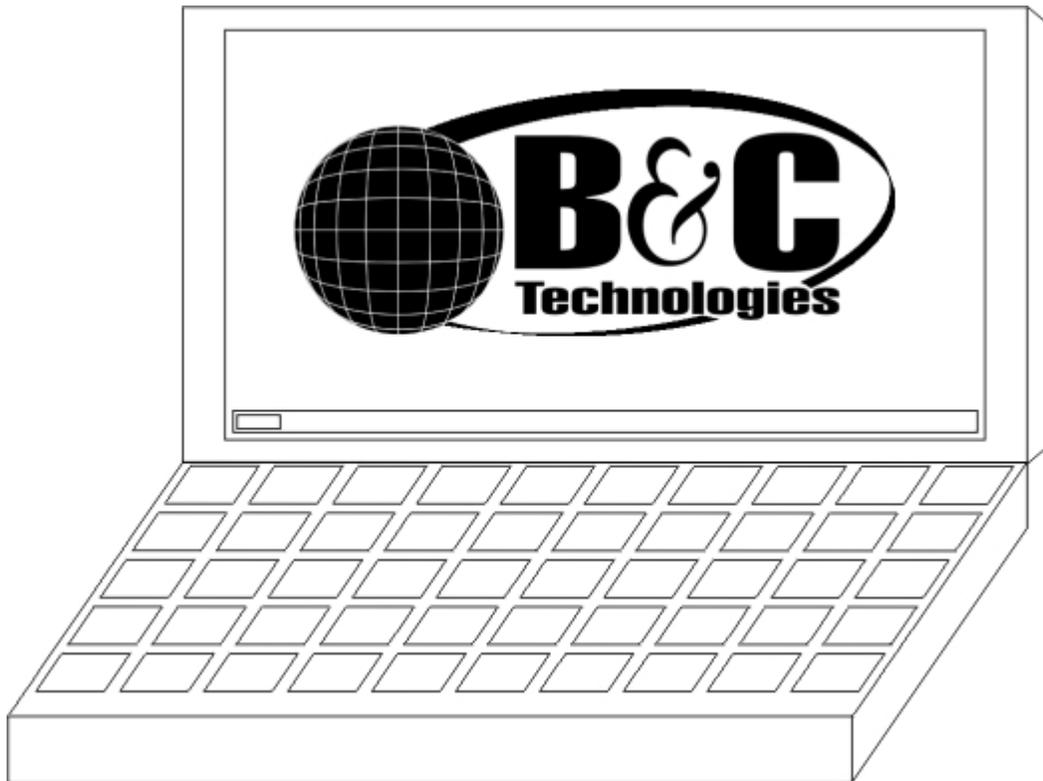


# EL6 Win 2 Programming Guide

Washer-Extractor

Feb 2, 2017

Revision 1.3



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# Chapter 1

## Introduction

### 1.1 Download the WashTools™ Programming App



Figure 1.1: The WashTools(TM) App

B&C Technologies launched the **WashTools™** Android Programming App in 2019. Able to quickly and easily program any FM7 equipped B&C washer, the app can be freely downloaded from the Google Play Store. Simply scan the QR code above to be taken directly to the download page, or search the Play Store for the **WashTools™** App.

### 1.2 A Note about the FM7

The EL6 Win 2 software is fully compatible with the FM7 control, launched in the summer of 2015 by B&C Technologies. However, the FM7 communicates using Bluetooth rather than using a serial connection. Please refer to the Bluetooth Assistant software and the associated manual, available for download on Service page of the B&C Technologies website, <http://bandctech.com/service.php>, for more details on the communication method and how to transfer programs to the FM7.

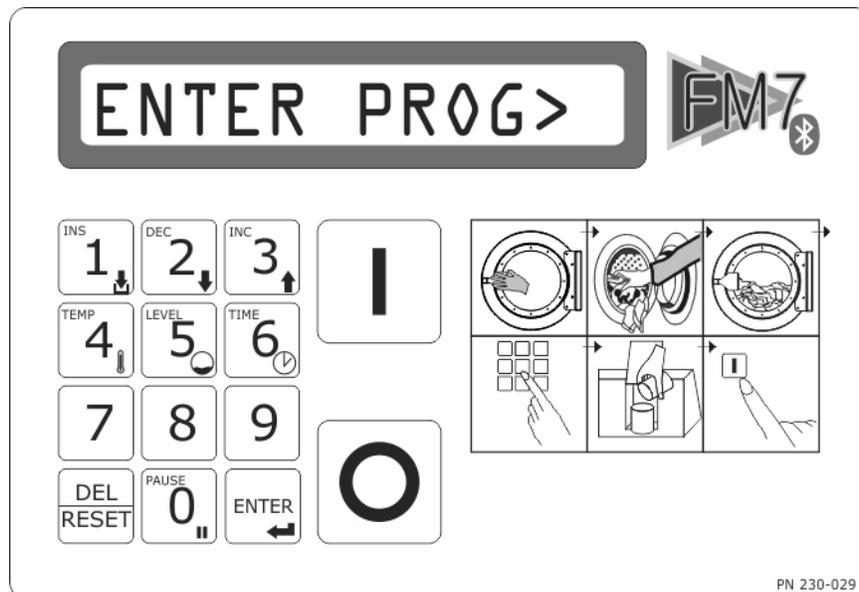


Figure 1.2: The FM7 Control

### 1.3 Guide to Successful Programming

Before beginning to program, make sure you read through this document to better understand the capabilities of the EL6/FM7. The EL6/FM7 is a very flexible controller, but you can get into trouble if you don't fully understand what is happening in the programming.

All B&C Washer-Extractors come programmed with a set of wash programs. Refer to the EL6/FM7 stock program list for complete details. The preprogrammed formulas will form the basis for your custom programs, so it is important to get to know them.

One important note, Programs are made up of Cycles, and Cycles are made up of Steps. There are five different Cycles:

- Prewash
- Wash
- Rinse
- Spin
- Unroll

Each of these cycles is made up of Steps, which control what actually happens during the wash program. Things like water valves, chemical signals, wash speed, etc. are all controlled in the steps.

In order to successfully program the machine, you'll need these things:

- Laptop

- Null Modem Cable (B&C p/n 141-100)
- USB Serial Adapter (B&C p/n 141-102)
- A copy of this guide

The EL6/FM7 software will work on any Windows based PC running Windows 98, Windows 2000, Windows XP, Windows Vista, Windows 7, Windows 8, or Windows 10. If your laptop already has a serial port (see figure 1.3 on page 3), you won't need the USB-Serial Adapter. In this case, you can plug the null modem cable directly from the laptop to the control. Any new laptop likely does NOT have a serial port. The connection is this:

**Laptop ⇒ Null Modem Cable ⇒ EL6 control**

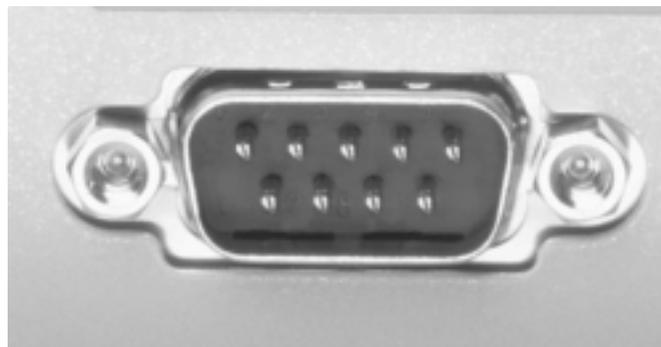


Figure 1.3: Laptop Serial Port

If your laptop is not equipped with a serial port, you'll need to use both the USB-serial adapter and the Null Modem adapter. If you don't use both parts, it will never work. In this case, the connection is this:

**Laptop ⇒ USB-Serial Adapter ⇒ Null Modem Cable ⇒ EL6 control**

## 1.4 Calling for Help

Make sure you've checked the stupid stuff:

- Do you have the proper cabling?
- If using the USB-Serial Adapter, is the driver installed?
- Check the information area for programing errors (red circles with bombs).

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# Chapter 2

## Guide to Successful Communication

### 2.1 Requirements

This section provides instructions on the EL6/FM7 Windows programming software. This section is not a tutorial on writing wash programs, but information on transferring custom programs from a laptop computer to the EL6/FM7 control. Please note that computer refers to your laptop and control refers to the EL6/FM7 control on the washer-extractor. Also note that "click" means **left click** and right click means (surprise!) **right click**. Typically, left click performs an action or selects something, while a right click brings up a context menu. Also note that "double click" means a **double left click**. A double right click will do nothing useful.

Requirements:

1. Windows computer running Windows 98 or higher (Windows 2000, or Windows XP. Windows Vista/7/8/10 will work if you have a compatible USB-serial adapter with proper drivers.).
2. Available serial port (or USB to Serial adapter, p/n 141-102, or Radio Shack 26-949 or similar)
3. Null modem adapter (p/n 141-100, or Radio Shack 26-264 or similar)

#### **A Note about USB-Serial Adapters**

All USB-Serial adapters are not created equally! Some simply will not work for serial communications, which is how the EL6 "talks" to the laptop and vice versa. The USB-Serial adapter sold by B&C Technologies is guaranteed to be compatible with the EL6. It has been tested and field proved for over 15 years. B&C Technologies can make no guarantee that the USB-Serial adapter purchased from *Computerz-R-Us* or any other vendor will work properly. There are literally **hundreds** of different USB-Serial adapters on the market, and it is impossible to test them all. If you want the guarantee of successful operation, purchase the USB-Serial adapter from B&C Technologies - the price is likely less than the big box stores.

## 2.2 Transferring from the Computer to the EL6

1. Install the EL6 Win 2 programming software - download from the Service page of the B&C website (<http://www.bandctech.com>). Installing the software will also install the factory wash programs.
2. Before plugging the adapter into your computer, install the USB to Serial Adapter software, if required. If your computer has a serial port, you do not need the USB to Serial Adapter. Please skip to step 4. To continue:
  - (a) Insert the CD that came with the adapter into your drive.
  - (b) Navigate to your CD drive and go to USBRS232 (Last item in the folder), then Windows, then double click on Setup. This will install the software for the USB to Serial Adapter. Follow the instructions to install. This is a typical driver install - yours may be different.
3. Plug in the USB to Serial Adapter. The found new hardware dialog box will appear, and the USB to Serial Adapter will be ready to use.

4. In order for your computer to communicate with the EL6/FM7 control, you must set up the EL6/FM7 software to communicate on the correct serial port. To determine which serial port your computer is using:

Windows XP and earlier: Start ⇒ Control Panel ⇒ System ⇒ Hardware (tab at the top) ⇒ Device Manager. Click the "+" next to Ports to expand the view.

Windows 7: Start ⇒ Control Panel ⇒ System and Security ⇒ Device Manager. Click the "+" next to Ports to expand the view.

Windows 8 and later: Press the Windows key (between the Ctrl and Alt keys on your keyboard) and the X key together ⇒ Control Panel ⇒ System and Security ⇒ Device Manager. Click the "+" next to Ports to expand the view.

See figure 2.1 on page 7. The port used for communication is COM1. If the communication port name doesn't show up, right click on the Communications port, then click Properties, then click the Port Settings tab, then click on the Advanced button. See figure 2.2 on page 7.

The COM Port must be COM1, COM2, COM3, or COM4. Use the pull down box to change the value of the COM Port Number to 1, 2, 3, or 4, then click OK. Do not pick a COM port that is in use.

5. Start the EL6 Win 2 software (Start ⇒ Programs ⇒ EL6/FM7 Win 2 ⇒ EL6/FM7 Win 2). On the top menu, click Communication, then Com Setup. The dialog box shown in figure 2.3 on page 7 appears.

Make sure the COM Port selected matches the COM port shown in the device manager. Also, move the slide bars over so that the Send and Receive timeouts are set to 1000msec.

6. Open the EL6 Win 2 software and create/modify the wash program you wish to transfer to the machine. Please note that programs are designed to work with particular machines. For example, you cannot download SP-65 programs into an HP-125 or any other machine. Water levels, speeds, and timeouts will be incorrect and may cause dangerous operation. Always test your programs before putting them into production!

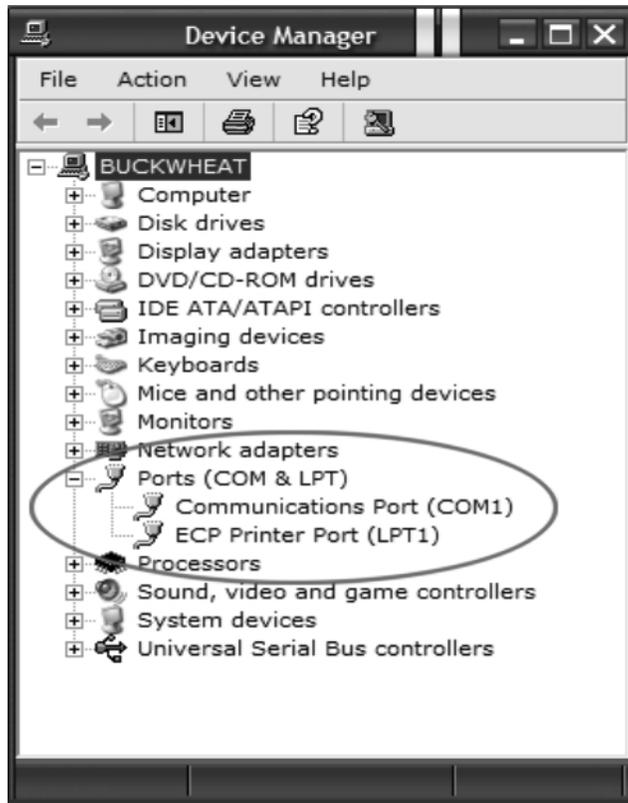


Figure 2.1: Device Manager View

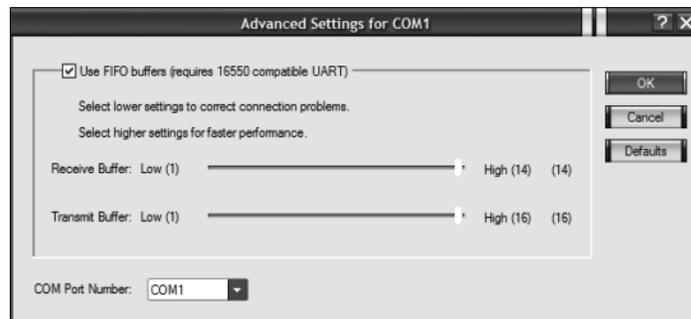


Figure 2.2: Advanced Port Settings Menu

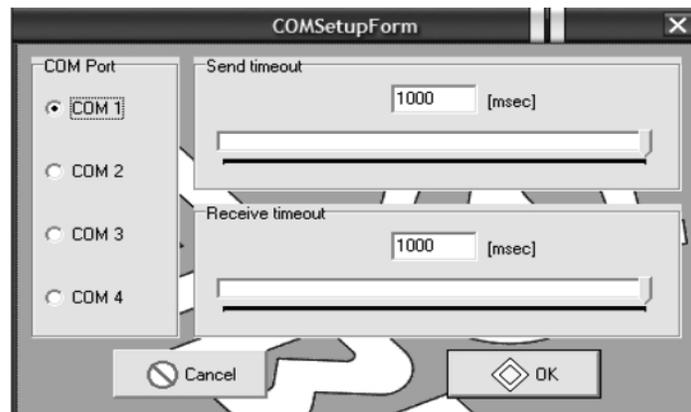


Figure 2.3: Communications Port Settings

7. Press the red emergency stop button on the front of the machine to turn off power to the control.
8. Connect the Null Modem cable (B&C Part number 141-100) between the EL6 and your computer (if you have a serial port) or to the USB to Serial adapter attached to your computer (if you don't have a serial port). If you are using the USB-Serial adapter, you *MUST ALSO USE THE NULL MODEM CABLE*.
9. Open the wash program you wish to download to the EL6.
10. Release the emergency stop button. After the self test, the EL6 display will change to PROGRAM N.
11. On the EL6, press the START and RESET keys together. The EL6 display will change to n?
12. On the EL6, press 1, then 4, then 4 again. The display will show an asterisk (\*) for each number entered.
13. Timing is critical for this step. Press Enter on the EL6 keypad - the display on the EL6 will change to RS232. As soon as the display on the EL6 changes to RS232, click the red down arrow in the EL6 software on your computer or press Ctrl-D on your computer's keyboard.
14. While the program is transferring to the EL6, the EL6 display will show COMPUTER ⇒ EL6 indicating that a program transfer is taking place. The laptop display will show a graphic of a computer attached to washing machine. The lower right information will remind you to press 144. If a red icon appears in this information box, the transfer will not start. The red icon indicates a problem with the program, and tells you exactly what the problem is. These problems must be corrected before the program can be saved to computer or transferred to the EL6.

## 2.3 Transferring from the EL6 to the Computer

The transfer from the EL6 to the laptop is called uploading. To upload from the EL6 to the laptop:

1. Follow steps 1 through 10 in the previous section.
2. Click the red up arrow in the EL6 Software on your computer or press Ctrl-U on your computer's keyboard. The dialog box shown in figure 2.4 on page 9 appears.
3. Ensure that the All SP, HP, SI button is selected on the left, and 24 is selected on the right.
4. Press the START and RESET keys together. The EL6 display will change to "'n?'"
5. Press 1, then 4, then 4 again. The display will show an asterisk (\*) for each number entered.
6. Press Enter on the EL6 keypad. When the display changes to RS232, click on the OK button in the dialog box on your laptop.

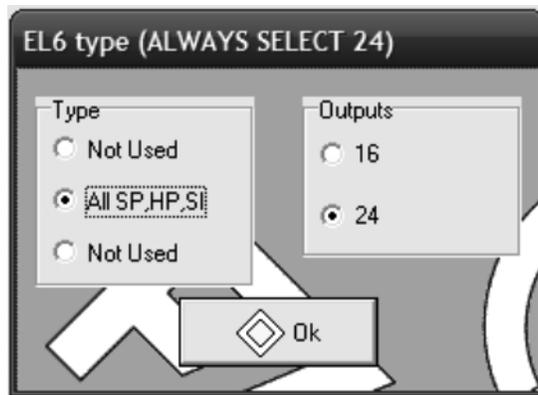


Figure 2.4: Selecting the EL6 Type

7. While the program is transferring from the EL6, the EL6 display will show EL6 ⇒ COMPUTER indicating that a program transfer is taking place. The laptop display will show a graphic of a computer attached to washing machine. The lower right information will remind you to press 144. When the transfer is complete, you will see the program set on your laptop display.

After you have uploaded the wash programs from the EL6, make sure to save the program set before modifying them. That way there is a known good backup in case of problems. Use the File — Save as command described previously. The easiest place to store the file is the Desktop. Of course, the EL6 file can be placed anywhere on the computer – Don't forget where it was saved!

## 2.4 Troubleshooting

1. You must use a null modem cable. An RS-232 extension cable will not work! If you are going to purchase your cable from a computer retailer, make sure you get a NULL MODEM cable or a NULL MODEM adapter.
2. Make sure that no other software is using the COM port that you are attempting to use with the EL6 control. If you have a PDA, or other software, such as Soap Pump control software, you may have problems. Make sure that no programs are running that use the serial port, except the EL6 Win 2 software.
3. If your computer has a COM port, but it doesn't show up in the Device Manager, it may be disabled in the BIOS of your computer to save battery power. It is beyond the scope of this document to re-enable your serial port. Refer to your computer manual or to a qualified computer technician.

# Chapter 3

## EL6 Win 2 Introduction

Figure 3.1 on page 11 shows a typical screen view. The EL6 window area is divided into the following panels:

- The section at the top left displays the list of programs and their associated cycles.
- The section below (resizable) displays the service information
- The section at the top middle displays the cycles grouped into the five categories
- The section below (resizable) displays the motor modes
- The right top section displays the list of steps associated with the cycle currently selected (Prewash 1 in the example)
- The section below reports diagnostic information associated with the particular operation: sending or receiving, importing, opening and closing files.
- The status bar at the bottom displays the currently selected language file.

All the areas are resizable for adapting to the editing needs and to the screen resolution. For example if motor modes are already configured, and if it is necessary to work on cycles, area dedicated to motor modes can be shrunk.

When one or more areas are resized the new size become the default. That means that new files or next time the program runs, the EL6 Win 2 will recall the last used sizes.

### 3.1 Menu Commands

Here is the list of available menu commands:

- File — New  $\implies$  New file creation
- File — Open  $\implies$  Open a existing file

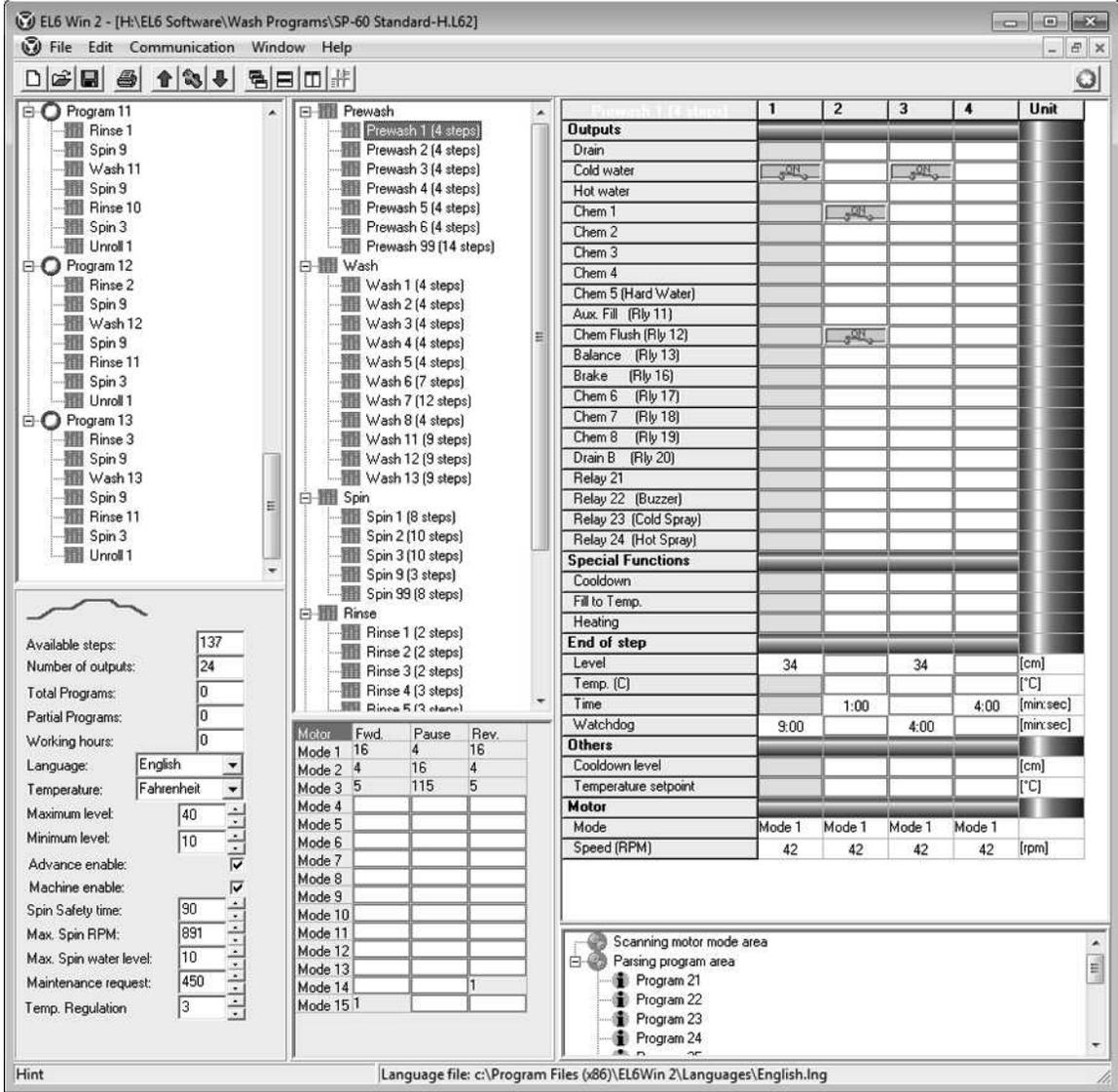


Figure 3.1: EL6 Main Program Window

- File — Save  $\implies$  Save current window content into a file using the current file name
- File — Save as  $\implies$  Save current window content into a file allowing to set the name
- File — Print  $\implies$  Print the current window content
- File — Open language  $\implies$  Open a language file
- File — Import .EL6 format  $\implies$  Import the previous version file format
- File — Exit  $\implies$  Quit EL6 Win 2
- Communication — Upload  $\implies$  Upload configuration from a connected EL6 device
- Communication — Download  $\implies$  Download current file to a connected EL6 device
- Communication — Com setup  $\implies$  Setup for communication with an EL6 device
- Commands for windows handling
  - Window — Cascade
  - Window — Horizontal tile
  - Window — Vertical tile
  - Window — Minimize all
  - Window — Arrange
- Help — About  $\implies$  Displays program version information

### 3.1.1 Additional Details About Selected Commands

#### File — New

This menu allows the creation of a new file. When executed, the program opens the window shown in figure 3.2 on page 13. This is used to determine the EL6 type. Always select All SP,HPSI on the left, and 24 on the right. It is unlikely that this command will be used - it is very difficult to start from scratch and build a working set of programs. It is always best to begin using the stock programs of the machine in question. For example, if building a set of custom programs for an SP-60, begin with the stock programs. The stock programs are automatically installed during the EL6 Win 2 software installation and can be found in:

*C : \ProgramFiles\EL6Win2\WashPrograms\*

or, for the 64 bit version of Windows:

*C : \ProgramFiles(x86)\EL6Win2\WashPrograms\*

#### File — Import .EL6 format

This menu command allows the opening of a file created using the previous program version. When this command is executed, the following window shown in figure 3.3 on page 13 opens.

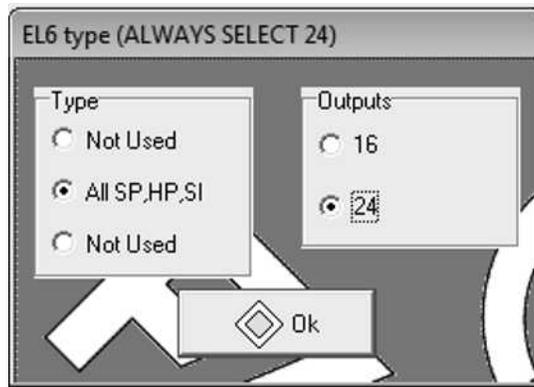


Figure 3.2: EL6 New Formula Dialog Box

Always select the middle button, EL6 Inverter for B&C Technologies machines. Once the file is imported, it can be modified and handled normally. When saved, the file will be saved in the new .L62 format.

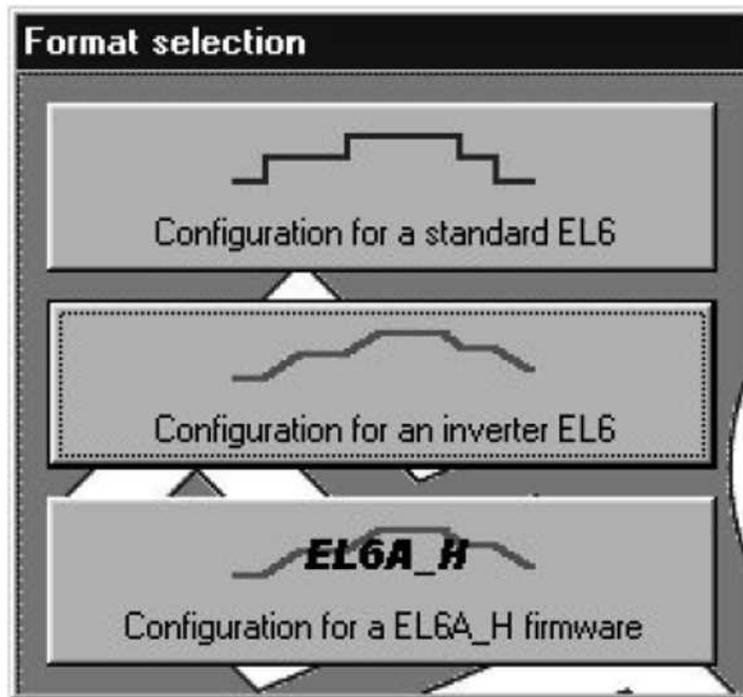


Figure 3.3: Import .EL6 Format Dialog

### File — Print

When this command is executed, the following window shown in figure 3.4 on page 14 opens. It is used to select which portions of the file content are to be printed.

### Help — About

When this command is executed, the following window shown in figure 3.5 on page 14 opens. This shows the currently installed version of the EL6 Win 2 software - the current version is 2.00.24.

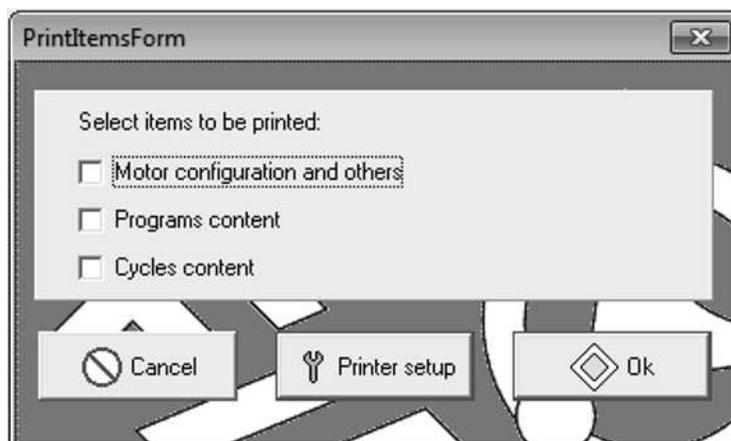


Figure 3.4: Print Dialog



Figure 3.5: EL6 Win 2 About Dialog

## **File — Open language file**

The Language File allows some customization of the EL6 Win 2 interface. The English.lng language file (the standard language file) has been modified to show the function of each relay. For example, all B&C Washer-Extractors use Relay 13 as the balance signal relay. When looking at an extract cycle, Relay 13 is identified as the balance relay. If programming the EL6 via the built in keypad, Relay 13 is simply called Relay 13.

In the unlikely event that the language file does not show the extended information, the Open Language File command allows the import of the correct Language File.

# Chapter 4

## The Cycles Window

Remember that Programs are made up of Cycles, and Cycles are made up of Steps. The Steps are where water valves are turned on, chemical assignments are made, etc. In order for the washer to do *anything*, cycles must be programmed. Typically, most cycles are created as a wash bath - i.e., water is added to a certain water level (step 1), chemicals are dosed (step 2), a check is made to see if water needs to be added (step 3), and finally, the load is agitated for some time (step 4). Refer to figure 4.1 on page 17. Spin cycles are used for drains and extracts. Spin 9 is the drain cycle (it contains no extract, only distribution speed). Spin 1, Spin 2, and Spin 3 are extracts (Low, Medium, and High speed respectively).

### 4.1 Cycle Types

The EL6 has 5 different cycle types in order to better define a wash program. These types are Prewash, Wash, Rinse, Spin, and Unroll.

#### 4.1.1 Prewash, Wash, Rinse Cycles

These cycles are bath cycles, and can be used interchangeably. Typically, these cycles would contain the steps necessary to create a bath: Fill to a level, dose chemicals, Top off to make sure level is maintained, agitate the load for some time. It is possible to insert steps to dose additional chemicals, add a drain step, fill step, and agitate step to insert a cheater rinse, or do whatever needs to be done for the particular wash process. The EL6 is very flexible. The EL6 Stock Program Listing has details on the standard cycles included with the machine. All cycles can be modified at will.

**A Note about Prewash 99:** The Prewash 99 cycle is a diagnostic cycle which goes through each output of the control. It is very useful when troubleshooting the machine when service is required. Unless a very complicated set of wash programs are being built, there will be plenty of left over steps and it is not necessary to delete this cycle.

Prewash 1 (4 steps)	1	2	3	4	Unit
<b>Outputs</b>					
Drain					
Cold water	ON		ON		
Hot water					
Chem 1		ON			
Chem 2					
Chem 3					
Chem 4					
Chem 5 (Hard Water)					
Aux. Fill (Rly 11)					
Chem Flush (Rly 12)					
Balance (Rly 13)					
Brake (Rly 16)					
Chem 6 (Rly 17)					
Chem 7 (Rly 18)					
Chem 8 (Rly 19)					
Drain B (Rly 20)					
Relay 21					
Relay 22 (Buzzer)					
Relay 23 (Cold Spray)					
Relay 24 (Hot Spray)					
<b>Special Functions</b>					
Cooldown					
Fill to Temp.					
Heating					
<b>End of step</b>					
Level	41		41		[cm]
Temp. (C)					[°C]
Time		1:00		4:00	[min:sec]
Watchdog	5:00		4:00		[min:sec]
<b>Others</b>					
Cooldown level					[cm]
Temperature setpoint					[°C]
<b>Motor</b>					
Mode	Mode 1	Mode 1	Mode 1	Mode 1	
Speed (RPM)	36	36	36	36	[rpm]

Figure 4.1: EL6 Cycle Window

## 4.1.2 Compound Rinses

Rinses and other cycles may be combined into a larger single cycle containing many steps. Rinse 10, 11, 12, and 13 as shown in the stock programs are examples of this idea. Refer to figure 4.2 on page 19 for details. By combining several rinses into one cycle, it is possible to do more baths under the 15 cycles per program limitation. For example, a typical wash program might look like this:

### Program 1

- Prewash 1
- Spin 9 (drain)
- Wash 1
- Spin 9 (drain)
- Rinse 1
- Spin 9 (drain)
- Rinse 1
- Spin 9 (drain)
- Rinse 3
- Spin 3 (extract)
- Unroll 1

This simple wash program uses 11 cycles. By using a compound rinse the number of the cycles in the program can be reduced to:

### Program 1

- Prewash 1
- Spin 9 (drain)
- Wash 1
- Spin 9 (drain)
- Rinse 11
- Spin 3 (extract)
- Unroll 1

Run 10 (11 steps)	1	2	3	4	5	6	7	8	9	10	11	Unit
<b>Outputs</b>												
Drain			ON	ON			ON	ON				
Cold water	ON				ON					ON		
Hot water												
Chem 1												
Chem 2												
Chem 3										ON		
Chem 4												
Chem 5 (Hard Water)												
Aux. Fill (Rly 11)												
Chem Flush (Rly 12)										ON		
Balance (Rly 13)												
Brake (Rly 16)												
Chem 6 (Rly 17)												
Chem 7 (Rly 18)												
Chem 8 (Rly 19)												
Drain B (Rly 20)												
Relay 21												
Relay 22 (Buzzer)												
Relay 23 (Cold Spray)												
Relay 24 (Hot Spray)												
<b>Special Functions</b>												
Cooldown												
Fill to Temp.												
Heating												
<b>End of step</b>												
Level	34		5		34		5		34			[cm]
Temp. (C)												[°C]
Time		2:00		0:10		2:00		0:10		1:00	3:00	[min:sec]
Watchdog	9:00		5:00		9:00		5:00		9:00			[min:sec]
<b>Others</b>												
Cooldown level												[cm]
Temperature setpoint												[°C]
<b>Motor</b>												
Mode	Mode 1	Mode 1	Mode 15	Mode 15	Mode 1	Mode 1	Mode 15	Mode 15	Mode 1	Mode 1	Mode 1	
Speed (RPM)	42	42	82	82	42	42	82	82	42	42	42	[rpm]

Figure 4.2: Compound Rinse Example

Program 1 now contains only 7 cycles, leaving room for plenty of customization in the wash process.

**A Note about modifying Bath cycles:** Modifying a cycle changes that cycle in whatever program that cycle is used. For example, if Wash 11 is used in Program 1 and Program 2, changes to Wash 11 would affect both Program 1 and Program 2. Use this feature to advantage! Much time can be saved through similarities in wash programs.

### 4.1.3 Spin Cycles

The spin cycles are used for drains and extracts:

- Spin 1 — 30 second intermediate spin
- Spin 2 — 5 minute medium speed spin
- Spin 3 — 5 minute high speed spin
- Spin 9 — Drain with no spin

**A Note about modifying Spins:** The EL6 is an incredibly flexible control – so flexible that it is possible to create cycles that don't work! The most common difficulty is with the spin cycles. By all means, use the existing spins and do not modify them. If a change is needed, the best course of action is to only modify the time or the RPM in the maximum RPM step, programmed for 4:30. This is the only step that affects the duration and force of the extract. The remaining steps control the ramp up to distribution speed, the balance step, and finally after the extract, the braking routine. Altering any of these steps will result in poor results and likely no extract at all.

### 4.1.4 Unroll Cycles

The Unroll cycles in the factory EL6 programs are used for redistributing the load in the event of an unbalance (Unroll 99) and as a shakeout routine at the end of the program (Unroll 1). Deletion of the Unroll 99 will remove the balance retry routine, and upon failure of balance, program termination (No balance retries).

## 4.2 Reserved Cycles

### 4.2.1 Unroll 99 - Spin retry routine

On an out of balance condition, the EL6 will jump from the programmed spin to the Unroll 99 cycle. After Unroll 99 has completed, the EL6 starts back at the beginning of the spin cycle where

the imbalance occurred. The EL6 will retry 3 times before terminating the program. This cycle should not be added to any program.

### 4.2.2 Spin 9 - Drain with no spin

Typically, a drain will follow a bath in a standard wash formula (no surprise!). The easiest way to achieve this is by using the already programmed Spin 9. Adding drain steps in each bath would waste many steps over simply using the Spin 9 routine (only 2 steps). In fact, this is a major strength of the EL6 – the ability to use a similar function over and over without reprogramming is a major time saver and makes it very easy to maintain the programs in the future.

**Note: NEVER USE 00 for a cycle number. EL6 Win will accept the data, but the programs will not execute properly.**

## 4.3 Adding a Cycle

To add a cycle, simply click the header of the cycle type you wish to add, right click, and on the sub-menu that appears, select New Cycle. Alternatively, press the Insert key on the computer keyboard.

### Example

Adding a new Prewash Cycle:

1. Click on Prewash in the cycles window (Prewash is now highlighted).
2. Right click on Prewash – the sub-menu appears.
3. Click New Cycle.
4. A new cycle appears at the bottom of the Prewash cycles list, with the next available lowest number.

## 4.4 Deleting a Cycle

To delete a cycle, click the cycle to select it. Pressing the delete key on the laptop keyboard or right click, then selecting Delete from the sub-menu will delete the cycle.

## 4.5 Copy and Paste a Cycle

To copy a particular cycle, first select the cycle to copy so that it is highlighted. Right click on the selected cycle, then click Copy Cycle on the sub-menu. The cycle is now copied to the clipboard

and can be pasted as a new cycle. To paste the cycle, select the cycle group header in which the cycle is to be pasted. For example, if the cycle will be a Wash cycle, click on and select the Wash header, located above all the other wash cycles. See figure 4.3 on page 22. Notice that the header, Wash, is highlighted. Now right click on Wash and click Paste Cycle in the sub-menu. The pasted cycle will appear as the next available cycle number at the bottom of the list of Wash cycles.

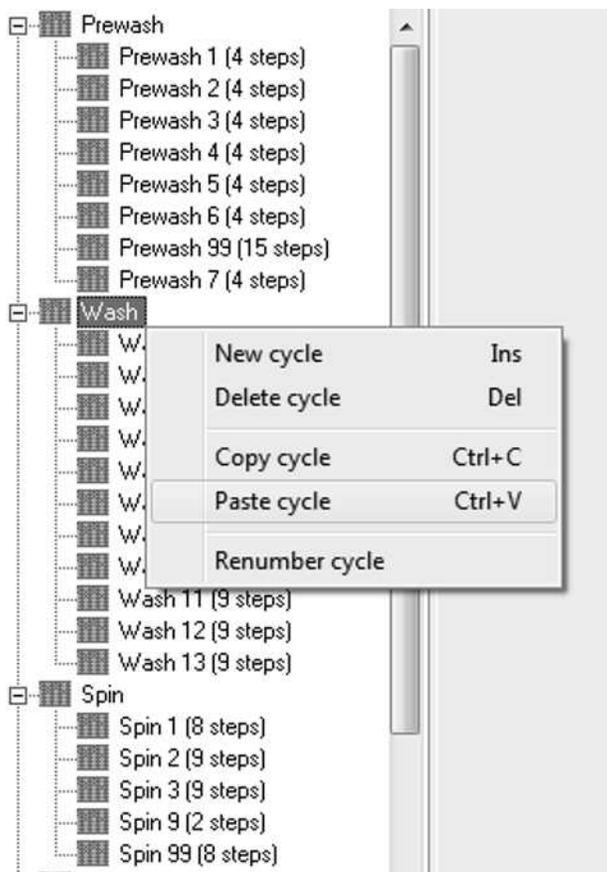


Figure 4.3: Pasting a cycle

**Note:** A cycle can be copied from one cycle type and pasted into another, i.e. copied from a Prewash cycle and pasted into a Wash cycle.

## 4.6 Renumbering a Cycle

Cycles can be renumbered for convenience easily. Simply select the cycle to be renumbered in the list of cycles, right click on the cycle, then select Renumber cycle from the sub-menu. Make sure to choose a cycle number that is not in use. Any value from 1 to 99 may be selected and used. If the cycle is already used in a program, be sure to delete the old cycle and replace it with the newly renumbered cycle.

## 4.7 Working with Steps

The steps are the building blocks used to create a wash cycle. Each cycle can contain up to 100 steps but remember that there are only 400 total steps allowed in total. The cycles window is shown in figure 4.1 on page 17. Everything that happens during the wash cycle is controlled discreetly by a step – one function at a time is performed (Fill ⇒ Chemical Dose ⇒ Top off ⇒ Agitate). Here's what is happening in the example cycle, Prewash 1, a bath (Drains and Spins are handled using different cycles).

- **Step 1:**  
The cold water output is energized, with an end step condition of 41cm, a 5 minute watchdog timer, and a speed of 36 RPM using motor mode 1.  
Step 1 is the fill step for this bath. The cold water valve will remain energized until the programmed water level is reached. Alternatively, if the watchdog time expires before level is reached, the EL6 will display a WTD TIME EXP alarm, indicating that the machine did not reach level. During the fill, the wash cylinder will rotate at 36 RPM using motor mode 1 (16 seconds forward, 4 second pause, 16 seconds reverse). As soon as water level is reached, Step 1 is over, and Step 2 begins.
- **Step 2:**  
The chemical 1 output is energized, with an end step condition of 1 minute, and a speed of 36 RPM using motor mode 1.  
Step 2 is the chemical dosing step. The chemical signal selected (Chemical 1) remains on for 1 minute. During this time, the wash cylinder will rotate at 36 RPM using motor mode 1 (16 seconds forward, 4 second pause, 16 seconds reverse). As soon as the time elapses, Step 2 is over, and Step 3 begins.
- **Step 3:**  
The cold water output is energized, with an end step condition of 41cm, a 4 minute watchdog timer, and a speed of 36 RPM using motor mode 1.  
Step 3 is the top off step. The cold water valve will remain energized until the programmed water level is reached. Alternatively, if the watchdog time expires before level is reached, the EL6 will display a WTD TIME EXP alarm, indicating that the machine did not reach level. During the fill, the wash cylinder will rotate at 36 RPM using motor mode 1 (16 seconds forward, 4 second pause, 16 seconds reverse). Typically, this step is skipped as the water level doesn't typically drop enough to trigger the fill valve. If the goods are unusually absorbent, this step can top off the water level. As soon as water level is reached, Step 3 is over, and Step 4 begins.
- **Step 4:**  
No outputs are energized, with an end step condition of 4 minutes, and a speed of 36 RPM using motor mode 1.  
Step 4 is the agitation step. No outputs are turned on, so the cylinder rotates at 36 RPM using motor mode 1 (16 seconds forward, 4 second pause, 16 seconds reverse) for the duration of the step. Once step 4 is over, the EL6 moves to the next programmed cycle – typically a drain (Spin 9).

Each step is split into 5 segments:

1. Outputs
2. Special Functions
3. End of Step
4. Others
5. Motor

### **4.7.1 Outputs**

The outputs are fairly self explanatory. When a particular output is turned on, that function is activated. Each relay output can be turned off or on by double clicking in the cell, or by pressing the spacebar when the cell is highlighted.

### **4.7.2 Special Functions**

Heating, Fill to temperature, and Cooldown are controlled by this section. Double clicking a function enables that function. When activated, each item will open a dialog box which asks for parameters necessary for the activation of the function.

### **4.7.3 End of Step**

Each step must have an end step condition – this is the condition to be met, indicating that the step is complete. Level and Temperature require a Watchdog time to be entered (typically 9 minutes for Level and 15 minutes for Temperature). The Time end step condition will automatically end when the time elapses, eliminating the need for a Watchdog. To edit or enable an end of step condition, double click. A dialog box will appear, allowing to to change or enter a value.

### **4.7.4 Others**

The Cooldown level and Temperature setpoint fields are indicators only - these fields will be blank unless one selects the Cooldown function or the Heating function.

### **4.7.5 Motor**

The motor segment indicates which motor profile and RPM (speed) will be used. Refer to the water level chart, figure 4.4 on page 25 and the RPM chart shown in table 4.1 on page 26 for details on the correct setting for the particular machine being programmed. Double clicking the field will cause a dialog box to appear so that the correct value can be chosen.

Machine	Low 15%		Med 25%		High 35%	
HE-35	15 cm	6.0 in	21 cm	8.4 in	27 cm	10.8 in
HE-45	16 cm	6.4 in	23 cm	9.1 in	30 cm	11.8 in
HE-65	18 cm	7.0 in	26 cm	10.1 in	34 cm	13.2 in
HE-85	20 cm	7.8 in	29 cm	11.5 in	38 cm	15.1 in
HE-110	21 cm	8.2 in	31 cm	12.0 in	40 cm	15.9 in
SP-40,45,50	16 cm	6.4 in	23 cm	9.1 in	30 cm	11.7 in
SP-60,65,75	18 cm	7.0 in	26 cm	10.1 in	34 cm	13.2 in
SP-100,110	20 cm	7.9 in	30 cm	11.6 in	39 cm	15.3 in
SP-130,135	22 cm	8.7 in	33 cm	12.9 in	43 cm	17.1 in
SP-155,165	22 cm	8.8 in	33 cm	13.1 in	44 cm	17.4 in
SP-195	28 cm	10.9 in	39 cm	15.5 in	51 cm	20.1 in
SI-110	24 cm	9.5 in	34 cm	13.2 in	43 cm	16.9 in
SI-135	26 cm	10.4 in	37 cm	14.7 in	48 cm	19.0 in
SI-200	28 cm	10.8 in	39 cm	15.4 in	51 cm	20.0 in
SI-275	30 cm	11.7 in	43 cm	16.9 in	56 cm	22.1 in
SI-300	30 cm	11.7 in	43 cm	16.9 in	56 cm	22.1 in
SI-450	34 cm	13.6 in	51 cm	20.0 in	67 cm	26.4 in
HP-60,65	18 cm	7.0 in	26 cm	10.1 in	34 cm	13.2 in
HP-85	24 cm	9.3 in	33 cm	12.9 in	42 cm	16.5 in
HP-125	26 cm	10.2 in	37 cm	14.4 in	47 cm	18.5 in
SB-60	18 cm	7.0 in	26 cm	10.1 in	34 cm	13.2 in
SB-80	18 cm	7.0 in	26 cm	10.1 in	34 cm	13.2 in
SB-155	26 cm	10.3 in	37 cm	14.5 in	47 cm	18.7 in
SB-225	26 cm	10.3 in	37 cm	14.5 in	47 cm	18.7 in
SB-300	28 cm	11.0 in	40 cm	15.7 in	52 cm	20.5 in
SB-485	31 cm	12.2 in	45 cm	17.7 in	59 cm	23.2 in

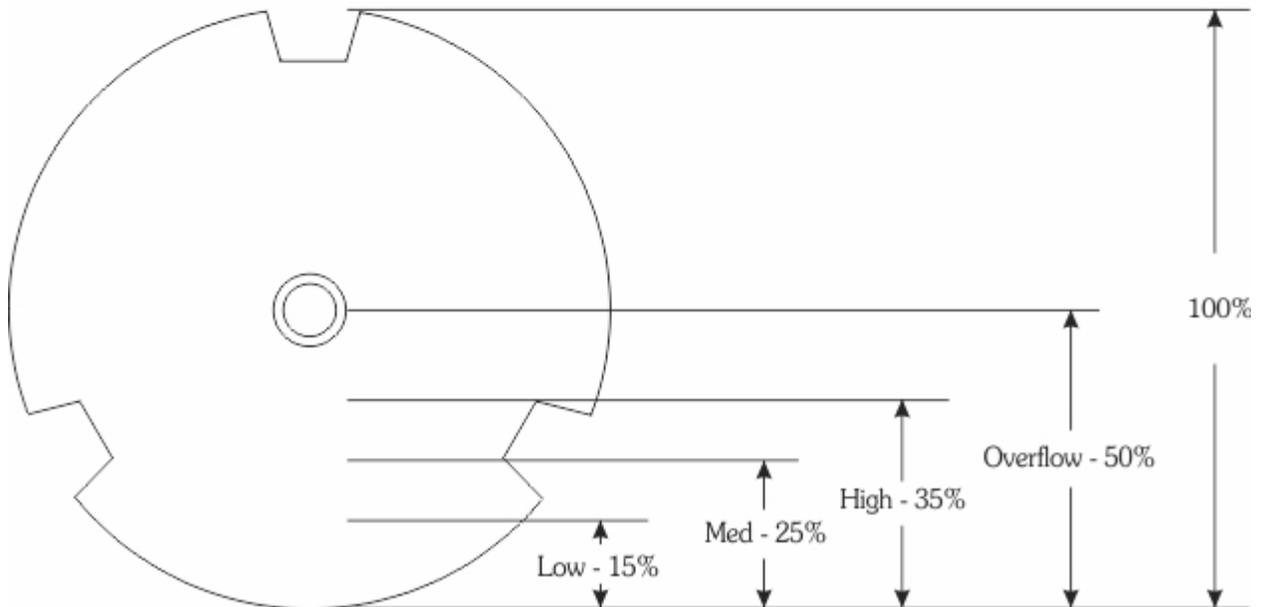


Figure 4.4: Water Level Guide

Table 4.1: EL6 Programming - Speed Guide

<b>Machine</b>	<b>Wash RPM</b>	<b>100G</b>	<b>150G</b>	<b>200G</b>	<b>300G</b>
HE-35	48	541	662	765	x
HE-45	46	512	627	724	x
HE-65	43	476	583	673	x
HE-85	39	440	539	622	x
HE-110	38	427	523	604	x
HI-85	40	443	542	626	x
HI-125	37	410	502	579	x
HP-60	42	476	583	673	823
SA-475	30	332	406	469	574
SP-40	46	513	628	726	889
SP-60	42	476	583	673	824
SP-100	40	441	540	624	764
SP-130	36	410	502	579	709
SP-155	36	405	496	573	701
SP-185	35	392	481	555	680
SB-60	42	476	583	673	823
SB-80	42	476	583	673	823
SB-155	36	409	501	579	709
SB-225	36	409	501	579	709
SB-300	35	386	473	546	669
SB-485	32	358	439	506	619
SI-110	39	436	534	617	756
SI-135	36	405	496	573	701
SI-200	35	391	479	553	678
SI-275	33	368	451	521	638
SI-300	33	368	451	521	638

## 4.8 Inserting a New Step

A new step is created by selecting an existing step, then right clicking the step. When the sub-menu appears, click Insert step or press the Insert key on the laptop keyboard. Refer to figure 4.5 on page 27. A new blank step is now inserted. Notice that all existing steps shift one column to the right and that the new step has replaced the previously highlighted step (Step 2 was highlighted, and now the new step is Step 2 and the previous Step 2 is now Step 3).

Prewash 1 (4 steps)	1	2	3	4	Unit
<b>Outputs</b>					
Drain					
Cold water		ON		ON	
Hot water					
Chem 1		ON			
Chem 2					
Chem 3					
Chem 4					
Chem 5 (Hard Water)					
Aux. Fill (Rly 11)					
Chem Flush (Rly 12)					
Balance (Rly 13)					
Brake (Rly 16)					
Chem 6 (Rly 17)					
Chem 7 (Rly 18)					
Chem 8 (Rly 19)					
Drain B (Rly 20)					
Relay 21					
Relay 22 (Buzzer)					
Relay 23 (Cold Spray)					
Relay 24 (Hot Spray)					
<b>Special Functions</b>					
Cooldown					
Fill to Temp.					
Heating					
<b>End of step</b>					
Level	41		41		[cm]
Temp. (C)					[°C]
Time		1:00		4:00	[min:sec]
Watchdog	5:00		4:00		[min:sec]
<b>Others</b>					
Cooldown level					[cm]
Temperature setpoint					[°C]
<b>Motor</b>					
Mode	Mode 1	Mode 1	Mode 1	Mode 1	
Speed (RPM)	36	36	36	36	[rpm]

Prewash 1 (5 steps)	1	2	3	4	5	Unit
<b>Outputs</b>						
Drain						
Cold water		ON		ON		
Hot water						
Chem 1			ON			
Chem 2						
Chem 3						
Chem 4						
Chem 5 (Hard Water)						
Aux. Fill (Rly 11)						
Chem Flush (Rly 12)						
Balance (Rly 13)						
Brake (Rly 16)						
Chem 6 (Rly 17)						
Chem 7 (Rly 18)						
Chem 8 (Rly 19)						
Drain B (Rly 20)						
Relay 21						
Relay 22 (Buzzer)						
Relay 23 (Cold Spray)						
Relay 24 (Hot Spray)						
<b>Special Functions</b>						
Cooldown						
Fill to Temp.						
Heating						
<b>End of step</b>						
Level	41			41		[cm]
Temp. (C)						[°C]
Time			1:00		4:00	[min:sec]
Watchdog	5:00			4:00		[min:sec]
<b>Others</b>						
Cooldown level						[cm]
Temperature setpoint						[°C]
<b>Motor</b>						
Mode	Mode 1		Mode 1	Mode 1	Mode 1	
Speed (RPM)	36		36	36	36	[rpm]

Figure 4.5: Inserting a new step

## 4.9 Deleting a Step

To delete a step, select the step to delete – the column will be highlighted in yellow. Right click the step and select Delete step or press the delete key on the laptop keyboard. Be careful! There is no undo!

## 4.10 Copy/Paste a Step

To copy a step, select it by clicking on it – the column will be highlighted in yellow. Right click the step and select Copy step. Now select where the step needs to go, either in the current cycle

or another cycle in the program group. Right click, and select Paste step from the sub-menu. Just as with the Insert Step function, all existing steps shift one column to the right and that the pasted step has replaced the previously highlighted step.

## 4.11 Enabling/Disabling Cells

In order to change the function of a step type, the existing end step function must be disabled before the new condition can be enabled. The EL6 allows only one end step condition per step. To disable a field, click the cell to select it. Then right click the cell and select Disable field from the sub-menu. Now a different end step condition can be selected. If moving from a level or temperature based step to a timed step, the watchdog timer must also be disabled. The motor mode and RPM fields can also be disabled if no cylinder rotation is desired (Still fill for example).

## 4.12 Special Functions

### 4.12.1 Cooldown

The cooldown function can be used to cool the laundered goods to a particular temperature. Enabling the cooldown function will display the sub-menu shown in figure 4.6 on page 28. Enter the minimum water level (in cm of water), the maximum water level (in cm of water), the desired temperature (in degrees Celsius), and the allowed time. The EL6 will alternate between draining and filling of the machine in order to reach the desired temperature while maintaining the minimum and maximum level parameters given a particular time.

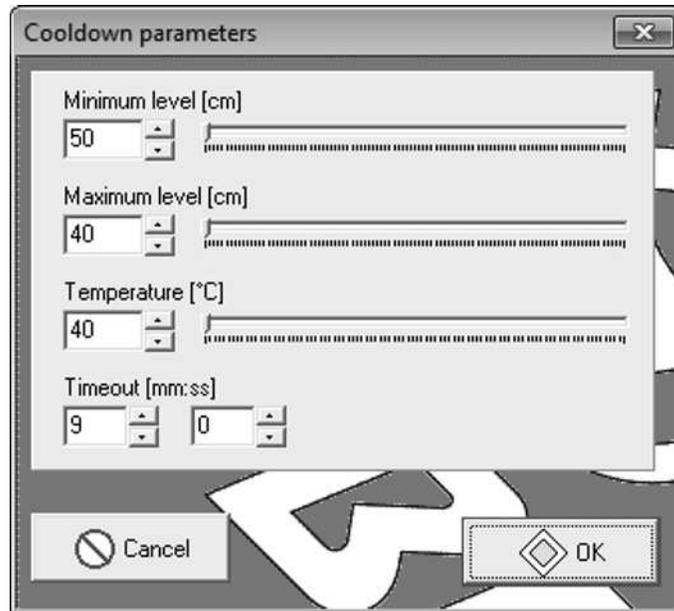


Figure 4.6: Cooldown Dialog

### 4.12.2 Fill to Temperature

The Fill to Temperature function is used to fill the machine to a temperature between the incoming cold and hot water supply lines. Enabling the Fill to Temperature function will display the sub-menu shown in figure 4.7 on page 29. Enter the water level (in cm of water), desired temperature (in degrees Celsius), and the allowed time. The EL6 will modulate the cold water and hot water valves to maintain the programmed temperature to the given level in the allotted time.

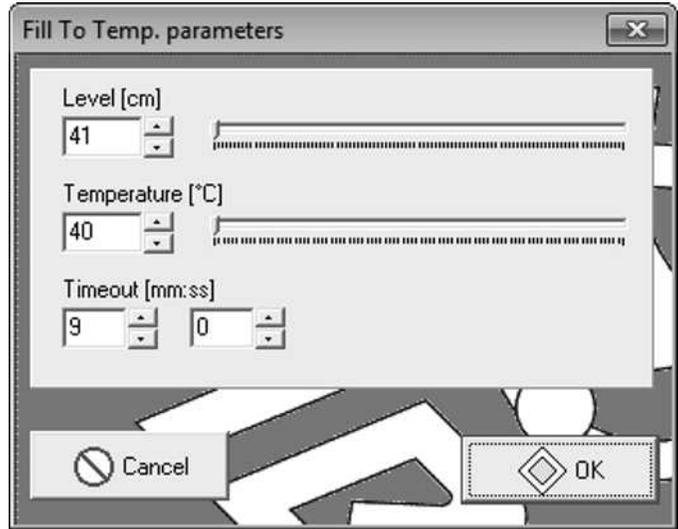


Figure 4.7: Fill to Temperature Dialog

### 4.12.3 Heating

The heating function controls the auxiliary heating system optionally installed (typically steam or electric heating). Enter the desired temperature (in degrees Celsius). The EL6 will regulate the temperature within 3 degrees Celsius (adjustable – see the maintenance functions section on page 37). Enabling the Heating function will display the sub-menu shown in figure 4.8 on page 29.

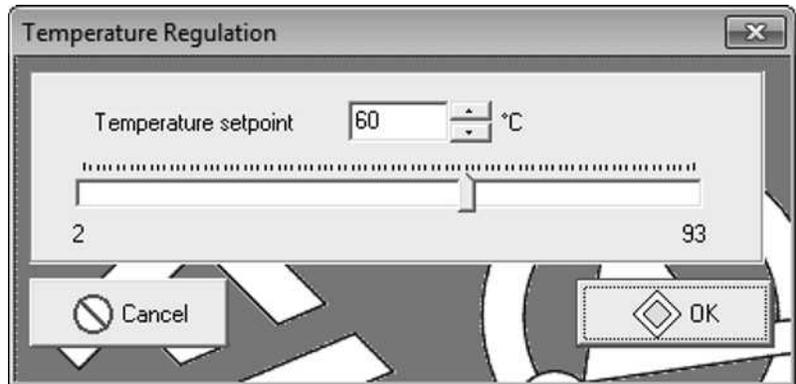


Figure 4.8: Heating Dialog

## 4.13 Creating a Heat Cycle

Any cycle can be converted to a heating cycle by inserting a step after the fill, and setting the end step condition to a temperature (See Step 2 in figure 4.9 on page 31).

Step 1 - Fill to a water level with hot water. Heat is on, and will engage when a minimum water level is met. Watchdog timer of 5:00 allows time to fill before an alarm is generated. Step 1 ends when the water level is reached.

Step 2 - Heat output is on. Watchdog timer of 15:00 allows time to heat to the required temperature before an alarm is generated. Step 2 ends when the target temperature is reached.

Step 3 - Heat output is on, Chemical 1 output is on. Step 3 ends when a time of 1:00 elapses.

Step 4 - Top off step, same outputs as step 1.

Step 5 - Heat output is on in order to regulate temperature during the agitation phase. Step 5 and the entire cycle are complete when a time of 7:00 elapses.

Prewash 1 (5 steps)	1	2	3	4	5	Unit
<b>Outputs</b>						
Drain						
Cold water						
Hot water						
Chem 1						
Chem 2						
Chem 3						
Chem 4						
Chem 5 (Hard Water)						
Aux. Fill (Rly 11)						
Chem Flush (Rly 12)						
Balance (Rly 13)						
Brake (Rly 16)						
Chem 6 (Rly 17)						
Chem 7 (Rly 18)						
Chem 8 (Rly 19)						
Drain B (Rly 20)						
Relay 21						
Relay 22 (Buzzer)						
Relay 23 (Cold Spray)						
Relay 24 (Hot Spray)						
<b>Special Functions</b>						
Cooldown						
Fill to Temp.						
Heating						
<b>End of step</b>						
Level	41			41		[cm]
Temp. (C)		60				[°C]
Time			1:00		7:00	[min:sec]
Watchdog	5:00	15:00		4:00		[min:sec]
<b>Others</b>						
Cooldown level						[cm]
Temperature setpoint	60	60	60	60	60	[°C]
<b>Motor</b>						
Mode	Mode 1					
Speed (RPM)	36	36	36	36	36	[rpm]

Figure 4.9: Typical Heat Cycle

# Chapter 5

## Motor Modes

Motor Modes are used to set the agitation profile for each step. There are 5 stock motor modes used:

- Mode 1 – Standard wash agitation: 16 seconds forward, 4 seconds pause, 16 seconds reverse
- Mode 2 – Gentle wash agitation: 4 seconds forward, 16 seconds pause, 4 seconds reverse
- Mode 3 – Soak agitation: 5 seconds forward, 115 seconds pause, 5 seconds reverse
- Mode 14 – Reverse only: Used in the rebalancing function after an unbalance condition.
- Mode 15 – Forward only: Used in extract cycles

Motor	Fwd.	Pause	Rev.
Mode 1	16	4	16
Mode 2	4	16	4
Mode 3	5	115	5
Mode 4			
Mode 5			
Mode 6			
Mode 7			
Mode 8			
Mode 9			
Mode 10			
Mode 11			
Mode 12			
Mode 13			
Mode 14			1
Mode 15	1		

Figure 5.1: Motor Mode Area

To customize or add a new motor mode, simply double click in the field you wish to adjust. Refer to figure 5.1 on page 32. When the sub-menu appears, change the seconds value to fit the process. Any value between 1 and 240 seconds may be entered.

# Chapter 6

## Creating/Modifying/Deleting Programs

### 6.1 Creating a New Program

Once a library of cycles is in place, a new wash program may be created. To create a new wash program, click on any existing program, then right click that program and select Insert program from the sub-menu. Alternatively, press the insert key on the laptop keyboard. A new blank program is created *at the end of the existing program list*. The new program will be numbered with the next available unused number. If adding a new program to the stock programs, Program 1 will be found at the bottom of the program list in the programs window on the upper left of the EL6 Win 2 main window. Cycles may be added to this new program by the “drag and drop” method:

1. Click and hold the desired first cycle in the new program.
2. Drag the mouse over to the new program (continue holding in the left mouse button).
3. Release the left mouse button when the dragged cycle is on top of the new program (The program name will be highlighted).

**Remember that an EL6 program can contain a maximum of 15 cycles. Unfortunately, the EL6 Win 2 software doesn't do a great job of monitoring this limitation. Adding more than 15 cycles to a program will lead to program corruption and wash program misbehavior.**

This dropped cycle becomes the first cycle in the new program. Adding additional cycles to the program is the exact same procedure with one exception – when the next cycle is dragged over, drop it on the last cycle added to the program to add it to the bottom of the list. Otherwise, the new cycle will land directly below the cycle is is dropped onto. This is useful if a cycle or cycles need to be inserted into an existing wash program.

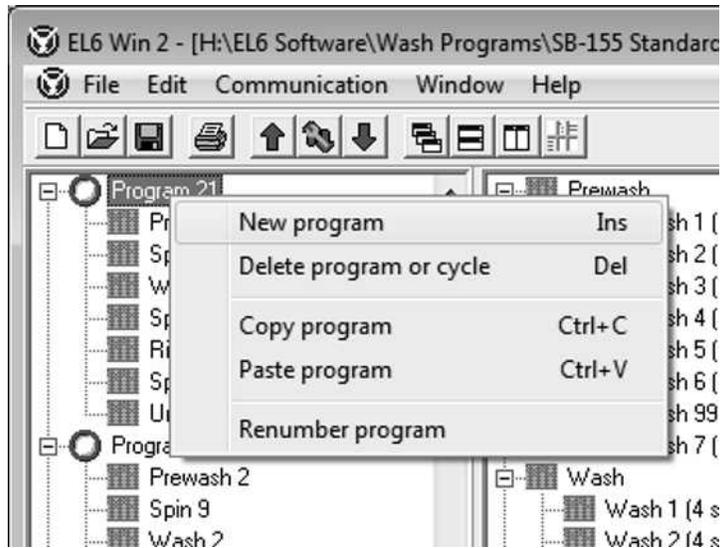


Figure 6.1: Creating a New Wash Program

## 6.2 Modifying a Program

As mentioned in the previous section, wash cycles may be added to existing programs through dragging and dropping. To remove a cycle from a program, click on the cycle to be removed so that it is selected. Right click the cycle, then click Delete program or cycle, or press the Delete key on the laptop keyboard. Make sure the desired cycle is selected before deletion – there is no undo!

## 6.3 Deleting a Program

Deleting a program is similar to deleting a cycle from a program. Select the program to be deleted by clicking on it. Right click the program, then select Delete program or cycle, or press the Delete key on the laptop keyboard. Make sure the desired program is selected before deletion – there is no undo!

# Chapter 7

## Information Window

The information window is located at the bottom right of the EL6 Win 2 window. During file save or file open operations, the EL6 Win 2 software error checks the file. During this procedure, the information window will change and give details about the progress of this error check.

Each node in the tree is represented by an icon:



– Action in progress

Includes:

- Parsing program area
- Analysis of program contents
- Scanning motor modes
- Analysis of motor modes
- Data upload or download
- File save
- Cycle tree scan



– Details about an action in progress

Includes:

- Program content analysis
- Adding a new cycle
- Handshaking in progress

- Sending data
- Receiving data



– Warning message

Includes:

- Reminder to put the EL6 in communication mode - function 144



– Error message which stops an action in progress.

Includes:

- No programs configured
- Program empty
- Non-existing cycle
- Motor mode wrong
- Trouble opening file
- Empty cycle
- Too many steps
- Step contains no end step value
- Step uses a motor mode that isn't configured
- Step has no watchdog time configured
- Cannot handshake with EL6
- Communication timeout expired
- Error sending data
- Error receiving data
- Data not complete



If an error occurs and the  (bomb) icon is displayed, the information window automatically resizes so that the user is better able to see the fault.

# Chapter 8

## Maintenance Functions

The maintenance functions are located in the maintenance area, located directly below the program window on the lower left of the EL6 Win 2 window. Refer to 8.1 on page 37 for details. If the items in the maintenance area are hidden, hover the mouse on the bar just over the red "squiggly" line in the lower left of the window. The mouse cursor will change, and the bar can be dragged up, revealing the maintenance area.

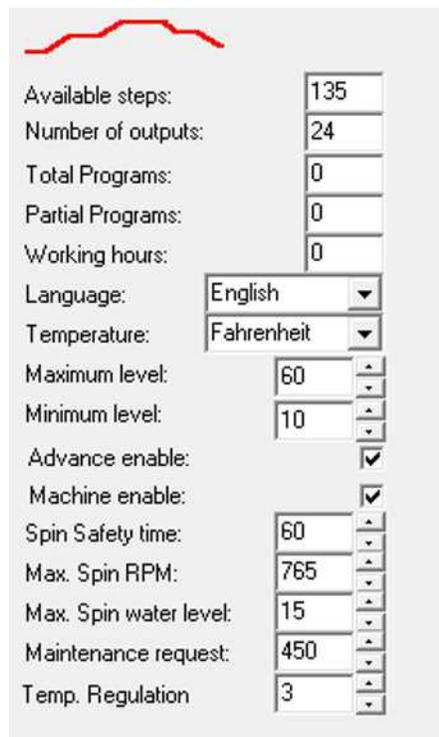


Figure 8.1: Maintenance Area

The items in the maintenance area are:

- Available Steps

Displays the number of steps left in memory allowed to be used. Read only.

- Number of outputs  
Displays the EL6 configuration. Should **ALWAYS** say 24. Anything else and your programs **WILL BE CORRUPTED**. Recovery is possible, but embarrassing for the poor soul that makes this error. Read only.
- Total Programs  
The total number of programs this EL6 control has executed, not including partial programs. Take care when transferring programs to a machine in use. If the stock programs are transferred to the machine, this counter will be overwritten. If making changes, it is best practice to transfer the program set from the machine to the laptop, make the appropriate changes, and finally transfer the programs back to the control. This keeps all counters in order in the event that the owner/operator is making use of the program tracking features of the EL6. Read only.
- Partial Programs  
The total number of interrupted programs, caused by stopping the program before completion or possibly an out of balance condition. Read only.
- Working hours  
The number of hours the control has spent executing wash programs. Does not include idle time. Read only.
- Language  
Selects from amongst 5 the languages the EL6 can display.
- Temperature  
Select to display temperature in degrees Fahrenheit or degrees Celsius. Note: programing is still done in degrees Celsius.
- Maximum level  
Do not change - overflow and water waste will occur if levels too high for the machine are programmed.
- Minimum level  
Should never need changing. Leave at 10cm.
- Advance enable  
Unchecking the box disables the advance button on the EL6 keypad.
- Machine enable  
Unchecking the box will cause the EL6 to display an exclamation point (!) upon power cycle. Very likely to confuse the operator and/or make the operator think the control is damaged.
- Spin safety time  
Do not adjust! Really. Do not adjust!

- Max Spin RPM

Sets the scaling so that the control can properly control the inverter drive. Adjustment of this parameter will very likely cause the machine to never extract. Other speeds will be off, but the dead giveaway is no extract. Do not adjust.

- Max Spin water level

Should never need adjustment. Setting this lower than 10cm can cause the machine not to spin. Setting it to 0cm will just about guarantee that the machine won't spin.

- Maintenance request

Sets the number of programs needed to trigger the maintenance alarm. Typically 450 programs is about a monthly reminder.

- Temperature regulation

Controls the amount the temperature can drop before the heat is turned back on. 3 degrees Celsius is typical.