN] parameter of the <b>D_SET.INI</b> file.
<b>ALT + T</b>	All	Resets the dispenser consumption counter stored in the <b>D_SET.CFG</b> file and lately displayed in the <b>DISPENSER_TOT.CSV</b> file.
<b>\$</b>		Shows / hides the cost of the formula. The single colorant costs must be stored (see access key below) in the <b>D_DSP.CST</b> file.
<b>ALT + U</b>		Sequentially displays all the most important dispensing parameters: cc/ml = Formula in c.c. Grams = Formula in grams Steps = Formula in motor steps Level = Colorant level in the canister SG = Specific gravity of the colorant K1 = Calibration K1 K2 = Calibration K2 Adj. gr = Grams left to be dispensed Adj. stp = Steps left to be dispensed Pos. = Canister(s) position

## 1.2. File D\_SET.INI

This file contains essential configuration parameters for **D\_DSP**. The file parser detects the variable name at the beginning of each line and associates the value following the "=" character to the specific program parameter.

Is possible to associate to each line a comment or a note, adding the "//" string before the comment text. Is also possible, for better viewing, to insert empty lines to logically separate the different parameters.

Data in this file is NOT line number sensitive, line content is only define by the initial variable definition.

### File example:

D_DSP.INI	
POS_UNI = 1/32	//Default manual unit (1/32, 1/96, gr., cc, )
POS_FRA =32	//Ounce fraction
POS_ONZ = Y	//Ounce id. character
POS_UCC = 0.924063	//Shot volume in cc./ml. (0 = grams)
WHT_MAX = 2	//Max final weight tolerance
WHT_INI = 85	//Initial weight dispensing
TNK_MAX = 10	//Tanks positive weight tolerance
TNK_MIN = 10	//Tanks negative weight tolerance
COM_DSP = 2	//Dispenser COM Port (0 = None)
COM_SCA = 1	//Scale COM Port (0 = None)
COM_EXT = 5	//Tanks COM Port (0 = None)
DSP_LOG = d_dsp.log	//Log file path and name
DSP_OUT = C:\D_DSP\dromont.txt	//Formula file full path and name
RUN_TIT = d-pos formula manager	//Formula book app. title
RUN_SET = 0	//Show 0 = Window
	// 1 = Maximized
DSP_SET = 1	//Formula 0 = Prompt for import
	// 1 = Auto import
	// 2 = Auto dispense
DSP_RUN = 1	//Wait while dispensing 0 = OFF/default
	// 1 = ON
EDI_SET = 1	//Editor 0 = OFF
	// 1 = ON/default
MIX_SET = 1	//Purge/Mix 0 = OFF/default
	// 1 = Show keys
	// 2 = Warning
	// 3 = Forced purge
IMG_DIR = layout\gr	//Ext. images/lang. subdirectory
IMG_TX1 = 255.255.255	//D-POS Text color
IMG_TX2 = 128.123.255	//D-POS Light text color
PRN_SET = 2	//Label printer (0=OFF/default 1=POS 2=DSP)

This file **MUST** reside in the same folder/directory where the application is running.

To access the [INI] file, from the application main screen (this applies to both **D\_DSP** and **D\_POS**) press <ALT + I>. An editor window will appear to modify the configuration parameters.

Follows a list of the parameters recognized by the **D\_DSP** and **D\_POS** software packages:

<b>Parameter</b>	<b>Example</b>	<b>Default</b>	<b>Description</b>
POS_UNIT	<b>1/96</b>		This is the text string describing the unit used to dispense the formula. This string is used in different parts of the application to identify formula quantities. Typical dispensing units are: 1/48 <sup>th</sup> , 1/32 <sup>nd</sup> , 1/96 <sup>th</sup> 1/384 <sup>th</sup> , Ounces, Gr. and ml.
POS_FRA	<b>96</b>		This defines the number of shots contained in a fluid ounce (only when the dispenser unit is set in ounces and fractions). This parameter is not considered in formulas expressed in weight or milliliters.
POS_OZ	<b>Y</b>		This is the character used to identify fluid ounces in the formula.
POS_CC	<b>0.30802</b>		This is the volume of the dispensing unit expressed in cubic centimeters or milliliters. For formulas in grams or weight units, this parameter must be set to zero.
WHT_MAX	<b>1.2</b>		This is the target positive tolerance (%) to be reached during gravimetric dispensing of the formula from internal canisters. The dispenser performs sequential corrections until it reaches this tolerance window. This parameter is ignored during volumetric dispensing.
WHT_INI	<b>95</b>		This is the percentage of the recipe initially delivered during the gravimetric dispensing from internal canisters. Once this amount is delivered, the final correction is calculated on the base of the scale reading. This parameter is ignored during volumetric dispensing.
TNK_MAX	<b>1.0</b>		This is the target positive tolerance (%) to be reached during gravimetric dispensing of the formula from external tanks. The dispenser performs sequential corrections until it reaches this tolerance window.
TNK_MIN	<b>1.0</b>		This is the target negative tolerance (%) to be reached during gravimetric dispensing of the formula from external tanks. The dispenser performs sequential corrections until it reaches this tolerance window.
COM_DISP	<b>1</b>		This is the COM port where the dispenser (only internal circuits) is connected. Serial ports from COM1 to COM8 are supported. Setting this parameter to 0 (zero) disables all the internal dispenser functions.
COM_SCA	<b>2</b>		This is the COM port where the electronic scale is connected. Serial ports from COM1 to COM8 are supported. Setting this parameter to zero disables the scale communication and all the gravimetric dispensing functions.
COM_EXT	<b>5</b>		This is the COM port where the external tanks circuits is connected. Serial ports from COM1 to COM8 are supported. Setting this parameter to 0 (zero) disables all the external tanks dispenser functions.
DSP_LOG	<b>C:\ ...</b>		This is the full name and path of the file where <b>D_DSP</b> writes the dispensing <b>LOG</b> . Each time a formula is dispensed, modified or updated, this file is re-written with all the formula related information.

<b>Parameter</b>	<b>Example</b>	<b>Default</b>	<b>Description</b>
DSP_OUT	C:\ ...		This is the full name and path of the file where the calling program (formula book or color-matching software) writes the formula to be handled by <b>D_DSP</b> . The program cyclically search for changes in this file (polling) and updates the displayed dispensing data.
RUN_TIT	<b>D-POS – Formula Manager</b>		This is the name of the program that appear in the title bar of the window formula book application.
RUN_SET	<b>1</b>	<b>0</b>	When this parameter is set to 0, after dosing D_DSP remains in the back ground. When this parameter is set to 1, after dosing, D_DSP closes and the window of the formula book application will maximize.
DSP_SET	<b>2</b>		When this parameter is set to <b>1</b> , each time a new formula is stored in the <b>FILE_IN</b> file, the software automatically loads the recipe into the dispenser page. The default value of <b>0</b> forces the software to display an "Import" button to prompt the operator. This is especially useful in a network environment where the calling software is not running on the same computer where <b>D_DSP</b> resides. When this parameter is set to <b>2</b> each time a new formula is stored in the <b>FILE_IN</b> file, the software automatically doses the recipe selected by formula book application without confirmation.
DSP_RUN			When this parameter is set to <b>1</b> D_DSP wait while dispensing. No other function or program can be used. In this case the program communicates with the machine and every problem is showed immediately on the monitor When this parameter is set to <b>0</b> D_DSP disconnects to the machine immediately after the formula is sent. It's possible use every other function/program but every problem will be showed only when an other formula is sent to the machine.
EDIT_SET	<b>0</b>	<b>1</b>	When this parameter is set to zero the "Editor" tab is disabled. In this case the operator cannot modify the existing formula or add a new recipe.
MIX_SET	<b>1</b>	<b>0</b>	This parameter selects how the "Purge" and "Mix" buttons are displayed. When this parameter is set to zero the 2 buttons are disabled. To purge or mix the colorants the operator must use the green push-button located on the control panel of the dispenser. Set to 1, the 2 buttons are displayed in the "Colorant level" window of the application. Set to 2, each time <b>D_DSP</b> is launched, the software shows the "Purge" button forcing the operator to consider a "beginning of the day" purge cycle. Set to 3, a purge must be performed before accessing any other application function.
IMG_DIR	<b>layout</b>		Ext. images/lang. subdirectory.
IMG_TX1	<b>R,G,B</b>		D-POS RGB Text color
IMG_TX2	<b>R,G,B</b>		D-POS RGB Text color



Parameter	Example	Default	Description
PRN_SET	1	0	<p>When this parameter is set to 0, the "Print label" tab is disabled and the operator cannot print formula and personal data.</p> <p>When this parameter is set to 1 the "Print label" tab is enabled in D_POS application and the operator can print formula and personal data.</p> <p>When this parameter is set to 2 the "Print label" tab is enabled in D_DSP application and the operator can print formula and personal data.</p>

### 1.3. File [ FILE\_LOG ]

**D\_DSP** generates this file after each dispensing cycle. It can be accessed by the calling application to check for formula consistency and to control the number of dispensing cycles performed.

Data in this file is **line number sensitive**. Each parameter is always associated to a specific line number.

**File structure:**

Line	File content	Description
1	Time : 20020805113152	Timestamp
2	Prod : Latex Exterior	Product or brand description
3	Note : Semi-gloss	Note or brand description
4	Code : XYZ7023	Color code or number
5	Tot. : 3	Number of formulas delivered
6	Mode : VOLUME	Dispensing mode (vol., weight or combo)
7	Unit : 1/48	Formula unit (1/96, 1/48, cc, grams etc.)
8	C.C. : 0.6160	Unit cc (set to 0 for grams)
9	Base : NEUTRAL	Base description
10	Size : Quart	Size description
11	Dye1 : AX      0.863      0.860	Col. # 1 code + formula + last delivered
12	Dye2 : BX      2.943      2.940	Colorant # 2
13	Dye3 : CX      1.811      1.810	Colorant # 3
14	Dye4 : DX      9.883      9.890	Colorant # 4
15	Dye5 :            0.000      0.000	Colorant # 5 (in this case empty)
16	Dye6 :            0.000      0.000	Colorant # 6 (in this case empty)
17	Dye7 :            0.000      0.000	Colorant # 7 (in this case empty)
18	Dye8 :            0.000      0.000	Colorant # 8 (in this case empty)

## 1.4. Formula file

This file is generated by the application calling **D\_DSP** and contains the formula data to be dispensed. Typically the application is a color matching software or an electronic formula book.

In a **network environment**, the calling application, should place this file on the **local computer** where **D\_DSP** is running. This configuration will increase network efficiency as **D\_DSP** performs a systematic check of the INPUT file (polling). If the file resides in a different machine, the network must sustain the polling traffic with possible reduction of the driver and network speed.

Data in this file is **line number sensitive**. Each parameter is always associated to a specific line number.

*File structure:*

Line	File content	Description
1	<b>AX = 20</b>	Colorant # 1 code + quantity
2	<b>BX = 123</b>	Colorant # 2 code + quantity
3	<b>CX = 0.5</b>	Colorant # 3 code + quantity
4	<b>DX = 2 Y</b>	Colorant # 4 code + quantity
5	<b>EXX = 1 Y 44</b>	Colorant # 5 code + quantity
6	<b>FYY = 123</b>	Colorant # 6 code + quantity
7		Colorant # 7 code + quantity (empty in this case)
8		Colorant # 8 code + quantity (empty in this case)
9	<b>48</b>	Ounce fraction (set to 0 for grams)
10	<b>NEUTRAL</b>	Base code or number
11	<b>5 Gallon</b>	Size description
12		Line # 12 is <b>reserved</b> (product family)
13	<b>XYZ Corporation</b>	Note or brand description
14	<b>SUPER Latex Paint</b>	Product description
15	<b>555 BLUE VELVET</b>	Color reference
16		Line # 16 is <b>reserved</b> (barcode ID)
17	<b>12345678</b>	Color <b>RGB</b> values (R + G*256 + B*65536)

## 1.5. File Dispenser\_Tot.csv

This file contains information about the total colorant consumption from a given date. The starting date is set when the special key combination <ALT - T> is pressed in **D\_DSP**.

This file is automatically generated each time **D\_DSP** is quitted.

### *File example:*

```
Dispenser_Tot.csv
FT,10.340,Lt.,08/13/2002
HS,0.760,Lt.,08/13/2002
HS,0.000,Lt.,08/13/2002
LS,0.000,Lt.,08/13/2002
KS,0.000,Lt.,08/13/2002
MS,0.000,Lt.,08/13/2002
MT,0.000,Lt.,08/13/2002
PT,0.000,Lt.,08/13/2002
RS,0.000,Lt.,08/13/2002
RT,123.540,Lt.,08/13/2002
ST,0.000,Lt.,08/13/2002
TT,0.000,Lt.,08/13/2002
US,0.000,Lt.,08/13/2002
VT,0.000,Lt.,08/13/2002
XT,0.000,Lt.,08/13/2002
ZT,0.000,Lt.,08/13/2002
TANK1,2345.492,Lt.,08/13/2002
TANK6,0.000,Lt.,08/13/2002
FT,0.000,Lt.,08/13/2002
```

### *Line structure:*

**FT** (colorant), **10.340** (quantity), **Lt.** (unit), **08/13/2002** (count start)

## 1.6. File Dispenser\_Log.dbf

This file contains a complete history of the last 25,000 dispensing cycles. The standard DBF format grants compatibility with popular desktop applications.

The file is automatically generated and updated after the execution of each dispensing command.

### *File structure:*

<b>Field</b>	<b>Description</b>
<b>DATE</b>	Dispensing date
<b>TIME</b>	Dispensing time
<b>MODE</b>	Dispensing mode. V = Volume, G = Weight, C = Combo
<b>ERROR</b>	Dispenser error code. "NO" or full error description
<b>CODE # (1 to 8)</b>	Colorant reference
<b>SHOT # (1 to 8)</b>	Quantity in dispensing unit
<b>UNIT # (1 to 8)</b>	Quantity in grams (calculated from original unit)
<b>DONE # (1 to 8)</b>	Quantity really delivered (Weight mode only)
<b>PROD</b>	Product line description
<b>CODE</b>	Color code, name or reference
<b>BASE</b>	Base code, name or reference
<b>SIZE</b>	Base can size description
<b>NOTE</b>	Note or comments

## 2 D\_SET UTILITY

### WARNING!

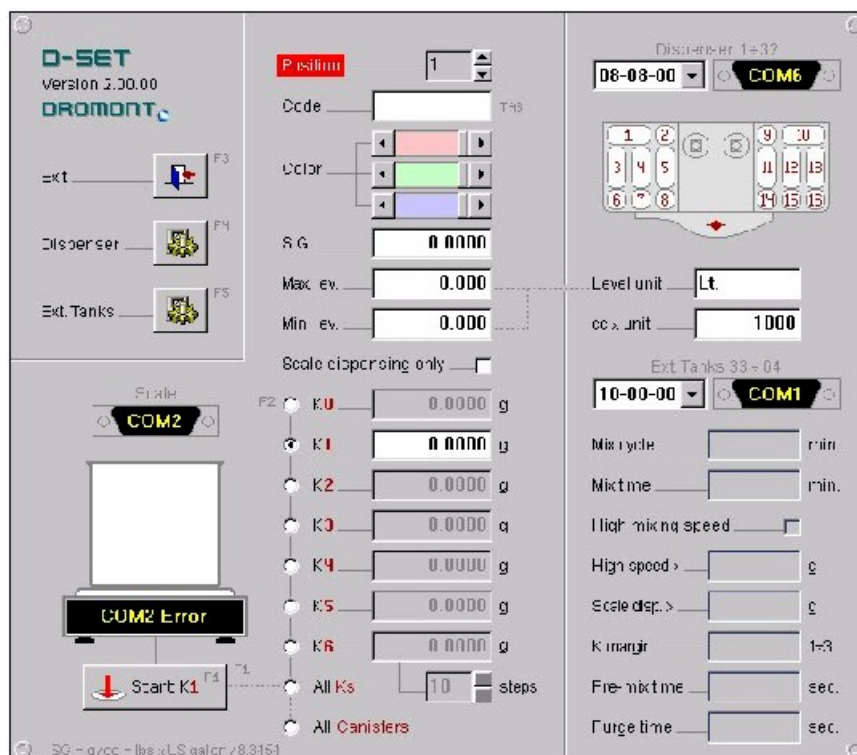
**D\_SET ALLOWS ACCESS TO THE DISPENSER'S BASIC OPERATING PARAMETERS.**

**IMPROPER USE WILL CAUSE THE MACHINE TO MALFUNCTION.**

**D\_SET** is one of the companion software package for the **Prima Colorant Dispensers**. The package provides utilities for color system configuration, machine calibration, usage tracking, and machine control.

**D\_SET** is intended for authorized service technicians and is used to assign identification codes and dispensing parameters to each canister ([**D\_SET.CFG**]). This information will be used by the dispenser driver software to identify canisters, adjust formulas, and monitor the colorant levels.

**D\_SET** is a Windows application and is accessed running the [**D\_SET.EXE**] file. The configuration file [**D\_SET.CFG**] must be installed in the same directory.



All service personnel using **D\_SET** must read and understand completely this Software Manual. This manual is an important part of the software package. It should be stored in a manner that will prevent unauthorized use of the software yet allow for reference when required.

All **D\_SET** functions are accessed through the main control screen.

Canisters are identified by an on-screen color display and a canister position number. Navigating through the different canister positions will force the color display and the entry fields to show the selected canister data.

All the buttons and entry fields of the application are accessible by mouse clicking and through control keys. The available keys are indicated on the main screen in the proximity of the associated function / field.

## 2.1. Buttons

On the main control screen 3 buttons are located in different parts of the window:



Quits **D\_SET** and returns to the operating system.



Accesses the machine setup function.



Accesses the machine setup function.



Activates the dispenser and delivers the Ks amount of colorant.

## 2.2. Level Unit

The upper part of the window is used to enter information about the level unit and volume to be used for colorant level control:



**Level unit** The unit of volume to be used for the canisters. Typically QT. (quarts), L. (liters), Gal. (gallons), etc.

**c.c. x unit** Volume in cc. (ml.) of the Level unit (Typically 946.24cc per quart, 1000cc per litre, etc.).

These values are entered once and are valid for all canisters.

## 2.3. Canister Position

### Position

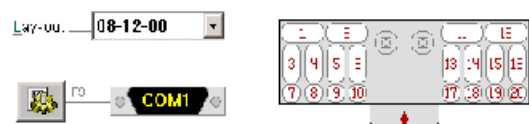
This control, located in the upper right part of the window, is used to select the specific canister position for data display and editing.



### Machine lay-out

A list of machine lay-outs is available in the upper right part of the screen. Selecting a specific lay-out will modify the way D\_DSP shows canister levels.

The dispenser COM port number is also displayed.



### Ext Tanks lay-out

A list of external tanks lay-outs is available in the upper right part of the screen under the dispenser lay out. Selecting a specific lay-out will modify the way D\_DSP shows canister levels.

The dispenser COM port number is also displayed.



## 2.4. Colorant Data Fields

The central lower part of the window is used to enter, modify, and retrieve colorant data:

**Code** Colorant code for each canister position. This field should be left blank for empty positions.

**Max. level** Maximum canister capacity. This level is indicated by the maximum number of **Level units** allowed. This maximum level is set by the manufacturer for each canister size.




**Min. level** Minimum canister operating capacity. This level is indicated by the minimum number of **Level units** allowed. This level is also set by the manufacturer to prevent running the pump dry. Dispensing is disabled when a formula will deplete the colorant supply below this level.

**High speed<sup>1</sup>** The quantity of colorant upper this value is dispensed at the high speed


**Scale disp<sup>1</sup>** The quantity of colorant upper this value is dispensed reading the scale (the program doesn't calculate the calibration parameter).

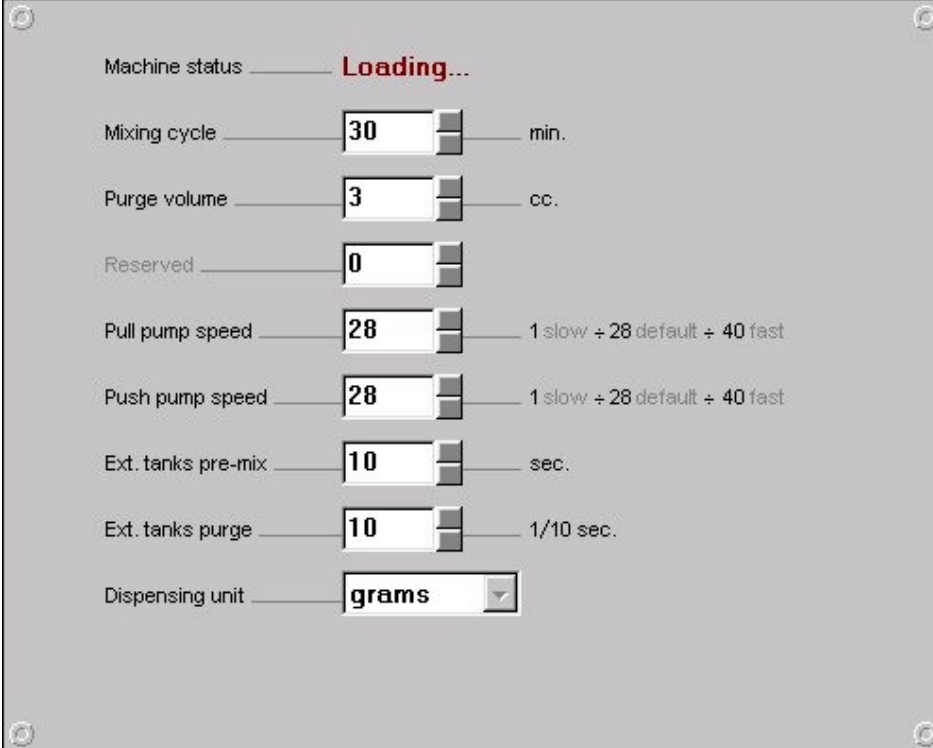
<sup>1</sup> Just for external tanks



- K margin<sup>1</sup>**  
**[1÷3]** For the external tanks. In every step the program dispenses a quantity of colorant equal to the Ks immediately lower to [quantity to be dispense]/[K margin].
- S.G.** Colorant's specific gravity (g./c.c.).
- Grav. only** Specifies if the colorant is forced to be dispensed only by weight. By default all colorants contained in external tanks are dispensed gravimetrically only.
- K0 - 6 g** These entry fields contain the weight in grams for the different calibration deliveries.  
For the internal canister K1 is the largest calibration volume while K6 is the smaller.  
For the external tanks K0 is the largest calibration volume while K6 is the smaller.  
The pump movement for K6 can be manually defined from 1 to 20 steps.
- K0 – 6** These radio buttons select the calibration delivery to be performed (pressing the  key). Individual deliveries can be enabled selecting K0 to K6.
- All Ks** This radio button enables D\_SET to perform a complete calibration of all the K values of the selected colorant (pressing the  key). The process is fully automatic and is performed only if an electronic scale is connected.
- All Colorants** This radio button enables D\_SET to perform a complete calibration of all the K values of all the colorants contained in the machine (pressing the  key). The process is fully automatic and is performed only if an electronic scale is connected.

## 2.5. Machine Setup

After pressing the  button a setup utility will appear on the screen :



Machine status **Loading...**

Mixing cycle  min.

Purge volume  cc.

Reserved

Pull pump speed  1 slow + 28 default + 40 fast

Push pump speed  1 slow + 28 default + 40 fast

Ext. tanks pre-mix  sec.

Ext. tanks purge  1/10 sec.

Dispensing unit

This utility is mainly used to set the parameter of the machine.

**Mixing cicle**            Mixing wait time of the dispenser (from 10 to 240 minutes)

**Purge volume**            Volume that will be dose in the purge (from 1 to 7cc)

**Pull pump speed**    pump speeds from 10 (slowest speed) to 40 highest speed.  
28 = Default

**Push pump speed**    pump speeds from 10 (slowest speed) to 40 highest speed.  
28 = Default

**Ext. Tanks Premix** Time in second to premix the colorant in the external tanks before

dispense the colorant.

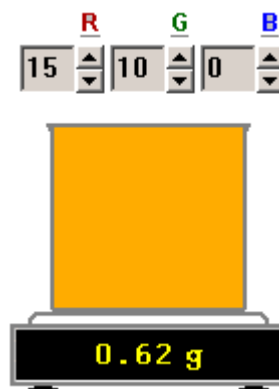
**Ext. Tanks Purge** Open time ON/OFF valve in 1/10 second to purge from the external tanks.

**Dispensing Unit** Unit used to dose by control panel

Individual parameters are retrieved from the dispenser (they reside in the dispenser embedded controller) and can then be modified and uploaded.

## 2.6. Colorant **RGB** Reference

A reference color can be assigned to each individual canister/colorant :



**R** Modify the **RED** (0 - 15) component value of the colorant RGB reference.

**G** Modify the **GREEN** (0 - 15) component value of the colorant RGB reference.

**B** Modify the **BLUE** (0 – 15) component value of the colorant RGB reference.

## 2.7. Quit D\_SET

After pressing the  button a confirmation window appears on the screen:



**Save**            Exit and save data.

**Abort**            Exit without saving data. All the modifications introduced will be lost.

**Cancel**            Return to **D\_SET** without quitting.

## 2.8. System Calibration

**D\_SET** provides a simple, user friendly calibration utility. The utility operates in manual or automatic modes. This chapter will provide a complete description of the recommended calibration procedure.

Calibration is accomplished by recording a set (K0 to K6) of delivery weights in grams. For the internal canisters the minimum requirement is to perform K1 (this is a large delivery that normally averages 2 ounces by volume) and K2 (this is approximately 1 to 2% of K1). The program uses this data and either the published or actual colorant weight to create the calibration profile.

An electronic digital scale with resolution to hundredths of a gram is recommended for this procedure.

**WARNING!**

**VERIFY SCALE COMPATIBILITY WITH D\_SET'S SOFTWARE DRIVERS.**

A digital scale equipped with an RS-232 (serial) interface may be used with the calibration utility in automatic mode. The scale read out will be displayed on-screen. When a dispensing cycle is completed, the measured or averaged weight can be transferred to the correspondent K field. The scale will be automatically zeroed before each delivery. These features are typical; however, each scale's capabilities and software protocol will determine functionality.



**Store**            Transfer the measured weight to the specific K field.

**Average**        Store an average between the measured weight and the weight presently recorded in the K field.

**Cancel**            Return without saving data.

When no scale is connected to D\_SET, the K weight can be entered using the correspondent K entry field.

## 2.9. Calibration Procedure


The following procedure is recommended for proper calibration of the automatic dispenser. Insure all calculations are correct and entered data is accurate.

**Step 1:**        Setup the scale for the procedure. The ideal situation places the scale on a stable platform under the nozzle with a small container to catch the colorant. For automatic operation, a serial cable is connected between the scale and the available PC serial port. Level and calibrate the scale as recommended by the manufacturer.


The COM port assignments for the dispenser and the electronic scale is the same as defined in the [D\_DSP.INI] file. (If this file is not available, default settings are COM1 for the dispenser and COM2 for the scale).

**IT IS RECOMMENDED THE COLORANTS BE WELL CONDITIONED AND THE NOZZLE PURGED BEFORE CALIBRATION.  
RUN THE MIX CYCLE TWO OR THREE TIMES BEFORE PROCEEDING.**

**Step 2:** Using the information provided by the colorant manufacturer, enter the **Specific gravity** (grams / c.c.) for the colorant(s) to be calibrated.


**Step 3:** In manual mode, insure the scale has been zeroed. Select **K1** for delivery and press the  to activate the dispenser.

In manual mode, type the weight (in grams) of the colorant dispensed into the **K1** entry field. In automatic mode, press **<Store>** to transfer the scale reading to the **K1** field. It is advisable to deliver a second **K1** amount to double check the weight.

**Step 4:** In manual mode, insure the scale has been zeroed. Select **K2** for delivery and press the  to activate the dispenser.

Enter the weight into the **K2** entry field. To correct minor dispensing variations, repeat the **K2** delivery several times. In manual mode, insert the first weight directly then calculate and insert the average of each subsequent amount. In automatic mode, press **<Store>** to insert the first weight directly then use the **<Average>** button to enter the average of each subsequent amount.

**Step 5:** In order to obtain an higher dispensing precision, additional K values can be added. **K0** deliveries roughly a tenth of K1. **K3** to **K6** delivery smaller colorant quantities. To perform each K calibration follow the same instructions as for step 4.

**Step 6:** Repeat this procedure for each colorant requiring calibration. When completed, press  and **<Store>** to exit the D\_SET. The configuration file ([D\_SET.CFG]) will be automatically updated.

## 2.10. Manual Calibration Procedure (without scale connected to the PC)


The following procedure is recommended for proper calibration of the automatic dispenser. Insure all calculations are correct and entered data is accurate.

**Step 1:** Setup a scale for the procedure. The ideal situation places the scale on a stable platform under the nozzle with a small container to catch the colorant.

**IT IS RECOMMENDED THE COLORANTS BE WELL CONDITIONED AND THE NOZZLE PURGED BEFORE CALIBRATION.  
RUN THE MIX CYCLE TWO OR THREE TIMES BEFORE PROCEEDING.**


**Step 2:** Using the information provided by the colorant manufacturer, enter the **Specific gravity** (grams / c.c.) for the colorant(s) to be calibrated in D\_SET.

**Step 3.1:** Ensure the scale has been zeroed.

**Step 3.2:** Click on the Radio button **K1** and start the dispensing by the button "Start **K1**"  to activate the dispenser.


**Step 3.3:** Read the weight dispensed and type it (in grams) in the field corresponding to **K1**. It is advisable to deliver a second **K1** amount to double check the weight

**Step 4.1:** Ensure the scale has been zeroed.

**Step 4.2:** Select the radio button **K2** for dispensing and press "Start **K2**"  to activate the dispenser.

**Step 4.3:** Enter the weight into the **K2** entry field. To correct minor dispensing variations, repeat the **K2** delivery some times and insert the average of the subsequent amount.

**Step 5:** In order to obtain an higher dispensing precision, additional K values can be added: **K0** deliveries roughly a tenth of K1. **K3** to **K6** delivery smaller colorant quantities. To perform each K calibration follow the same instructions as for step 4.1→4.3.

**Step 6:** Repeat this procedure for each colorant requiring calibration. When completed, press  and **<Store>** to exit the D\_SET. The configuration file ([D\_SET.CFG]) will be automatically updated.

**File CALIBRATION\_LOG.DBF**

Each time D\_SET is quitted saving data, colorant information is appended (1 colorant per record) to the [CALIBRATION\_LOG.DBF] file. This archive contains the chronological history (last 1,000 records) of the modifications introduced by D\_SET to the configuration file [D\_SET.CFG].

The file is automatically generated and handled by D\_SET. The standard DBF format grants compatibility with popular desktop applications.

*File structure:*

<i>Field</i>	<i>Description</i>
<b>DATE</b>	Calibration log date
<b>TIME</b>	Calibration log time
<b>CODE</b>	Colorant reference
<b>SG</b>	Colorant specific gravity
<b>CAL_K0</b>	K0 calibration weight in grams
<b>CAL_K1</b>	K1 calibration weight in grams
<b>CAL_K2</b>	K2 calibration weight in grams
<b>CAL_K3</b>	K3 calibration weight in grams
<b>CAL_K4</b>	K4 calibration weight in grams
<b>CAL_K5</b>	K5 calibration weight in grams
<b>CAL_K6</b>	K6 calibration weight in grams
<b>IDX_K6</b>	K6 calibration control in pump motor steps



### 3 D\_TST Utility

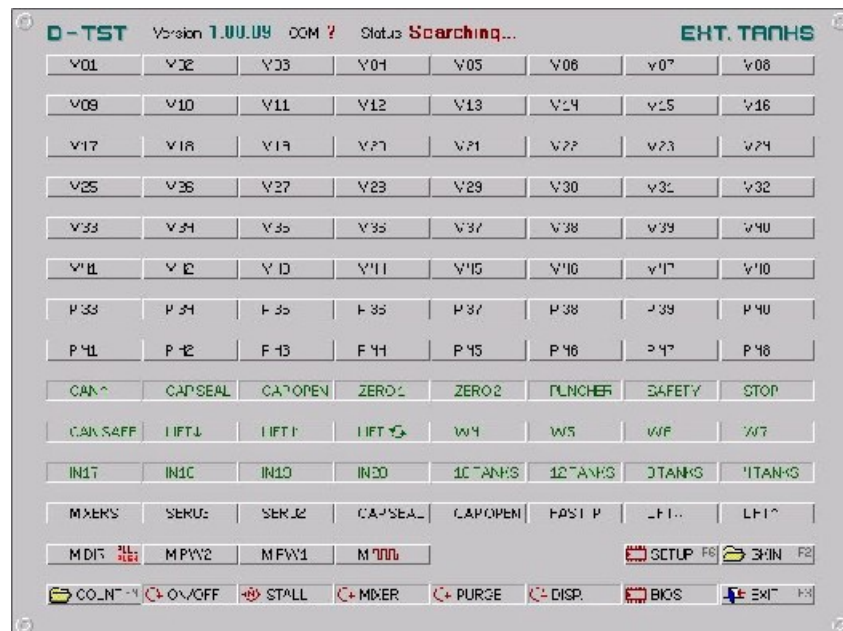
**D\_TST** is one of the companion software packages for the **Prima Colorant Dispensers** and provides utilities for machine testing.

This machine test utility is intended for authorized service technicians. The program provides the means to activate individual valves, run the stepping motors, and check switches and relays. Operation data is also recorded for use during service analysis.

**D\_TST** is a Windows application and is accessed running the [**D\_TST.EXE**] file.

As testing procedure for different machine configurations can vary, the application can be graphically customized using customized screen lay-outs. With this method only valid I/O signals can be visualized for a more user-friendly interaction with the utility.

Modified screenshot files must be installed in the same folder/directory where the application is running. The file must be named [**D\_TST\_\*\*\*\*\*.PNG**] (\*\*\*\*\* identifies a version/property designator) and must be saved in 16 or 256 colors PNG format (to avoid GIF license fees).



All service personnel using **D\_TST** must read and understand completely this Software Manual. This manual is an important part of the software package. It should be stored in a manner that will prevent unauthorized use of the software yet allow for reference when required.

**WARNING!**  
**D\_TST ALLOWS ACCESS TO THE DISPENSER'S BASIC OPERATING FUNCTIONS.**  
**IMPROPER USE WILL CAUSE THE MACHINE TO MALFUNCTION.**

### 3.1. Valve testing

In the first lines, located on the upper part of the screen, are the valve (colorant) circuit controls. From V01 to V32 are valves associated to machine internal canisters, from V33 to V40 are associated to external tanks valves, from P33 to P48 are associated to the external tanks agitators.



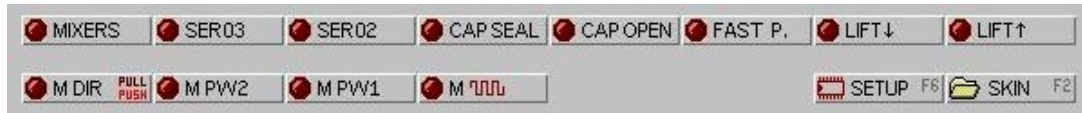
Each control consists of a button with the valve number. Press the button (or key) once to activate, press again to de-activate.

Each control displays the valve status. A grey LED indicates the valve is not activated (nozzle close). A red LED indicates the valve is activated (nozzle open). A gray LED indicates the control is not available.

Below each valve control a counter array is positioned. The program maintains a running total of valve activations for each circuit. Both dispensing and purge cycles are counted.

### 3.2. Motor testing

In the bottom side of the screen is the I/O test area.



Controls are provided for activating the motors and other motion devices. The following are few examples of usual controls:

- MIXERS            Activates all the stirring mixers attached to each canister.
  
- CAP OPEN        Activates (opening) the nozzle cap motor. Once the cap reaches a fully opened position the motor is automatically switched OFF.
  
- CAP SEAL        Activates (closing) the nozzle cap motor. Once the cap reaches a fully closed position the motor is automatically switched OFF.
  
- FAST P.          Activates Fast speed pumps activated
  
- LIFT ↑            Start lifter up
  
- LIFT ↓            Start lifter down
  
- M PW2            Pump motor #2 power control. This motor is usually installed only in machines with more than 16 pumps.
  
- M PW1            Pump motor #1 power control.
  
- M DIR            Pump motor direction. When pumps are pushing, the position switches will stop the motors in the lower position. This command is common to the all pump motors (PW1 and PW2). A lighted LED is associated to the pushing movement. The pumps are pulling if the LED is off.
  
- M STEPS          Starts a short pump movement. This command is common to the 2 pump motors (PW1 and PW2) and is only available when at least one of the motors is switched ON.

**WARNING!**

**SEVERAL I/O CONTROLS HAVE DIFFERENT PURPOSES IN  
DIFFERENT MACHINE CONFIGURATIONS.**

### 3.3. Input testing

In the central area of the screen the input components group is located. Green LEDs indicate the components are deactivated. Red LEDs indicate the components are activated. Gray LEDs indicated the component is not available.



The following are few examples of usual input components:

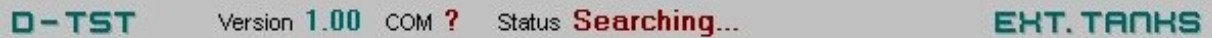
- CAN ↑** Can light detector or can positioning device.
- CAP SEAL** Cap closing limit switch or sensor. Stops the cap motor when the cap is completely closed.
- CAP OPEN** Cap opening limit switch or sensor. Stops the cap motor when the cap is completely opened.
- ZERO 2** Starting position switch for the pump assembly # 2 (17 or more canisters configuration). Stops the stepping motor when the pistons have discharged all the colorant from the pumps.
- ZERO 1** Starting position switch for the pump assembly # 1. Stops the stepping motor when the pistons have discharged all the colorant from the pumps.
- SAFETY** Interlock switches that disable machine operation when service or protection devices are removed.
- STOP** Front panel, red emergency push button that disables machine operation when pressed.
- CAN SAFE** Safety device of the elevator detected
- LIFT ↓** Stop switch down elevator detected
- LIFT ↑** Stop switch up elevator detected
- LIFT↓↑** Automatic elevator mode setted

<b>W4</b>	Jumper inserted in W4 on the mother board
<b>W5</b>	Jumper inserted in W5 on the mother board
<b>W6</b>	Jumper inserted in W6 on the mother board
<b>W7</b>	Jumper inserted in W7 on the mother board
<b>16 TANKS</b>	16 external tanks setted
<b>12 TANKS</b>	12 external tanks setted
<b>8 TANKS</b>	8 external tanks setted
<b>4 TANKS</b>	4 external tanks setted

**WARNING!**

**SEVERAL INPUT COMPONENTS HAVE DIFFERENT PURPOSES  
IN DIFFERENT MACHINE CONFIGURATIONS.**

### 3.4. Communication status



D-TST    Version 1.00    COM ?    Status Searching...    EXT. TANKS

**D\_TST** communicates with the dispenser via an RS-232 serial port, a lamp flashes while the test communication protocol is engaged. The communication status identifies the serial COM port (1 to 8) utilized and the status of the machine.

**D\_TST** automatically detects the machine COM port; this is a useful feature to help configuring the driving software during setup and installation.

In the status field the following information may be displayed:

**Searching...**    COM ports are scanned to establish connection with the dispenser.

**READY**    Communication is established and all devices are available for testing.

**MIXING**    The machine is mixing colorants (canister only).

**NO CAN**    The machine is waiting for a correct positioning of the base can.

**CAN ERROR**    The can has been removed during an operating cycle.

**BUSY**    The machine is occupied with another function.

**TEST**    The tester communication protocol is running.

**SAFETY\_X**    A safety interlock switch is open or a safety device is activated.

**STOP**    The emergency stop button is pressed.

**OFF**    The machine is not turned ON, the connection cable is not properly installed or the on-board computer is occupied with an internal function.

**STALL**    The program has detected an error from the motor control circuit.

### 3.5. Cycle counters

The last grouping in the tester screen, located in the lower part, provides counter data and machine controller information.







As mentioned, the machine maintains counters for each valve circuit to assist in analyzing failures. For the same reason, the program also counts the following functions and operations:

- ON/OFF**     Number of times the dispenser has been turned OFF and ON.
  
- STALL**     Number of motor stalls and malfunctioning registered.
  
- MIXER**     Number of mixing cycles performed, manual and automatic. When available the mixer waiting time is also displayed.
  
- PURGE**     Number of purge cycles performed. When available the purge volume is also displayed.
  
- DISP.**     Number of dispensing cycles performed. When available the machine canister configuration is also displayed.
  
- BIOS**     Firmware version number for the machine's on-board controller and date when all counters were set to zero.



### 3.6. Special keys

Special button/key controls are located along the bottom of the screen:

	Quits <b>D_TST</b> .
	Open <b>D_SET</b>
	Retrieves the tester counters from the dispenser.
	Resets all counters to zero. The counters should not be reset unless directed by the manufacturer. In the event a new part is installed, the current count is noted for future reference.

### 3.7. File **D\_TST.LOG**

Each time counters are retrieved from the machine (using the **Count** button), all the data is also stored in the [**D\_TST.LOG**] file.

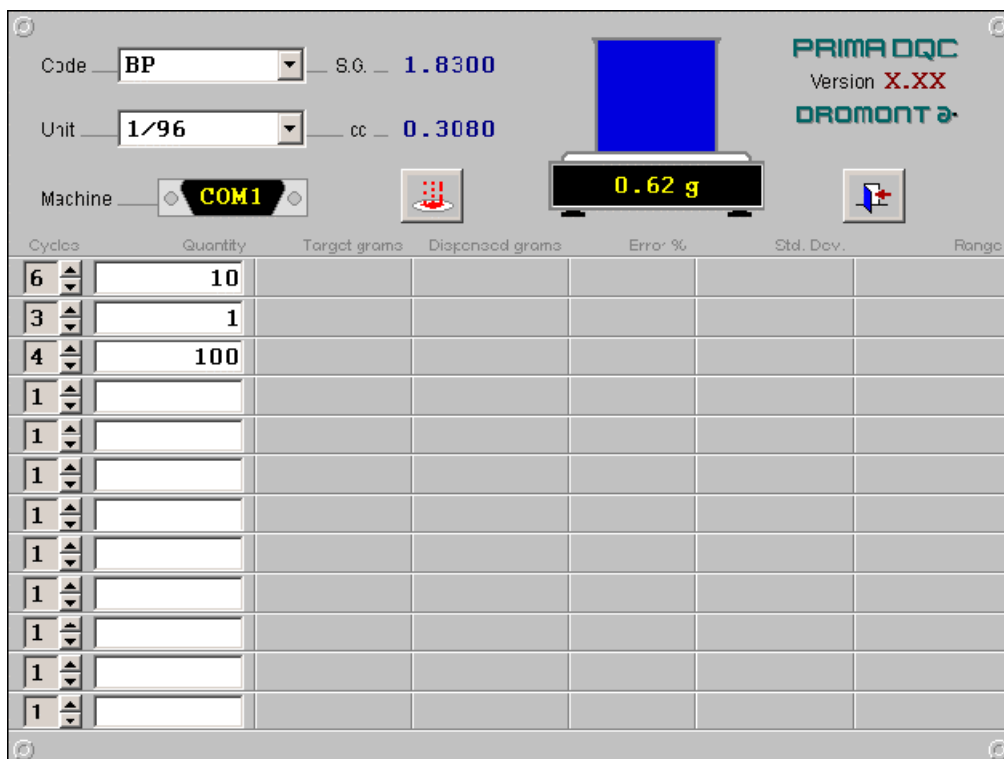
This is the typical internal structure of this file:

<i>Line</i>	<i>File content</i>	<i>Description</i>
1	<b>Ver. X.XX / YYMMDD -&gt; YYMMDD HH:MM:SS</b>	Firmware version / Last reset date -> Log date and time
2	<b>57</b>	Total machine ON/OFF cycles
3	<b>0</b>	Motor stall/error counter
4	<b>2876</b>	Total mixing cycles
5	<b>324</b>	Total purging cycles
6	<b>635</b>	Total dispensing cycles
7	<b>0</b>	<i>Reserved</i>
8	<b>0</b>	<i>Reserved</i>
9	<b>0</b>	<i>Reserved</i>
10	<b>186</b>	Total valve #1 activations
11	<b>94</b>	Total valve #2 activations
...		
40	<b>0</b>	Total valve #31 activations
41	<b>0</b>	Total valve #32 activations

## 4 D\_DQC Utility

**D\_DQC** is one of the companion software packages for the **Prima Colorant Dispensers**. The package is designed to provide control on the machine dispensing precision and repeatability.

**D\_DQC** is a Windows application and is accessed running the [**D\_DQC.EXE**] file (the colorant configuration file [**D\_SET.CFG**] must be installed in the same directory).



All service personnel using **D\_DQC** must read and understand completely this Software Manual. This manual is an important part of the software package. It should be stored in a manner that will prevent unauthorized use of the software yet allow for reference when required.

All **D\_DQC** functions are accessed through the main control screen.

Canisters are identified by an on-screen color display and a canister reference list. Navigating through the different canisters will force the color display and the entry fields to show the selected canister data.

## 4.1. Buttons

On the main control screen 2 buttons are located in the upper part of the window:



Quits **D\_DQC** and returns to the operating system.



Starts the dispensing cycle and delivers the selected amount of colorant.

## 4.2. Dispensing Control Procedure

The following procedure is recommended for proper control of the automatic dispenser precision and repeatability.

**Step 1:** Setup the scale for the procedure. The ideal situation places the scale on a stable platform under the nozzle with a container dimensioned to catch all the colorant. The serial cable must be connected between the scale and the available PC serial port. Level and calibrate the scale as recommended by the manufacturer.

The COM port assignments for the dispenser and the electronic scale is the same as defined in the [D\_DSP.INI] file. (If this file is not available, default settings are COM1 for the dispenser and COM2 for the scale).


**IT IS RECOMMENDED THE COLORANTS BE WELL  
CONDITIONED AND THE NOZZLE PURGED BEFORE  
DISPENSING.  
RUN THE MIX CYCLE TWO OR THREE TIMES BEFORE  
PROCEEDING.**

**Step 2:** Select the colorant to be dispensed from the reference list. The colorant specific gravity is automatically displayed. A color reference is also displayed on the can icon above the scale.

**Step 3:** Select the dispensing unit to be used to define each delivering quantity. The correspondent volume in cc (milliliters) is displayed automatically. For quantities in grams, this cc value is not available.

**Step 4:** Insert in the "Quantity" field the amount of colorant to dispense. Up to 12 different quantities can be inserted. Leave this field blank for a lesser number of dispensing cycles.

**Step 5:** Select the number of dispensing "Cycles" for the inserted quantity (number of times, from 1 to 9, the specific quantity will be delivered).

**Step 6:** When all the quantities will be correctly entered, press the  button to start the dispensing cycles.

The machine will sequentially dispense each inserted quantity and the correspondent data fields (target grams, dispensed grams, error %, std.dev., range) will be automatically updated. At the end of the cycle all the application LOG files will be updated.

It's possible to stop the dispensing cycle at any time pressing the Emergency Stop button located on the control panel of the dispensing unit.

Dispensing unit, quantities and cycles numbers are stored by the application for future operation. Next time D\_DQC is run, the last configuration is automatically applied.

#### File CONTROL\_LOG.DBF

Each time D\_DQC performs a dispensing cycle, result information is appended (1 colorant per record) to the [CONTROL\_LOG.DBF] file. This archive contains the chronological history (last 1,000 records) of the dispensing cycles performed by D\_DQC.

The file is automatically generated and handled by D\_DQC. The standard DBF format grants compatibility with popular desktop applications.

*File structure:*

<i>Field</i>	<i>Description</i>
<b>DATE</b>	Dispensing log date
<b>TIME</b>	Dispensing log time
<b>CODE</b>	Colorant reference
<b>SG</b>	Colorant specific gravity
<b>UNIT</b>	Volume in cc of the dispensing unit (set to 0 for grams)
<b>STATUS</b>	Dispenser report field
<b>CYCLES</b>	Number of times the specific quantity has been dispensed
<b>VALUE</b>	Quantity of colorant to be dispensed in selected units
<b>TARGET</b>	Quantity of colorant to be dispensed in grams
<b>RESULT</b>	Average weight of colorant really dispensed
<b>ERROR</b>	Difference (%) between target and real result
<b>STDEV</b>	Statistical standard deviation of dispensed data
<b>RANGE</b>	Statistical range of dispensed data

### **4.3. File D\_DQC.LOG**

As for [CONTROL\_LOG.DB] file, each time D\_DQC performs a dispensing cycle, the same result information is also stored in the [D\_DQC.LOG] file. This text archive contains only data related to the last dispensing cycle.

The file is automatically generated and handled by D\_DQC. The standard ASCII format grants easy access to the application result data.

*File example:*

D\_DQC.LOG

Date = YYYY.MM.DD  
Time = HH:MM:SS  
Colorant = BP  
Specific gravity = 1.8300  
Dispensing unit = 1/96 / 0.3080 cc

Status = OK  
Cycles = 6  
Value = 10.0000  
Target (g) = 5.6364  
Result (g) = 5.6412  
Error % = 0.0852  
Std. Dev. = 0.0067  
Range = 0.1200

Status = OK  
Cycles = 3  
Value = 1.0000  
Target (g) = 0.5636  
...

