

AEROSPRAY® HEMATOLOGY  
PRO

SLIDE  
STAINER/CYTOCENTRIFUGE  
7151



**Programming Manual**

57-0020-01A

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U.S. Patent Numbers  
4,004,550; 4,089,989; 5,009,185; 6,858,432B2.

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# **1**

## **PROGRAMMING INSTRUCTIONS**

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SECTION 1

# Programming Instructions



## 1.1 Overview

The Aerospray Hematology Pro stainer is designed for simple operation using a choice of 4 preset programs as explained in the User's Manual. Given the wide range of user preferences in the field of hematology, however, the stain settings are adjustable. The Hematology Pro is equipped with a simple adjustment function which changes the thiazin/eosin ratio, spin time and final rinse selection for the Rapid, Wright-Giemsa and May-Grünwald Giemsa stain modes. This allows simple fine tuning of the preset protocols to individual preferences. When more flexibility or special procedures are required, the fully programmable Custom Stain function is available. The Custom Stain mode allows you to alter each step in each intensity in the mode, using the 10 variables shown in the main timing table. The default settings of the custom stain are set up to function like a single staining mode (with 9 intensity variations) as with the other staining modes. It is a specially developed protocol for the Aerospray stainer and compares favorably to both the May-Grünwald Giemsa and Wright-Giemsa staining modes.

A password protection feature is available to prevent unauthorized changes to custom programs and adjustments to the Rapid, Wright-Giemsa, and May-Grünwald Giemsa modes.

### **Rapid, Wright-Giemsa, and May-Grünwald Giemsa Staining Modes**

These modes are constructed from the timings in Table B. The preset selections used are shown in Table C. Each of the 11 run sequence steps contains a number corresponding with one of the 10 selections in Table B. The T/E ratio (steps 2, 6), the spin time (steps 3, 7) and the rinse (Step 10) can be varied within the 10 settings of the Main Timing Table. Both the concentrated and dilute stain steps are changed when you enter a T/E ratio or spin time adjustment. See Table A for a brief description of the effects of varying these parameters.

## 1.2 Adjustment Function

### NOTE:

*For purposes of readability, display text may appear different or in different positions than that on your instrument.*

### Main Programming Menu

```
1 = SET INTENSITY
2 = SET FIXATION
3 = ADJUST STAIN
4 = STAIN MODE
```

### Adjustment Menu

```
ADJUST STAIN
T/E RATIO (0-9): = 4
SPIN TIME (0-9): = 4
RINSE (0-9): = 3
```

### NOTE:

*Fixation changes are observable on the display. See User's Manual for more information.*

### Thiazin/Eosin (T/E) Ratio

Since the eosin and thiazin stains are separate reagents, their ratio can be adjusted in the instrument. This gives greater flexibility in staining results to satisfy individual preferences (0 = 100% eosin; 9 = 100% thiazin).

### Spin Time Adjustment

The spin time adjustment controls the duration of slide centrifugation following stain application. Evaporating the methanol content of the stain by air flow during centrifugation dramatically accelerates staining. This drying step also concentrates the dye in the staining film--an important parameter in accelerating the staining process. As the selection number is increased, staining intensity also increases (0 = no evaporation, 9 = maximum evaporation).

### Rinse Selection

The mid-rinse is not adjustable, the final rinse is adjustable. Increasing the rinse destains the slide and decreases debris. It can also enhance the appearance of eosinophils and erythrocytes.

To adjust T/E ratio, rinse and spin time:

1. Press **PROG** to enter the main programming menu.
2. Press **3** to enter the adjustment menu. Follow the cursor to set T/E, spin time, and rinse adjustments.

To remove the adjustments:

Press **PROG**, then press **3** to enter the adjustment menu and then press **CLEAN**. This resets the program to default settings. Press **STOP** to return the stainer to the run display.

### NOTE:

*Adjustments affect all intensities of the current stain mode. Once the adjustment function is used, the main screen will display a plus sign next to the intensity number until the adjusted settings are returned to the default settings by pressing CLEAN in the selection display. See the User's Manual for information on setting fixation and intensity.*

## 1.3 Custom Programming Instructions

### Main Programming Menu

1 = SET INTENSITY  
2 = SET FIXATION  
3 = ADJUST STRAIN  
4 = STAIN MODE

### Stain Mode Menu

1 = RAPID STAIN  
2 = WRIGHT GIEMSA  
3 = MG GIEMSA  
4 = CUSTOM STAIN

### Custom Programming Menu

1 = SET INTENSITY  
2 = SET FIXATION  
3 = PROG STAINER  
4 = STAIN MODE

### Intensity Display

STAIN INTENSITY  
IS \_  
SELECT (0-9)\_

### Custom Programming Menu

1 = SET INTENSITY  
2 = SET FIXATION  
3 = PROG STAINER  
4 = STAIN MODE

### Using the Custom Stain Mode

The Custom Stain mode is similar in form and operation to the other staining modes. The default settings of the custom mode provide useful starting points for custom programming. Custom Stain mode contains 9 independently programmable intensity selections which are accessed by the Set Intensity function. Changing intensity settings is explained in the User's Manual.

The Custom Mode allows greater flexibility to alter protocols than other staining modes. It allows you to alter each of the 11 steps in the Run sequence (see Table A for varying the settings), including different T/E ratios and spin time adjustments in the concentrated and dilute stain steps.

1. To access the Custom Mode, press **PROG**, then press **4** to select the Stain Mode menu. Press **4** again to select the Custom Stain mode.
2. Press **PROG** to access the Custom Programming menu.
3. Press **1** to bring up the Intensity Display. Select an intensity (1-9).

The display will show:

CUSTOM STAIN #1  
  
FULL CAROUSEL


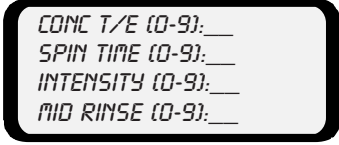
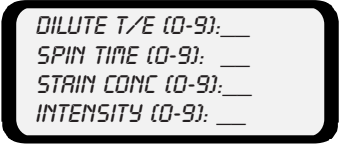
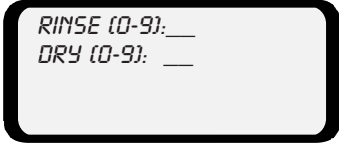
This specifies the intensity selection to be programmed in the following step. Each of the 9 intensity selections are individually programmed as 9 separate protocols. A change to one intensity selection does not change the other intensity selections.

To change the settings of the selected intensity:

1. Press **PROG** to enter the Custom Programming menu (shown at left). Then press **3** (program stainer).

## 1.3 Custom Programming Instructions

The following displays will appear sequentially. Follow the cursor to set each of the 11 steps in the run sequence.

1. 
2. 
3. 
4. 

While fixation is the first step in the 11 step sequence, it can also be adjusted by override using the fixation selection (#2 in the Main Programming Menu) as in the other staining modes. (See User's Manual Section 3.6). The override affects all 9 intensities, whereas the settings to display #1 above only affect the selected intensity. The override fixation setting is displayed on the RUN screen as ` in the other 3 modes.

You can return to the default settings in the Custom Stain mode by entering each of the 4 displays shown above and pressing CLEAN. Pressing STOP while in any of the displays advances to the next screen without changing any settings. Pressing STOP twice exits the programming function and returns the RUN function to the display.

### NOTE:

*Once the programming function is used, the main screen will display a plus sign next to the intensity indication until the adjusted settings are returned to the default settings by pressing CLEAN in the selection display.*

## 1.4 Password Protection

### Password Protection

Both custom programs and adjustments to set programs can be password protected to avoid unauthorized changes. Use the following steps to access password protection.

1. Turn **OFF** the stainer and then turn it back **ON**.
2. Press **RUN** when the display lights up and after the series of black dots disappears. The instrument will display.



3. Enter a 4 digit password on the keypad. This will remove access to adjustment and programming menus from the display and prevent changes in the settings.

To end password protection, repeat steps 1-3 above and enter the same 4 digit password used to lock the settings.

### NOTE:

*In case of a forgotten password, contact Wescor's Service Department to obtain a replacement or master password for your stainer. Your stainer's serial number is required to obtain a replacement password. See Customer Service (Section 6.7) in the User's Manual.*

SECTION 1

PROGRAMMING INSTRUCTIONS

## *1.5 Information About Preset Programs*

The preset run sequences for Rapid, Wright-Giemsa, May-Grünwald Giemsa, and Custom Stain Modes are constructed by selecting 0-9 for each of the 11 steps in the Main Timing Table (B). Table C gives the default values of the four staining modes. The times and volume of reagent used are approximate and may vary.

If changes are desired, use the preset information as a starting point to build your own custom programs.

SECTION 2

Tables



*Table A: Description of Steps in Table B*

The following table explains the function and effects of each step in Table B:

**STEP 1: Fixation (selection 0 to 9)**

- 0 = OFF
- 1-9 = Increasing Fixation

**STEP 2: Thiazin/Eosin (T/E) Ratio in Concentrated Stain Step (selection of 0 to 9)**

- Increasing numbers = higher thiazin = bluer slide
- Decreasing numbers = lower thiazin = redder slide

**STEP 3: Spin Time (selection of 0 to 9)**

- Increasing spin time greatly accelerates staining. Neutrophil and monocyte granules are particularly enhanced by increasing spin time.

**STEP 4: Duration of Staining (selection of 0 to 9)**

- Increasing numbers yield stronger staining
- x = spin time from Step 3

**STEP 5: Duration of Rinse (selection 0 to 9)**

- Mid-cycle rinse
- Rinsing concentrated stain from slide

*Table A: Description of Steps in Table B*

<b>STEP 6</b>	<b>Thiazin/Eosin (T/E) Ratio in dilute Stain Steps (select 0-9)</b> <ul style="list-style-type: none"><li>• Increasing numbers = higher thiazin = bluer slide</li><li>• Decreasing numbers = lower thiazin = redder slide</li></ul>
<b>STEP 7:</b>	<b>Spin Time (select 0- 9)</b> <ul style="list-style-type: none"><li>• Accelerates staining</li><li>• Increases duration of spin time</li></ul>
<b>STEP 8</b>	<b>Stain Concentration in Buffer (select 0-9)</b> <ul style="list-style-type: none"><li>• Increasing number= more stain, less buffer</li><li>• Increasing numbers = darker staining</li></ul>
<b>STEP 9</b>	<b>Duration of Dilute Stain (select 0-9)</b> <ul style="list-style-type: none"><li>• Increasing numbers = darker staining</li></ul>
<b>STEP 10</b>	<b>Duration of Rinse (select 0-9)</b> <ul style="list-style-type: none"><li>• Increasing rinse yields stronger eosin staining and less precipitates, but washes out thiazin stain.</li></ul>
<b>STEP 11</b>	<b>Dry Time (select 0-9)</b> <ul style="list-style-type: none"><li>• 3 Second line purge and slide front cleaning</li><li>• 3 Second reverse spray to slide back</li><li>• 950 RPM to dry slide</li></ul>

*Table B: Main Timing Table*

**Note: All Settings shown in seconds except those specified as %.**

	0	1	2	3	4	5	6	7	8	9
<b>A. Fixation (Program Step 1)</b>										
Off	0									
Spray	0	3	3	3	6	6	6	9	9	9
Wait	0	30	60	90	30	60	90	30	60	90
<b>B. Concentrated Stain Steps</b>										
1. Thiazin/Eosin Ratio (Step 2)										
%Thiazin	0	30	40	45	50	55	60	70	80	100
% Eosin	100	70	60	55	50	45	40	30	20	0
2. Spin (Step 3)										
	0	1	16	20	25	30	35	40	45	60
3. Intensity 1-9 (Step 4)										
Prime	0	2	2	2	2	2	2	2	2	2
Spray	0	6	6	6	6	6	6	6	6	6
Spin	0	x	x	x	x	x	x	x	x	x
Wait	0	0	0	0	0	0	0	0	0	0
Spray			3	3	3	3	3	3	3	3
Spin			x	x	x	x	x	x	x	x
Wait			0	4	8	12	24	30	36	24
Spray			3	3	3	3	3	3	3	3
Spin			x	x	x	x	x	x	x	x
Wait			0	4	8	12	24	30	36	24
Spray										3
Spin										x
Wait										24
<b>C. Mid Cycle Rinse (Steps 5-7)</b>										
Rinse Duration (Step 5)										
Spray	0	9	9	9	9	9 2*	9 2*	9 2*	9 3*	9 4*
Spin	0	1	1	1	1	1	1	1	1	1
Wait	0	0	12	24	36	0	12	24	0	0

\* Indicates the number of times the shaded sequence is executed.

SECTION 2

TABLES

**Table B: Main Timing Table**

**Note: All Settings shown in seconds except those specified as %.**

	0	1	2	3	4	5	6	7	8	9
<b>D. Diluted Stain Steps</b>										
1. T/E (Step 6 )										
%Thiazin	0	30	40	45	50	55	60	70	80	100
%Eosin	100	70	60	55	50	45	40	30	20	0
2. Spin (Step 7))										
	0	1	20	25	30	35	40	45	50	65
3. Stain Buffer Ratio (Step 8)										
%Stain	0	30	32	34	36	38	41	44	50	55
%Buffer	100	70	68	66	64	62	59	56	50	45
4. Intensity (Step 9)										
Prime (600 RPM)	0	2	2	2	2	2	2	2	2	2
Spray	0	6 2*	6 2*	6 2*	6 3*	6 3*	6 4*	6 4*	6 5*	6 7*
Spin	0	y	y	y	y	y	y	y	y	y
Wait	0	25	40	60	30	60	30	60	30	30
<b>E. Final Duration Rinse (Step 10)</b>										
Spray A	0	6	9	9 2*	9 3*	9 4*	9 5*	9 6*	9 7*	9 9*
Spin	0	1	1	1	1	1	1	1	1	1
<b>F. Dry Time (Step 11)</b>										
950 RPM Spin	0**	20	20	20	20	20	20	20	20	20
Spray D, ABC Nozzle	0	3	3	3	3	3	3	3	3	3
950 RPM Spin	0	5	5	5	5	5	5	5	5	5
Reverse Spin 900 RPM	0	3	3	3	3	3	3	3	3	3
Spray D Nozzle	0	3	3	3	3	3	3	3	3	3
Reverse Spin 950 RPM	0	5	15	20	30	40	50	65	90	120

\*Indicates the number of times the shaded sequence is executed.

\*\*If dry step is set to "0" you must run a manual System Clean at the end of the staining cycle.

*Table C: Run Sequences*

**Rapid Stain  
INTENSITY SETTINGS**

STEP	1	2	3	4	5	6	7	8	9	
1. Fixation	4	4	4	4	4	4	7	7	7	Adjustable
<b>Concentrated</b>										
<b>Stain Steps</b>										
2. T/E Ratio	4	4	4	4	4	4	4	4	4	Adjustable
3. Spin	5	5	5	5	5	5	5	5	5	Adjustable
4. Intensity	1	2	3	4	5	6	7	8	9	
5. Mid Rinse	0	0	0	0	0	0	0	0	0	
<b>Dilute Stain Steps</b>										
6. T/E Ratio	0	0	0	0	0	0	0	0	0	
7. Spin	0	0	0	0	0	0	0	0	0	
8. Stain/Buffer	0	0	0	0	0	0	0	0	0	
9. Intensity	0	0	0	0	0	0	0	0	0	
10. End Rinse	3	3	3	3	3	3	4	4	5	Adjustable
11. Dry Time	4	4	4	4	4	4	4	4	4	
Elapsed Time (min)	3.2	4.4	4.6	4.8	4.9	5.6	5.7	5.9	6.7	
*Fixative Used (mL)	6.6	6.6	6.6	6.6	6.6	6.6	8.1	8.1	8.1	
*Eosin Used (mL)	2.4	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.3	
*Thiazin Used (mL)	2.4	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.3	
Buffer Used (mL)	9.3	9.3	9.3	9.3	9.3	9.3	14	14	19	

\* Times and volumes are approximate and may vary slightly between runs and instruments. The System Clean uses about 2-2.5 mL of methanol. The Carousel Clean uses about 5.5 mL of methanol and 4.5 mL of buffer

## SECTION 2

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**Table C: Run Sequences**

Step	Wright-Giemsa Stain Intensity Settings									
	1	2	3	4	5	6	7	8	9	
1. Fixation	4	4	4	4	4	4	7	7	7	Adjustable
<b>Concentrated Stain Steps</b>										
2. T/E Ratio	4	4	4	4	4	4	4	4	4	Adjustable
3. Spin	7	7	7	7	7	7	7	7	7	Adjustable
4. Intensity	1	1	1	1	1	1	1	1	1	
5. Mid Rinse	5	5	5	5	5	5	5	5	5	
<b>Dilute Stain Steps</b>										
6. T/E Ratio	4	4	4	4	4	4	4	4	4	Adjustable
7. Spin	1	1	1	1	1	1	1	1	1	Adjustable
8. Stain/Buffer	1	1	1	1	1	1	1	1	1	
9 Intensity	1	2	3	4	5	6	7	8	9	
10. End Rinse	4	4	4	4	4	4	4	4	4	Adjustable
11. Dry Time	4	4	4	4	4	4	4	4	4	
Elapsed Time (min)	5.4	5.9	6.6	6.4	7.8	7.0	9.1	7.8	9.2	
*Fixative Used (mL)	6.6	6.6	6.6	6.6	6.6	6.6	8.1	8.1	8.1	
*Eosin Used (mL)	3.5	3.5	3.5	4.2	4.2	4.5	4.5	5.0	5.8	
*Thiazin Used (mL)	3.5	3.5	3.5	4.2	4.2	4.5	4.5	5.0	5.8	
Buffer Used (mL)	28	28	28	30	30	32	32	34	38	

\* Times and volumes are approximate and may vary slightly between runs and instruments. The System Clean uses about 2-2.5 mL of methanol. The Carousel Clean uses about 5.5 mL of methanol and 4.5 mL of buffer

*Table C: Run Sequences*

May Grünwald Giemsa Intensity Settings										
Step	1	2	3	4	5	6	7	8	9	
1. Fixation	4	4	4	4	4	4	7	7	7	Adjustable
<b>Concentrated Stain Steps</b>										
2. T/E Ratio	6	6	6	6	6	6	6	6	6	Adjustable
3. Spin	6	6	6	6	6	6	6	6	6	Adjustable
4. Intensity	2	2	2	2	2	2	2	2	2	
5. Mid Rinse	5	5	5	5	5	5	5	5	5	
<b>Dilute Stain Steps</b>										
6. T/E Ratio	7	7	7	7	7	7	7	7	7	Adjustable
7. Spin	1	1	1	1	1	1	1	1	1	Adjustable
8. Stain/Buffer	1	1	1	1	1	1	1	1	1	
9. Intensity	1	2	3	4	5	6	7	8	9	
10. End Rinse	4	4	4	4	4	4	4	4	4	Adjustable
11. Dry Time	4	4	4	4	4	4	4	4	4	
Elapsed Time (min)	6.8	7.3	8.0	7.7	9.2	8.4	10.4	9.1	10.6	
*Fixative Used (mL)	6.6	6.6	6.6	6.6	6.6	6.6	8.1	8.1	8.1	
*Eosin Used (mL)	4.1	4.1	4.1	4.3	4.3	4.5	4.5	4.8	5.1	
*Thiazin Used (mL)	6.6	6.6	6.6	7.6	7.6	8.6	8.6	9.0	10.9	
Buffer Used (mL)	28	28	28	30	30	32	32	34	39	

\* Times and volumes are approximate and may vary slightly between runs and instruments. The System Clean uses about 2-2.5 mL of methanol. The Carousel Clean uses about 5.5 mL of methanol and 4.5 mL of buffer

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*Table C: Run Sequences*

Step	Custom Stain Intensity Settings								
	1	2	3	4	5	6	7	8	9
1. Fixation	4	4	4	4	4	4	7	7	7
<b>Concentrated Stain Steps</b>									
2. T/E Ratio	6	6	6	6	6	6	6	6	6
3. Spin	6	6	6	6	6	6	6	6	6
4. Intensity	1	2	3	4	5	6	7	8	9
5. Mid Rinse	5	5	5	5	5	5	5	5	5
<b>Dilute Stain Steps</b>									
6. T/E Ratio	5	5	5	5	5	5	5	5	5
7. Spin	1	1	1	1	1	1	1	1	1
8. Stain/Buffer	1	1	1	1	1	1	1	1	1
9. Intensity	4	4	4	4	4	4	4	4	4
10. End Rinse	4	4	4	4	4	4	4	4	4
11. Dry Time	4	4	4	4	4	4	4	4	4
Elapsed Time (min)	6.3	7.3	7.8	8.1	8.2	8.4	8.7	8.9	9.7
*Fixative Used (mL)	6.6	6.6	6.6	6.6	6.6	6.6	8.1	8.1	8.1
*Eosin Used (mL)	3.9	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.8
*Thiazin Used (mL)	5.2	6.8	6.8	6.8	6.8	6.8	6.8	6.8	7.8
Buffer Used (mL)	30	30	30	30	30	30	30	30	30

\* Times and volumes are approximate and may vary slightly between runs and instruments. The System Clean uses about 2-2.5 mL of methanol. The Carousel Clean uses about 5.5 mL of methanol and 4.5 mL of buffer