Custom Control Systems Inc.
Ellis Dryer Control
Configuration and Operation Manual

Revised 1/19/2004

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1 Introduction

1.1 Hardware Specifications

Microcontroller:	Z-180
RAM:	128k
ROM:	256k
Serial Port:	Two ports, RS-485/RS-232
Character Display:	4x20 vacuum fluorescent
Status LEDs:	25
Keypad:	Sealed silver/carbon, 38 keys

1.2 Software Features

96 Dry formulas
7 Operations per formula
Formulas may be configured to:

- dry at an outlet temperature for a programmed time
- dry at an inlet temperature for a programmed time
- dry until the inlet and outlet temperatures reach a programmed differential
- dry until an outlet humidity is reached
- dry until an outlet humidity is reached, then run for a programmed time

1.3 Warranty

1.3.1 Terms

All products manufactured by Custom Control Systems Inc. (CCS), are warranted against defects in material and workmanship for two years from the date of purchase. Warranty is extended to the original purchaser only.

If a defect occurs, the product will be repaired, provided that inspection proves the claim, and that the purchaser give CCS written notice, or returns such defect within 30 days. Defective product shall be returned to the factory, freight prepaid, in original shipping package.

Custom Control Systems Inc. extends this warranty in lieu of any other warranties expressed or implied, and CCS neither assumes, nor authorizes any other person to assume for it, any other liability in connection with its equipment. Remedies provided in this warranty shall constitute the exclusive remedies available to the original purchaser, and all other warranties and damages, statutory or otherwise, are hereby expressly waived by the original purchaser.

1.3.2 Exclusions

1. This warranty is void if the equipment is not properly installed, operated, and serviced as specified by the factory or if the equipment is not operated under normal conditions and with competent help.
2. Parts subject to normal wear or damaged by corrosion or exposure to weather, are not covered under this warranty.
3. This warranty does not cover labor to replace defective parts.
4. Expenses for removal and replacement of defective parts are not assumed by CCS.
5. Any modification made to CCS equipment after shipment from the factory or replacement of parts with types or makes other than originally furnished with the equipment, voids this warranty, unless such change or replacement has been approved in writing by CCS.
6. This warranty does not include any liability for consequential or incidental damage attributable to failure of any part of the equipment.
7. Although sold by CCS, equipment manufactured by others which is not an integral part of a CCS control, is excluded from this warranty, but may be covered by a warranty of the other manufactures.

1.3.3 Replacement of Parts Under Warranty

1.3.3.1 Ordering Replacement Parts

When ordering replacement parts, furnish the following information:

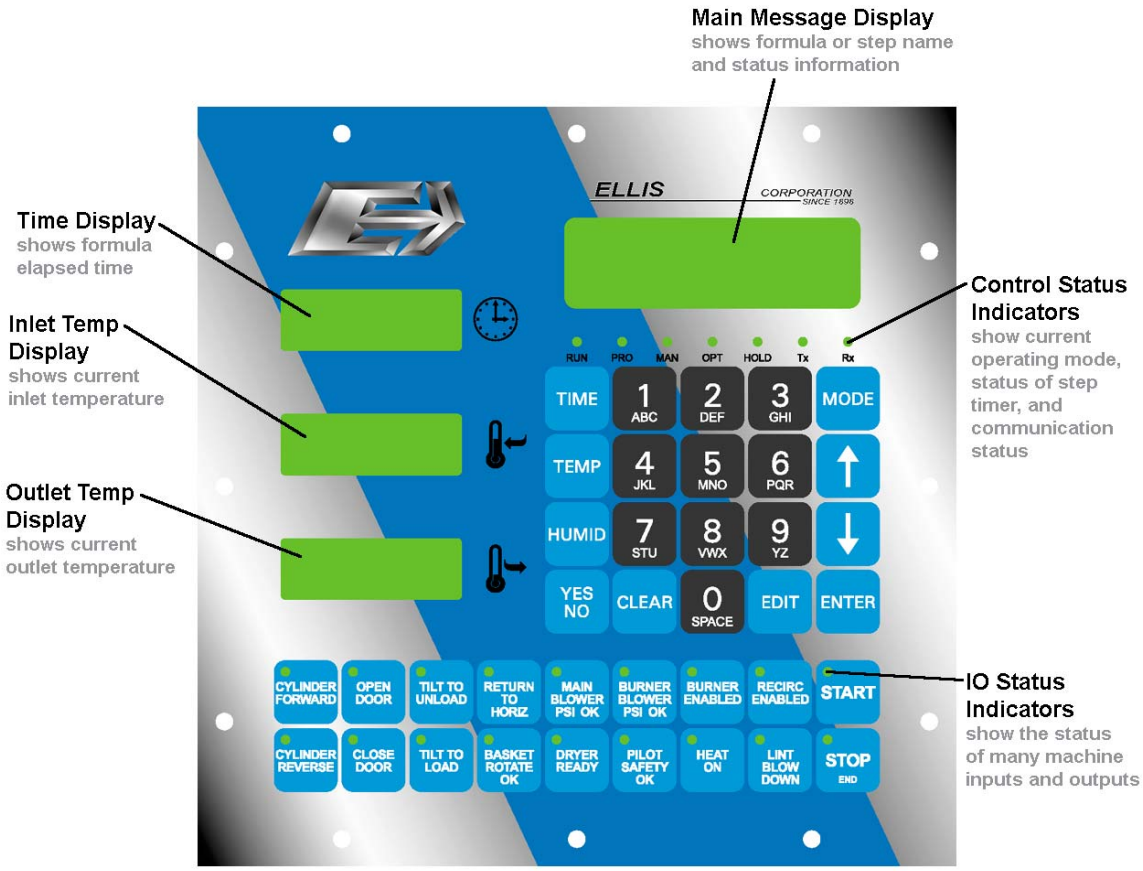
1. Model number and serial number.
2. Part number, description and quantity.
3. Shipping instructions.

1.3.3.2 Returning Parts Under Warranty

All parts furnished under warranty will be invoiced by CCS. If we do not want the part to be returned for inspection, the invoice will show that the replacement part was furnished at no charge. If however, the part is to be returned for inspection and possible credit, the invoice will show the cost of the part, and credit will be issued upon receipt of the defective part provided:

1. The replaced parts must be returned to the factory, freight prepaid, within 30 days from the date of invoice.
2. Each part to be returned for credit and inspection must be tagged, showing name of customer, invoice number of replacement part, and a brief explanation of difficulty. (Be more explicit than stating "N.G. or Defective".) Pack parts carefully, to avoid damage in shipment.
3. The inspection must prove that the part was defective and had to be replaced.
4. Replacement parts will be shipped freight prepaid and the amount will be added to the invoice. If the returned part proves to be defective, the credit issued for the part will include minimum shipping charges incurred. No allowance will be made for air freight or express shipments.
5. Replacement parts which are returned unused are subject to a 25% restocking charge. Special made parts that are not normally stocked by CCS are not returnable for credit.

1.4 Display/Keypad Layout



2 Run Mode/Idle

When the control first powers up, it is in Run Mode/Idle. In Run Mode/Idle, you can select and start a formula as well as load or unload the dryer.

2.1 Active Keys

0 SPACE - 9 YZ	Used to enter formula number.
↑	Selects next programmed formula.
↓	Selects previous programmed formula.
TEMP	Switches display between actual inlet and outlet temperatures, programmed inlet and outlet temperatures, the programmed and actual temperature difference, and the set and actual modulating gas valve positions.
MODE	Selects operation mode (will take user from Run Mode to Program Mode).
TIME	Switches display between programmed step time, formula remaining time, formula elapsed time, and step time remaining.
HUMID	Switches display between programmed humidity, outlet humidity, and ambient humidity.
START	Starts running the currently selected formula.
ENTER	Allows operator to select individual steps in the current fomula.
YES NO	Exits step selection and returns to formula selection.

2.2 Mode Select

When the processor is first powered up, it will be in the Run Mode. To change to any of the other modes (Program Mode, Manual Mode, Options Mode), press the MODE key. You may be required to enter a password (see Password, section 7.3.8, page 32) to leave the Run Mode.

2.3 Displays

When the control first powers up, the control shows formula information on the top two lines of the display, and machine status information on the bottom two lines of the display.

```
01  Formula     1          67%
01    98°F        87°F   11:00
Waiting  for
Start  Button
```

Formula Information - shows the formula name and number, current humidity, step number, inlet temperature, outlet temperature, and step time remaining.

Formula # Formula Name or Step Name Humidity

```
01  Formula   1      67%
01   98°F     87°F  11:00
```

Step# Inlet Temp Outlet Temp Time

Machine Status – shows what the machine is currently doing, as well as any error conditions that might occur.

```
Waiting for
start button
```

2.4 Select Formula

Formulas can be selected by one of two methods:

1. Press the ↑ and ↓ keys to scroll through the available formulas. The formula number and name will appear on the top line with the step number, temperature, level and time appearing on the second line.
2. Press the numeric keypad (0 SPACE - 9 YZ) to enter the desired formula number (01=formula 1; 16=formula 16). The formula number and name will appear on the top line and the step number will appear on the second line. If a mistake is made, reenter the desired formula number.

NOTE: Formulas can only be selected after the current formula has run to the end step and the signal or stop buttons have been pressed. This feature can be bypassed if desired (see Allow Step Advance, section 7.3.7, page 31).

2.5 Select Step

To scroll through the available steps in the selected formula, press ENTER then use ↑ or ↓ to scroll to the desired step. The step name will appear on the top line and the step number will appear on the second line.

Press YES NO to return to formula selection.

NOTE: Selecting Steps is protected by an Option Setting, but can be unprotected if desired (see Allow Step Advance, section 7.3.7, page 31).

2.6 Run a Formula

Select desired formula, then press the START key. The control will start the washer, and will enter Run Mode/Running.

3 Run Mode/Running

3.1 Active Keys

Used to stop the dryer. The control will enter the Run Mode/Stopped mode.

Switches display between actual inlet and outlet temperatures, programmed inlet and outlet temperatures, the programmed and actual temperature difference, and the set and actual modulating gas valve positions.

Switches display between programmed step time, formula remaining time, formula elapsed time, and step time remaining.

Switches display between programmed humidity, outlet humidity, and ambient humidity.

3.2 Running Formula

The control will begin running the formula with the currently selected step. The step timer will be started when the step's other criteria are met.

3.2.1 Maintain Outlet Temperature Setting

- The control will open the high fire or proportional gas valve to raise the outlet temperature when below the setpoint.
- The control will close the high fire or proportional gas valve to lower the outlet temperature when above the setpoint.
- The control will start the step timer when the programmed outlet temperature is first achieved after the control is started.

3.2.2 Maintain Inlet Temperature Setting

- The control will open the high fire or proportional gas valve to raise the inlet temperature when below the setpoint.
- The control will close the high fire or proportional gas valve to lower the inlet temperature when above the setpoint.
- The control will switch to outlet temperature control when the programmed outlet temperature is reached.

3.2.3 Inlet/Outlet Temperature Difference

- The control will open the high fire or proportional gas valve to raise the outlet temperature when below the setpoint.
- The control will close the high fire or proportional gas valve to lower the outlet temperature when above the setpoint.
- The control will start the step timer when the programmed difference between the inlet and outlet temperatures is reached.

3.2.4 Humidity

- The control will open the high fire or proportional gas valve to raise the outlet temperature when below the setpoint.
- The control will close the high fire or proportional gas valve to lower the outlet temperature when above the setpoint.
- The control will start the step timer when the outlet humidity has reached the setpoint and has remained there for the Humidity at Setpoint Time (section 7.3.13, page 32).

3.2.5 Recirculation

- The control will open the high fire or proportional gas valve to raise the outlet temperature when below the setpoint.
- The control will close the high fire or proportional gas valve to lower the outlet temperature when above the setpoint.
- The control will close the recirculation damper for the amount of time programmed in the step, beginning when the dryer is started (see Programming Outputs, section 5.6.4, page 21).

4 Run Mode/Stopped

If the dryer stops while running a formula – either because the operator presses the STOP key, or because an error condition has occurred, the control will enter Run Mode/Stopped. When stopped, the dryer door may be opened (assuming that the dryer temperature is below the low temperature setting (section 7.3.10, page 32) and the dryer may be unloaded.

4.1 Active Keys

TEMP	Switches display between actual inlet and outlet temperatures, programmed inlet and outlet temperatures, the programmed and actual temperature difference, and the set and actual modulating gas valve positions.
MODE	Selects operation mode (will take user from Run Mode to Program Mode).
TIME	Switches display between programmed step time, formula remaining time, formula elapsed time, and step time remaining.
HUMID	Switches display between programmed humidity, outlet humidity, and ambient humidity.
START	Starts running the currently selected formula.

5 Program Mode

The Program Mode is used to configure the control's dry formulas. The user may configure up to 96 dry formulas consisting of up to 7 steps each. This section explains how to select and name formulas, program dry steps, and enter temperature and humidity settings. Steps may be inserted, deleted or renamed.

5.1 Entering Program Mode

If the password feature has not been enabled, press the MODE key and proceed to step 4 below.

Otherwise, start with step 1.

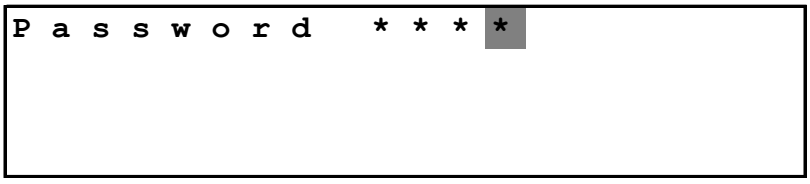
Note: the factory default password is 5500. To change the control password, see Password, section 7.3.8 on page 32. This example assumes that the control has been set up with the factory default password. If your password is different, use it instead.

1. Press the MODE key. (example for the default password)

The display will now read:

2. Press 5 MNO 5 MNO 0 SPACE 0 SPACE.

The display will now read:



3. Press the ENTER key. The control will now be in the Program Mode, and the "PRO" light will be illuminated.

5.2 Active Keys

Key	Function
↑	Selects the next formula or step (will discard any changes made to the current step if the step has not been saved).
↓	Selects the previous formula or step (will discard any changes made to the current step if the step has not been saved).
TEMP	Programs inlet temperature, outlet temperature, and temperature difference setpoints for the current step.
TIME	Programs step time for the current step.
HUMID	Programs humidity for the current step.
STOP END	Makes the current step an End Step.
EDIT	Start editing the steps of current formula.
YES NO	Exits step programming mode.
MODE	Selects operation mode (will take user from Program Mode to Manual Mode).

5.3 Displays

When the control first enters the Program Mode, the display will show the formula name and number, step number, programmed temperatures and programmed time. The status LEDs will show the outputs that have been programmed for that step.

Formula # Formula Name or Step Name Humidity

```
01  Formula    1      13h
01  550i      180o  15:00
```

Step# Inlet Temp Outlet Temp Time

5.4 Selecting a Formula

Select the Formula to be edited using the ↑ key to go to the next-higher numbered formula and the ↓ key to go to the next-lower numbered formula.

5.5 Editing the Formula Name

The formula name is displayed to the right of the formula number. If you want to change the name of a formula, you must first make sure that you are displaying the formula name, not the step name. When shipped from the factory, the control will have generic formula names programmed into it – Formula 1, Formula 2, etc. If the control is not showing the formula name, press the YES NO key to exit step editing mode.

Press the EDIT key, and the display will read:

```
Formula  edit
  1-Steps  2-Name
```

Press 2 DEF to edit name. A flashing cursor will appear on the first letter of the formula name.

```
01 Formula    1
```

5.5.1 Active Keys

CLEAR — Clears the formula name. Pressing the clear key twice restores the original name.

ENTER — Saves the formula name.

0 SPACE - 9 YZ — Use these keys to enter letters and numbers. When editing the formula name, the first time you press the button, you will get the number. The second time you press it , you get the first letter. The third time you press it, you get the second letter, and so on.

↑ — Moves the cursor one space to the right.

↓ — Moves the cursor one space to the left.

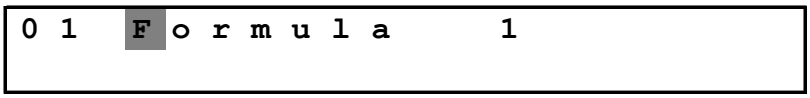
EDIT — Switches between capital and lowercase letters.

5.5.2 Sample Formula Name

To change the name of formula 1 from “Formula 1” to “Pants”, Press the EDIT key, and the display will read:

```
Formula  edit
  1-Steps  2-Name
```

Press 2 DEF to edit name. A flashing cursor will appear on the first letter of the formula name.



Press CLEAR to clear the formula name. The display will read:

Press the 6 PQR key once. The display will read:

Press the 6 PQR key a second time. The display will read:

Now, press the key to move the cursor one spot to the right.

Press the EDIT key to switch to lowercase letters, then press the 1 ABC key. The display will read:

Press the 1 ABC key again. The display will read:

Now, press the key to move the cursor one spot to the right.

Press the 5 MNO key. The display will read:

Press the 5 MNO key again. The display will read:

Press the 5 MNO key a third time. The display will read:

Now, press the key to move the cursor one spot to the right.

Press the 7 STU key three times. The display will read:

Now, press the key to move the cursor one spot to the right.

Press the 7 STU key twice more. The display will read:

Now press ENTER to save the name. The display will read

```
01  Pants
    Name  saved
```

for a few seconds, then return to the standard formula name display.

5.6 Program/Edit Formula Steps

Once you have selected the formula you wish to edit, press the EDIT key to access the step editor. The display will read:

```
Formula  edit
  1-Steps   2-Name
```

Press 1 ABC to edit steps. The display will now show the step name and the parameters programmed on that step.

```
01  Dry  One  Way      13h
01  550i      180o  15:00
```

5.6.1 Selecting Step to Edit

Use the ↑ and ↓ keys to select the step to be edited.

5.6.2 Clearing a Step

Use the CLEAR key to clear all outputs, temperatures and times programmed on the current step.

5.6.3 Saving a Step

The ENTER key saves the current step. The control will display the following message when saving a step:

```
01  Dry  One  Way      13h
01      Step  saved
```

5.6.4 Programming Outputs

Each step in a formula has different "outputs" programmed on it. An output is a machine function, such as the burner or basket rotation; when we say it is "programmed," we mean that the control will automatically operate that machine function when running the formula. Each of the programmable outputs has an indicator light while will be illuminated if that output is programmed on the current step.
On the dryer control, the following outputs are programmable:

programs the burner, or heat, on the current step.

programs recirculation on the current step.

programs forward basket rotation on the current step.

programs reverse basket rotation on the current step.

5.6.5 Programming Temperatures

The 

key is used to edit temperatures. Pressing the 

key cycles you between the following items: inlet temperature, outlet temperature, temperature difference and maximum valve position.

5.6.6 Programming Time

The 

key is used to edit the programmed step time.

5.6.7 Programming Humidity

The 

key is used to edit the programmed humidity on the current step.

5.6.8 End Step

The 

key programs an End Step, which indicates to the control that the dry formula is done.

5.6.9 Programming Edit

The [EDIT] key accesses the advance editing options. The control will display:

```
1 - I n s e r t ,   2 - D e l e t e
3 - S t e p   N a m e   4 - J u m p
```

5.6.9.1 Insert

The Insert function inserts a blank step before the current step. In other words, if you are working with step 2, and select insert, step 2 will become step 3, step 3 will become step 4 and so on, and a new blank step will be added as step 2.

5.6.9.2 Delete

The delete function removes the current step from the formula and moves the remaining steps down. For example, if you are working with step 2 and select the delete function, step 3 will become step 2, step 4 will become step 3, and so on. A blank step will be added to the end of the formula.

5.6.9.3 Step Name

The process of entering a step name is the same as the process of entering a formula name. See the example in Section 5.5.2, page 18.

5.6.9.4 Jump

Allows you to quickly jump to another step in the formula.

5.7 Sample Formula Programming Procedure

Use the ↑ and ↓ keys to select the formula you wish to edit. Press the Press the EDIT key, and the display will read:

```
Formula edit
  1-Steps   2-Name
```

Press 2 DEF to edit name. A flashing cursor will appear on the first letter of the formula name.

```
01  Formula     1
```

Follow the formula name programming procedures in Section 5.5.2, on page 18.

Once you finished editing the formula name, press the EDIT key to access the step editor. The display will read:

```
Formula edit
  1-Steps   2-Name
```

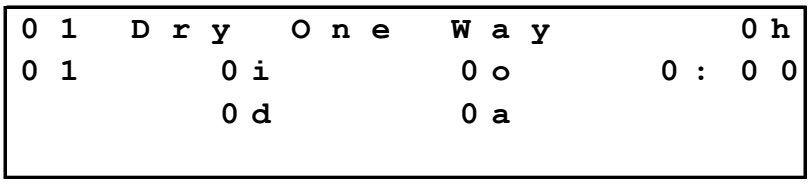
Press 1 ABC to edit steps. The display will now show step 1.

```
01    **  End  **          0h
01      0i       0o      0:  00
```

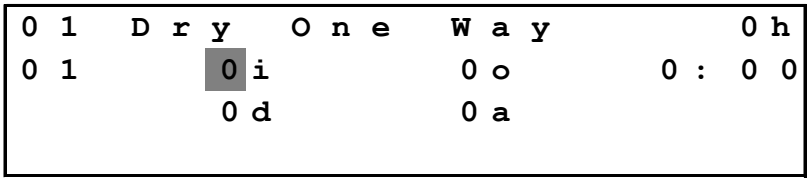
Use the CLEAR key to clear step one. The display will now read:

```
01  Cooldown              0h
01      0i       0o      0:  00
```

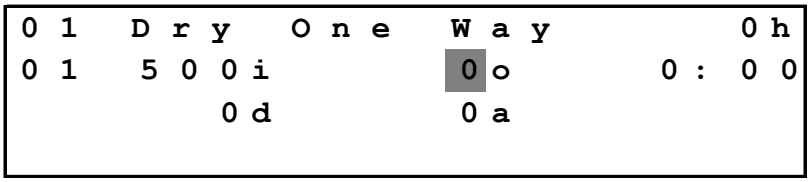
Typically, the first step of the formula is a heat step. Press the BURNER ENABLED key to enable the burner, and the CYLINDER FORWARD key to select forward rotation. The display will now read:



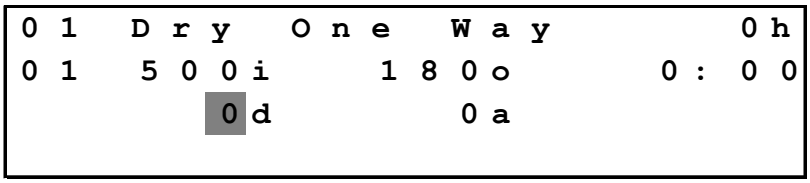
Next, we will want to program our inlet and outlet temperatures, so press the TEMP key. The cursor will start flashing on the inlet temperature:



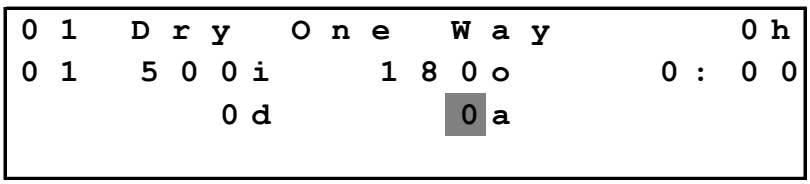
Use the number keys to type in your desired inlet temperature. In this case, press 5 MNO 0 SPACE 0 SPACE to enter 500 degrees. Then press TEMP again.



The cursor will now be blinking on the outlet temperature. Again, use the number keys to enter your desired outlet temperature, in this case, 180. Then press TEMP again.



The cursor will now be blinking on the temperature difference. Leave this set to zero, and press TEMP again.



The cursor will now be blinking on the maximum gas valve setting. Leave this set to zero, and press TEMP again. The cursor will stop blinking.

Now, press the TIME key. The cursor will start blinking on the step time.

```
01   Dry   One   Way          0h
01   500i     180o        0:  00
          0d       0a
```

Use the number keys to enter your desired step time, in minutes and seconds. To program four minutes and thirty seconds, press 4 JKL 3 GHI 0 SPACE, then press TIME.

Next, to program humidity, press the HUMID key. The cursor will start blinking on the humidity setting.

```
01   Dry   One   Way          0h
01   500i     180o        4:  30
          0d       0a
```

Use the number keys to enter the desired humidity, and press the HUMID key again.

Now, to save the step, press ENTER. The control will tell you that it is saving the step:

```
01   Dry   One   Way          5h
01       Step  saved
```

The control will automatically advance to step two. The display will read:

```
01   Cooldown                 0h
02       0i          0o      0:  00
```

Step two is typically a cooldown step. We're going to select forward rotation, by pressing the CYLINDER FORWARD key, then press the TEMP key twice to enter our desired cooldown temperature of 130 deg.

```
01   Cooldown                 0h
02       0i      130o        0:  00
```

Once the cooldown outlet temperature is entered, press TEMP again.

Now, to save the step, press ENTER. The control will tell you that it is saving the step:

```
0 1   C o o l d o w n                0 h
0 2       S t e p   s a v e d
```

The control will automatically advance to step three. The display will read:

```
0 1   C o o l d o w n                0 h
0 3       0 i          0 o       0 : 0 0
```

Step three is typically an end step. To program an end step, press the STOP key.

The control will tell you that it is saving the step:

```
0 1     * *   E n d   * *              0 h
0 3       S t e p   s a v e d
```

Now, press the YES NO key to exit step editing mode and return to the formula list.

5.8 Exit Program Mode

To exit the program mode, press the MODE key. This will take you to the Manual Mode.

6 Manual Mode

6.1 Entering Manual Mode

If the password feature has not been enabled, press the MODE key and proceed to step 4 below.

Otherwise, start with step 1.

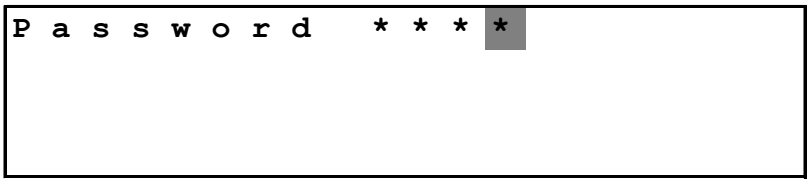
Note: the factory default password is 5500. To change the control password, see Password, section 7.3.8 on page 32. This example assumes that the control has been set up with the factory default password. If your password is different, use it instead.

1. Press the MODE key. (example for the default password)

The display will now read:

2. Press 5 MNO 5 MNO 0 SPACE 0 SPACE.

The display will now read:



3. Press the ENTER key. The control will now be in the Program Mode, and the "PRO" light will be illuminated.
4. Press the MODE key again. The control will now be in the Manual Mode, and the "MAN" light will be illuminated.

6.2 Active Keys

MODE	Exits the Manual Mode and enters the Options Mode.
EDIT	Accesses the formula counters and hour meter.

6.3 Displays

When you first enter the manual mode, the display will show:

```
        M a n u a l   m o d e
    7 4 °    7 1 °    3 3 %
  1 3   2 7   2 4 8   1 4   1 8
  7 4   7 1       0     0
```

On this screen, you see the actual inlet and outlet temperatures and the outlet humidity. On the bottom two lines of the display, you see the raw readings from the control's analog channels. These are available for troubleshooting purposes.

6.4 Reviewing Formula Counters

1. Press the EDIT key. The review hour meter/formula count section of the Manual Mode will be entered. The display will read:

```
        H o u r   m e t e r
           2 3 :  1 7
```

This shows the total hours of operation of the dryer.

2. Press the ↑ key. The display will read:

```
0 1   F o r m u l a      1
D a y      3   T o t a l        3 6 5
```

This shows the two formula counters – the "day" counter, which can be reset and used to keep track of the number of times the formula has been run recently, and the "total" counter, which contains the total number of times the formula has been run, which cannot be reset. (The day count, if not reset, will count 255 loads and then roll over and start at zero again. The total count, regardless of resets, will count to 65,535 loads and then roll over and start at zero.

3. Press ↑, to advance to the next formula for review.

4. Press the STOP key to exit the review hour meter/formula count section and return to the Manual Mode.

NOTE: Formulas will only be displayed if they have been previously run. The total counter will not be reset.

6.5 Resetting Daily Counters

1. Press the EDIT key to enter the review hour meter/formula count section.

2. Press the CLEAR key. The display will read "Clear Daily Counters: No". Press the YES NO key to change option to YES.

3. Press ENTER to finalize reset of Load Counters for all formulas.

4. Press the STOP END key to exit the review hour meter/formula count section and return to the Manual Mode.

6.6 Exiting Manual Mode

To exit the program mode, press the MODE key. This will take you to the Options Mode.

7 Options Mode

7.1 Entering Options Mode

If the password feature has not been enabled, press the MODE key and proceed to step 4 below.

Otherwise, start with step 1.

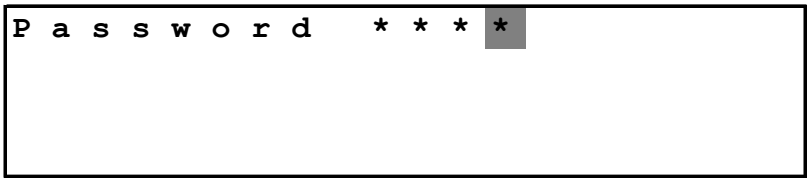
Note: the factory default password is 5500. To change the control password, see Password, section 7.3.8 on page 32. This example assumes that the control has been set up with the factory default password. If your password is different, use it instead.

1. Press the MODE key. (example for the default password)

The display will now read:

2. Press 5 MNO 5 MNO 0 SPACE 0 SPACE.

The display will now read:



3. Press the ENTER key. The control will now be in the Program Mode, and the "PRO" light will be illuminated.

4. Press the MODE key again. The control will now be in the Manual Mode, and the "MAN" light will be illuminated.

5. Press the MODE key again. The control will now be in the Options Mode, and the "OPT" light will be illuminated.

7.2 Active Keys

CLEAR	Sets the current option value to zero. Pressing the clear key twice restores the original setting.
ENTER	Saves the current option value.
0 SPACE - 9 YZ	Use these keys to enter numeric values for options.
↑	Selects the next option.

Selects the previous option.

Starts the process of editing the current option.

Exits the options mode and returns to the run mode.

7.3 Option Settings

7.3.1 Motor On

Enter the time for the basket motor run time (used only by dry formulas programmed for reversing).

7.3.2 Motor Off

Enter the time for the basket motor pause (used only by dry formulas programmed for reversing).

7.3.3 Signal On

Enter the on time for the signal output. The valid range for this field is .1 seconds to 10 seconds, the smallest unit of change is .05 seconds. If a mechanical bell is connected, this field can be changed to 10 seconds and the next field, signal off time, can be changed to zero seconds, which will cause the control to ring the bell continuously.

7.3.4 Signal Off

Enter the off time for the signal output. The valid range for this field is 0 seconds to 10 seconds, the smallest unit of change is .05 seconds. Changing this field to zero will cause the signal to ring without any pulsing.

7.3.5 Display Brightness

Enter the number from the following chart to set the display brightness.

2- (25%)
5- (50%)
7- (75%) (Default setting)
1- (100%)

Changes to this field will take effect immediately.

7.3.6 Temperature Timeout

Enter the time in minutes and seconds for the maximum allowable time for the dryer to come up to temperature. The default for this field is 10:00 minutes. The valid range for this field is zero to 25 minutes, the smallest unit of change is 15 seconds. This may cause some confusion if the user tries to set the time-out to 4:10 minutes, the dryer control will round this entry to 4:15 minutes. This field must be configured for proper control operation.

7.3.7 Allow Step Advance

Press the 

key, to toggle between YES (enabled) or NO (disabled). If this feature is enabled, it will allow the operator to change steps during a formula, or to start a formula on a step other than step one. If this feature is disabled the step can still be changed if the machine has a supervisor key option. If the supervisor key option has not been configured consult a Factory Authorized Technician to setup this option.

7.3.8 Password

Enter the password required for entry to the program, manual and options modes. The factory default for this field is 5500. It is recommended that the user change this field. If this field is set to 0 the password feature will be disabled. The operator may also enter the program and options modes with the use of the supervisor key, if this feature has been configured. If the supervisor key feature has not been configured consult a Factory Authorized Technician to set up the feature.

7.3.9 Chirp Time

Enter the on time for the key chirp output. The valid range for this field is .05 seconds to .95 second, the smallest unit of change is .05 seconds. This feature may be disabled by setting this field to zero.

7.3.10 Low Temperature

Enables the temperature interlock features of the dryer control. This feature keeps the door closed while the temperature of the machine is above the set value. The valid range for this field is 0 to 255 degrees.

7.3.11 Open Door Time

On machines equipped with an automatic door, this setting is used to set the amount of time that it takes the door to go from fully closed to fully open. The valid range for this field is 0 to 255 seconds.

7.3.12 Raise Machine Time

On machines equipped with a tilting basket, this setting is used to set the amount of time that it takes to go from the run position to the load or unload positions. The valid range for this setting is 0 to 255 seconds.

7.3.13 Humidity at Setpoint Time

This setting is used to set the amount of time that the outlet humidity must be at setpoint before starting the step timer.

7.3.14 Inlet Temperature Limit

This setting is used to set the maximum allowable inlet temperature. When this temperature is reached, the control will shut off the burner and start a cooldown cycle.

7.3.15 Outlet Temperature Limit

This setting is used to set the maximum allowable inlet temperature. When this temperature is reached, the control will shut off the burner and start a cooldown cycle.

7.3.16 Wait for Temp. to Start Step Timer

This setting is used to tell the dryer control that it should wait for the programmed inlet or outlet temperature to be achieved before starting the step timer.

7.3.17 Rotate Basket After Low Temperature

This setting is used to tell the dryer control that it should continue rotating the basket after low temperature has been reached at the end of a cycle.

7.3.18 Keep Blowers On In End Step

This setting is used to tell the dryer control that it should continue running the blowers when it reaches the end of the cycle. Pressing the 

key at the end of the cycle will turn the blowers off.

7.3.19 Rotate Basket In End Step

This setting is used to tell the dryer control that it should continue running the blowers when it reaches the end of the cycle. Pressing the STOP key at the end of the cycle will turn the blowers off.

7.3.20 Automatically Reset Display Modes

This setting is used to tell the dryer control whether it should automatically return the time display to elapsed time a few seconds after the user has pressed the TIME key to view programmed, step, or remaining time. If set to "Yes", the control will automatically return to the elapsed time display and the actual inlet and outlet temperatures. If set to "No", the display will remaining on whatever information was last viewed.

7.3.21 Set Up Service Alerts

Press the EDIT key and enter the password (2007) and press the ENTER key. There are four sections in the service alerts, which are accessed by pressing the the EDIT key:

7.3.21.1 Reset Service Alerts

```
Service item # 11
Item 11
Due at: 16309 hrs
Currently: 11452 hrs
```

This tells the control that the maintenance has been performed, and sets a new "due" time for the item. The reset service alerts section displays the service alert name, the next number of hours that the item is due at, and the current number of hours of operation. Use the ↑ and ↓ keys to select the alert you wish to reset. To reset the alert, press the CLEAR key when displaying the item you wish to reset. When finished, press the STOP key to exit.

7.3.21.2 Edit Service Alerts

```
Service item # 11
Item 11
Alert @ 250 hrs
Critical @ 300 hrs
```

This section edits service alert names and time intervals. To select the service alert you would like to edit, use the  and  keys. When the control is displaying the alert you wish to edit, press the  key. The cursor will begin flashing on the first letter of the service alert name.

Use the alphanumeric keys to enter the service alert name you wish to use, then press  . The cursor will then flash on the "Alert @" number. Use the alphanumeric keys to enter the number of hours you want between alarms for this service item, and press  . The cursor will then flash on the "Critical @" number. Use the alphanumeric keys to enter the number of hours you want to allow before the alert becomes critical - i.e., prevents the machine from running. Press  when you are finished. Press  to exit from this section.

7.3.21.3 Erase All Service Alerts

This provides a convenient way to erase all service alert settings. When you select this function, the control will ask, "Are you absolutely positive you want to clear service items?" Use the  key to select, then press  . If you selected "Yes", the control will clear all of your service items.

7.3.21.4 Edit Service Alert Options

This provides access to the various service alert options.

a. Enable service items - activates/deactivates the service alerts.

7.3.22 Factory Options

This is used to enter the factory options section. See manual section 8, page 35 for more information.

7.4 Exiting Options Mode

To exit the options mode, press the  key. This will take you to the Run Mode/Idle.

8 Factory Options

This section provides the information that controls proper setup and operations of your dryer. Only Qualified Service Personnel should change I/O assignments, as the safe operation of the washer may be effected. Failure to fully understand this data may result in the improper operation of the dryer and the dryer control. Incorrect setup may result in washer malfunctioning, which could result in personal injury, dismemberment or death. Custom Control Systems Inc. assumes no responsibility for improper use or setup of this unit. Contact a Factory Authorized Service Technician, to establish correct setup procedures.

8.1 Entering Factory Options

If the password feature has not been enabled, press the MODE key and proceed to step 4 below.

Otherwise, start with step 1.

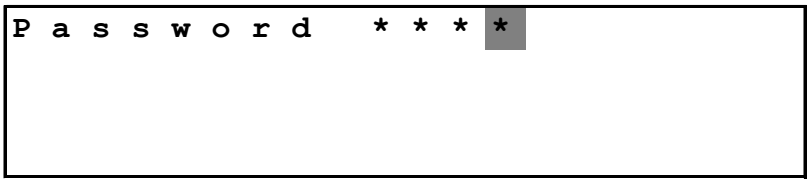
Note: the factory default password is 5500. To change the control password, see Password, section 7.3.8 on page 32. This example assumes that the control has been set up with the factory default password. If your password is different, use it instead.

1. Press the MODE key. (example for the default password)

The display will now read:

2. Press 5 MNO 5 MNO 0 SPACE 0 SPACE.

The display will now read:



3. Press the ENTER key. The control will now be in the Program Mode, and the "PRO" light will be illuminated.

4. Press the MODE key again. The control will now be in the Manual Mode, and the "MAN" light will be illuminated.

5. Press the MODE key again. The control will now be in the Options Mode, and the "OPT" light will be illuminated.

6. Now, press the ↓ key until "Factory Options" is shown on the display. Press the EDIT key. The control will ask for a password, type in "1206" and press ENTER.

8.2 Active Keys

Selects the next option.

Selects the previous option.

Enters the currently selected submenu.

Exits the options mode and returns to the run mode.

8.3 I/O Assignments

To edit the I/O Assignments, follow the directions for entering the factory options in section 8.1, Entering Factory Options, on page 35. Once in the factory options section, select "I/O Assignments" and press the EDIT key.

Once in the I/O Assignments section, the display will show: (note that your display may be slightly different, based on your machine's configuration)

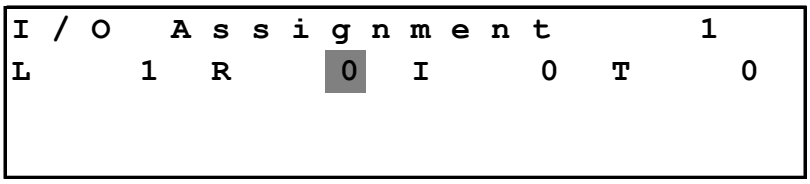
```
I / O   A s s i g n m e n t       1
L     0   R     0   I     0   T     0
```

The top line shows the I/O Assignment number, while the second line shows each of the four settings associated with an I/O Assignment – the LED, Relay, Input and Type. The LED setting tells the control which light on the front panel to illuminate when the machine function is active. The Relay setting tells the control which relay on the I/O board to activate to operate the machine function. The Input assignment tells the control which input on the I/O board to look at. The Type assignment allows the control to use machine functions in different ways.

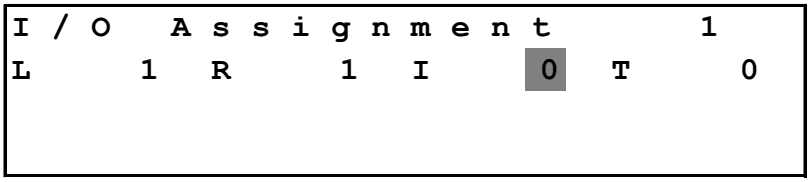
To edit an I/O assignment, press the EDIT key. The cursor will begin flashing on the LED assignment:

```
I / O   A s s i g n m e n t       1
L     0   R     0   I     0   T     0
```

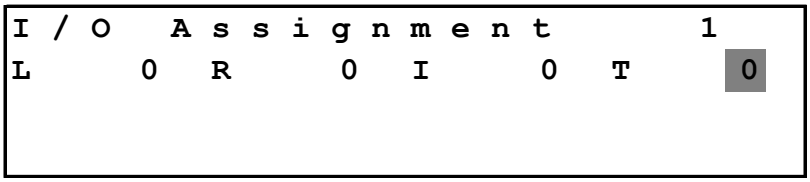
Use the number keys to enter the desired LED, then press the ENTER key to move to the Relay setting. The cursor will begin flashing on the Relay setting:



Use the number keys to enter the desired relay, then press the ENTER key to move to the Input setting. The cursor will begin flashing on the Input setting:



Use the number keys to enter the desired input, then press the ENTER key to move to the Type setting. The cursor will begin flashing on the Type setting:



Use the number keys to enter the desired type, then press the ENTER key to store the settings. At this point, you can select another I/O Assignment using the ↑ and ↓ keys.

When finished editing the I/O Assignments, press the STOP key to return to the Factory Options list.

8.3.1 High Fire

LED: Enter the number corresponding to the high fire LED.
Relay: Enter the number corresponding to the high fire relay. The dryer control will energize this output when it wants to open the high fire gas valve. A relay must be assigned to this I/O Assignment to enable heat.
Input: This field is not currently used.
Type: This field is not currently used.

8.3.2 Low Fire

LED: Enter the number corresponding to the low fire LED.
Relay: Enter the number corresponding to the low fire relay. The dryer control will energize this output when it wants to open the low fire gas valve.
Input: This field is not currently used.
Type: This field is not currently used.

8.3.3 Recirculation

LED: Enter the number corresponding to the recirculation damper LED.
Relay: Enter the number corresponding to the recirculation damper relay. The dryer control will energize this output when it wants to activate the recirculation damper.
Input: This field is not currently used.
Type: This field is not currently used.

8.3.4 Signal

LED: Enter the number corresponding to the signal LED.
Relay: Enter the number corresponding to the signal relay. If the piezo signal output from the back of the dryer control is used this field may be changed to zero. Additional fields in the options list should also be reviewed for setting the signal on and signal off times.
Input: Enter the number corresponding to the signal input. This input is normally floating high, connecting this input to the input common will acknowledge the signal.
Type: 0: The chirp output will sent to the CPU output and the relay output.
1: The chirp output will not be sent to the relay assignment.

8.3.5 Basket Forward

LED: Enter the number corresponding to the basket forward LED.
Relay: Enter the number corresponding to the motor forward starter relay.
Input: This field is not currently used.
Type: This field is not currently used.

8.3.6 Basket Reverse

LED: Enter the number corresponding to the motor reverse LED.
Relay: Enter the number corresponding to the motor reverse start relay.
Input: This field is not currently used.
Type: This field is not currently used.

8.3.7 (Not Used)

8.3.8 (Not Used)

8.3.9 (Not Used)

8.3.10 (Not Used)

8.3.11 (Not Used)

8.3.12 (Not Used)

8.3.13 Auxiliary 1

LED: Enter the number corresponding to the auxiliary output LED.
Relay: Enter the number corresponding to the auxiliary output relay.
Input: This field is not currently used.
Type: 0: This output will turn off if the dryer control is stopped while running a formula.
1: This output will remain on if the dryer control is stopped while running a formula.

8.3.14 Auxiliary 2

LED: Enter the number corresponding to the auxiliary output LED.
Relay: Enter the number corresponding to the auxiliary output relay.
Input: This field is not currently used.
Type: 0: This output will turn off if the dryer control is stopped while running a formula.
1: This output will remain on if the dryer control is stopped while running a formula.

8.3.15 Auxiliary 3

LED: Enter the number corresponding to the auxiliary output LED.
Relay: Enter the number corresponding to the auxiliary output relay.
Input: This field is not currently used.
Type: 0: This output will turn off if the dryer control is stopped while running a formula.
1: This output will remain on if the dryer control is stopped while running a formula.

8.3.16 Auxiliary 4

LED: Enter the number corresponding to the auxiliary output LED.
Relay: Enter the number corresponding to the auxiliary output relay.
Input: This field is not currently used.
Type: 0: This output will turn off if the dryer control is stopped while running a formula.
1: This output will remain on if the dryer control is stopped while running a formula.

8.3.17 Gas Blower

LED: Enter the number corresponding to the gas blower LED.
Relay: Enter the number corresponding to the gas blower relay. The dryer control will energize this output when running the gas blower during a dry step.
Input: This field is not currently used.
Type: This field is not currently used.

8.3.18 Exhaust Blower

LED: Enter the number corresponding to the exhaust blower LED.
Relay: Enter the number corresponding to the exhaust blower relay. The dryer control will energize this output when running the exhaust blower during a dry step.
Input: This field is not currently used.
Type: This field is not currently used.

8.3.19 Lint Blowdown

LED: Enter the number corresponding to the lint blowdown LED.
Relay: Enter the number corresponding to the lint blowdown relay. The dryer control will energize this output for the amount of time set in the Lint Trap Blowdown Time option, section 8.5.14, page 53. The control can be set up to blow down the lint trap at various times, including at the beginning of the formula, end of formula, whenever the control is

stopped, and periodically while the machine is running. See sections 8.5.15 through 8.5.19 on page 53 for more information.

Input: This field is not currently used.

Type: This field is not currently used.

8.3.20 De-Linter

LED: Enter the number corresponding to the de-linter LED.

Relay: Enter the number corresponding to the de-linter relay. The dryer control will energize this output for 15 seconds at the beginning of a dry formula

Input: This field is not currently used.

Type: This field is not currently used.

8.3.21 Flame Control Enable

LED: Enter the number corresponding to the flame control enable LED.

Relay: Enter the number corresponding to the flame control enable relay. The dryer control will energize this output whenever it wishes to use the burner.

Input: Enter the number corresponding to the flame control enabled input. The dryer control looks for this input to indicate that the burner has been lit and that the flame is within specifications.

Type: This field is not currently used.

8.3.22 Exhaust Pressure

LED: This field is not currently used.

Relay: This field is not currently used.

Input: Enter the number corresponding to the exhaust pressure switch input. The dryer control expects a connection between this input and the input common to indicate that the exhaust pressure is within the acceptable limits. The control will wait for twenty seconds after the main blower motor has been turned on before checking the status of this input.

Type: This field is not currently used.

8.3.23 Gas Pressure

LED: This field is not currently used.

Relay: This field is not currently used.

Input: Enter the number corresponding to the gas pressure switch input. The dryer control expects a connection between this input and the input common to indicate that the gas pressure is within the acceptable limits. The control will check the status of this input prior to enabling the flame control.

Type: This field is not currently used.

8.3.24 Excessive Backpressure

LED: This field is not currently used.

Relay: This field is not currently used.

Input: Enter the number corresponding to the excessive backpressure switch input. The dryer control expects a connection between this input and the input common to indicate that the exhaust backpressure has exceeded acceptable limits.

Type: This field is not currently used.

8.3.25 Lint Thermal Switch

LED: This field is not currently used.

Relay: This field is not currently used.

Input: Enter the number corresponding to the lint trap thermal switch input. The dryer control expects a connection between this input and the input common to indicate that there is a fire in the lint trap.

Type: This field is not currently used.

8.3.26 Modulating Valve Enable

LED: This field is not currently used.
Relay: Enter the number corresponding to the modulating gas valve enable relay. The dryer control will energize this relay when the modulating gas valve is in use.
Input: This field is not currently used.
Type: This field is not currently used.

8.3.27 Modulating Valve Open

LED: This field is not currently used.
Relay: Enter the number corresponding to the modulating gas valve open relay. The dryer control will energize this relay when it needs to open the modulating gas valve.
Input: This field is not currently used.
Type: 0: The dryer has a modulating valve that accepts contact-closure open and close signals, and provides a slide-wire position feedback system.
1: The dryer has a modulating valve that accepts an analog signal, either 4-20 mA 0-10 V and automatically opens and closes in response to that signal.

8.3.28 Modulating Valve Closed

LED: This field is not currently used.
Relay: Enter the number corresponding to the modulating gas valve close relay. The dryer control will energize this relay when it needs to close the modulating gas valve.
Input: This field is not currently used.
Type: This field is not currently used.

8.3.29 Start

LED: Enter the number corresponding to the Run Mode LED.
Relay: Enter the number corresponding to the run output. The behavior of this output depends on the Start I/O Assignment type.
Input: Enter the number corresponding to the external start input. When the dryer control sees a connection between this input and the input common, it will start the current formula.
Type: 0: The dryer control will energize the start output whenever the control is running a formula in the Run Mode.
1: The dryer control will pulse the start relay when the control starts running a formula in the Run Mode, and will energize the stop relay whenever the control is stopped.
2: The dryer control will energize the start relay whenever the control is running a formula in the run mode. If the dryer control is pulsing the operator signal, it will pulse the start relay as well. When the dryer control is stopped, it will energize the stop relay.

8.3.30 Stop

LED: Enter the number corresponding to the Program Mode LED.
Relay: Enter the number corresponding to the stop relay. The behavior of this output depends on the Start I/O Assignment type.
Input: Enter the number corresponding to the external stop input. When the dryer control sees a connection between this input and the input common, it will stop the current formula.
Type: 0: The dryer control uses an external stop switch connected to the stop input.
1: The dryer control uses the falling edge of the Start input as the external stop input.

8.3.31 Formula Up

LED: Enter the number corresponding to the Manual Mode LED.
Relay: This field is not currently used.
Input: Enter the number corresponding to the external formula up selector switch.
Type: 1: Will disable the membrane Formula Up/Down, Start and Signal keys from working in the run mode.

8.3.32 Formula Down

LED: Enter the number corresponding to the Options Mode LED.
Relay: This field is not currently used.
Input: Enter the number corresponding to the external formula down selector switch.
Type: This field is not currently used.

8.3.33 Hold

LED: Enter the number corresponding to the hold LED. The hold LED will come on whenever the step timer is being held. If the light is solid, it means that the control is waiting for some condition (temperature, humidity, etc.) to be met before starting the step timer. If the light is blinking, it means that the timer is being held in response to an external request.
Relay: This field is not currently used.
Input: Enter the number corresponding to the external hold input. The dryer control expects to see a connection between this input and the input common to place the formula timer on hold.
Type: This field is not currently used.

8.3.34 Communication

LED: Enter the number corresponding to the communication LED.
Relay: This field is not currently used.
Input: This field is not currently used.
Type: This field is not currently used.

8.3.35 Basket Motor Overload

LED: This field is not currently used.
Relay: This field is not currently used.
Input: Enter the number corresponding to the basket motor overload relay contact. If the contact is normally closed, enter the input number plus 100.
Type: 0: Normal basket motor overload message is displayed.
1: A general motor overload is displayed. This will allow machines that have all motor overloads tied to a single input to be monitored.

8.3.36 Blower Motor Overload

LED: This field is not currently used.
Relay: This field is not currently used.
Input: Enter the number corresponding to the blower motor overload relay contact. If the contact is normally closed, enter the input number plus 100.
Type: This field is not currently used.

8.3.37 Basket Rotation

LED: Enter the number corresponding to the basket rotation LED. The dryer control will illuminate this LED when it senses the basket rotation switch.

Relay: This field is not currently used.

Input: Enter the number corresponding to the basket rotation switch input.

Type:
- 0: The basket rotation sensor is a mechanical limit switch that is closed once per rotation. The switch is connected to the contact closure input set in the input field of the I/O Assignment. Each time the control sees this input pulse, it loads a timer with the number of seconds set in the Basket Rotation Time option (section 8.5.11, page 52). The control will display a "Basket Not Rotating" error if this timer runs out.
- 1: The basket rotation sensor is a proximity switch or photoeye that pulses more than once per rotation. The sensor is connected to the high speed counter input set in the input field of the I/O Assignment. Each time the control sees this input pulse, it loads a timer with the number of seconds set in the Basket Rotation Time option (section 8.5.11, page 52). The control will display a "Basket Not Rotating" error if this timer runs out.
- 2: The basket rotation sensor is part of a mechanical timer system that provides a solid contact closure when the basket rotation is good. When the control has this input, it loads an internal timer for the time set in the Basket Rotation Time option (section 8.5.11, page 52)

8.3.38 Supervisor Key

LED: This field is not currently used.

Relay: This field is not currently used.

Input: Enter the number corresponding to the external supervisor key switch. When the dryer control sees a contact between this input and the input common it will allow the supervisor to advance or decrement the step number, or even change the current formula number without completing the current formula.

Type:
- 0: Allow password or supervisor key to use mode select.
- 1: Require password and supervisor key to use mode select.

8.3.39 Front Tilt Safety

LED: This field is not currently used.

Relay: This field is not currently used.

Input: Enter the number corresponding to the front tilt function/tilt safety switch input. When the dryer control sees a contact between this input and the input common it will start the process of opening the dryer's door or tilting the basket. This input is used in conjunction with the front tilting and door command inputs.

Type: This field is not currently used.

8.3.40 Jog

LED: This field is not currently used.

Relay: This field is not currently used.

Input: Enter the number corresponding to the jog switch. When the dryer control sees a contact between this input and the input common and the machine has been tilted to the load or unload position, it will run the basket motor.

Type: This field is not currently used.

8.3.41 Run Position Front

LED: This field is not currently used.
Relay: This field is not currently used.
Input: See type for explanation of behavior.
Type:
- 0: The dryer has momentary push-button switches for the run, load, and unload positions. When the dryer control sees a contact between this input and the input common, it will begin tilting the machine to the selected position.
- 1: The dryer has a three-position selector switch for run, load, and unload positions. When the dryer control sees a maintained contact between this input and the input common, it will tilt the machine in the appropriate direction. If the dryer control does not see contact on either the load or unload position switches, it will automatically tilt the machine to the run position.
- 2: The dryer has separate momentary pushbuttons for the run, load and unload positions, as well as a tilt safety button. To tilt the dryer, the operator must press the button for the desired machine position and the tilt safety button. If the operator releases either button, the dryer stops moving.

8.3.42 Load Position Front

LED: This field is not currently used.
Relay: This field is not currently used.
Input: See type on the Run Position Front I/O Assignment (section 8.3.41, page 44).
Type: This field is not currently used.

8.3.43 Unload Position Front

LED: This field is not currently used.
Relay: This field is not currently used.
Input: See type on the Run Position Front I/O Assignment (section 8.3.41, page 44).
Type: This field is not currently used.

8.3.44 Door Open Front

LED: This field is not currently used.
Relay: This field is not currently used.
Input: Enter the number corresponding to the front door open switch input. Contact between this input and the input common indicates to the dryer control that the dryer's front door is open.
Type: This field is not currently used.

8.3.45 Door Closed Front

LED: This field is not currently used.
Relay: This field is not currently used.
Input: Enter the number corresponding to the front door closed switch input. Contact between this input and the input common indicates to the dryer control that the dryer's front door is closed.
Type: This field is not currently used.

8.3.46 Raise Door Front

LED: Enter the number corresponding to the raise/open front door indicator light. The dryer control will turn this light on when opening the front door.

Relay: Enter the number corresponding to the raise/open front door relay. The dryer control will energize this output when opening the front door.

Input: Enter the number corresponding to the raise/open front door push-button switch. When the dryer control sees a contact between this input and the input common, it will energize the raise front door output.

Type: 0: The dryer has doors that raise themselves, either using springs or air pressure. These doors cannot be "stopped" when opening; they will automatically lift themselves into their full open position. The control will energize, and keep energized, its lower door output to keep the door closed.

1: The dryer has doors that can be "stopped" when partially opened.

8.3.47 Lower Door Front

LED: Enter the number corresponding to the lower/close front door indicator light. The dryer control will turn this light on when closing the front door.

Relay: Enter the number corresponding to the lower/close front door relay. The dryer control will energize this output when closing the door.

Input: Enter the number corresponding to the lower/close front door push-button switch. When the dryer control sees a contact between this input and the input common, it will de-energize the raise front door output.

Type: This field is not currently used.

8.3.48 Raise Rear

LED: This field is not currently used.

Relay: Enter the number corresponding to the raise rear relay. The dryer control will energize this output when raising the rear of the machine.

Input: Enter the number corresponding to the rear up switch input. Contact between this input and the input common indicates to the dryer control that the rear of the dryer has been raised.

Type: This field is not currently used.

8.3.49 Lower Rear

LED: This field is not currently used.

Relay: Enter the number corresponding to the lower rear relay. The dryer control will energize this output when lowering the rear of the machine.

Input: Enter the number corresponding to the rear down switch input. Contact between this input and the input common indicates to the dryer control that the rear of the dryer has been lowered.

Type: This field is not currently used.

8.3.50 Raise Front

LED: This field is not currently used.

Relay: Enter the number corresponding to the raise front relay. The dryer control will energize this output when raising the front of the machine.

Input: Enter the number corresponding to the front up switch input. Contact between this input and the input common indicates to the dryer control that the front of the dryer has been raised.

Type: This field is not currently used.

8.3.51 Lower Front

LED: This field is not currently used.
Relay: Enter the number corresponding to the lower front relay. The dryer control will energize this output when lowering the front of the machine.
Input: Enter the number corresponding to the front down switch input. Contact between this input and the input common indicates to the dryer control that the front of the dryer has been lowered.
Type: 0: The dryer has separate lower front and lower rear outputs that are used to lower the appropriate side of the dryer when returning to the run position.
1: The dryer has a single "lower" valve that lowers the dryer, whether coming from the load or the unload position.

8.3.52 Run Position Rear

LED: This field is not currently used.
Relay: This field is not currently used.
Input: See type for explanation of behavior.
Type: 0: The dryer has momentary push-button switches for the run, load, and unload positions. When the dryer control sees a contact between this input and the input common, it will begin tilting the machine to the selected position.
1: The dryer has a three-position selector switch for run, load, and unload positions. When the dryer control sees a maintained contact between this input and the input common, it will tilt the machine in the appropriate direction. If the dryer control does not see contact on either the load or unload position switches, it will automatically tilt the machine to the run position.
2: The dryer has separate momentary pushbuttons for the run, load and unload positions, as well as a tilt safety button. To tilt the dryer, the operator must press the button for the desired machine position and the tilt safety button. If the operator releases either button, the dryer stops moving.

8.3.53 Load Position Rear

LED: This field is not currently used.
Relay: This field is not currently used.
Input: See type on the Run Position Rear I/O Assignment (section 8.3.52, page 46).
Type: This field is not currently used.

8.3.54 Unload Position Rear

LED: This field is not currently used.
Relay: This field is not currently used.
Input: See type on the Run Position Rear I/O Assignment (section 8.3.52, page 46).
Type: This field is not currently used.

8.3.55 Door Open Rear

LED: This field is not currently used.
Relay: This field is not currently used.
Input: Enter the number corresponding to the rear door open switch input. Contact between this input and the input common indicates to the dryer control that the dryer's rear door is open.
Type: This field is not currently used.

8.3.56 Door Closed Rear

LED: This field is not currently used.
Relay: This field is not currently used.
Input: Enter the number corresponding to the rear door closed switch input. Contact between this input and the input common indicates to the dryer control that the dryer's rear door is closed.
Type: This field is not currently used.

8.3.57 Raise Door Rear

LED: Enter the number corresponding to the raise/open rear door indicator light. The dryer control will turn this light on when opening the rear door.
Relay: Enter the number corresponding to the raise/open rear door relay. The dryer control will energize this output when opening the rear door.
Input: Enter the number corresponding to the raise/open rear door push-button switch. When the dryer control sees a contact between this input and the input common, it will energize the raise rear door output.
Type: 0: The dryer has doors that raise themselves, either using springs or air pressure. These doors cannot be "stopped" when opening; they will automatically lift themselves into their full open position. The control will energize, and keep energized, its lower door output to keep the door closed.
1: The dryer has doors that can be "stopped" when partially opened.

8.3.58 Lower Door Rear

LED: Enter the number corresponding to the lower/close rear door indicator light. The dryer control will turn this light on when closing the rear door.
Relay: Enter the number corresponding to the lower/close rear door relay. The dryer control will energize this output when closing the door.
Input: Enter the number corresponding to the lower/close rear door push-button switch. When the dryer control sees a contact between this input and the input common, it will de-energize the raise rear door output.
Type: This field is not currently used.

8.3.59 Jog Forward Front

LED: This field is not currently used.
Relay: This field is not currently used.
Input: Enter the number corresponding to the machine's front pendant jog forward input..
Type: 0: The dryer has separate inputs assigned for the load and unload side pendants. The dryer will disable the pendant on the inactive side of the dryer.
1: The dryer has one set of jog pendant inputs, shared by the front and back of the dryer. The control will enable the inputs only when one door is open.

8.3.60 Jog Forward Rear

LED: This field is not currently used.
Relay: This field is not currently used.
Input: Enter the number corresponding to the machine's rear pendant jog forward input..
Type: This field is not currently used.

8.3.61 Jog Reverse Front

LED: This field is not currently used.
Relay: This field is not currently used.
Input: Enter the number corresponding to the machine's front pendant jog reverse input..
Type: This field is not currently used.

8.3.62 Jog Reverse Rear

LED: This field is not currently used.
Relay: This field is not currently used.
Input: Enter the number corresponding to the machine's rear pendant jog reverse input..
Type: This field is not currently used.

8.3.63 Cycle End

LED: Enter the number of the LED you wish to have flash on the control's front panel at the end of a cycle.
Relay: Enter the number corresponding to the cycle end relay. The dryer control will energize this output when the dryer reaches the end of the drying cycle.
Input: This field is not currently used.
Type: This field is not currently used.

8.3.64 Soil Brush

LED: This field is not currently used.
Relay: Enter the number corresponding to the soil brush relay. The dryer control will energize this output when operating the machine's basket soil brush.
Input: This field is not currently used.
Type: This field is not currently used.

8.3.65 Front Control

LED: This field is not currently used.
Relay: This field is not currently used.
Input: Enter the number corresponding to the front control input. When the dryer control sees contact between this switch and the input common, it will switch control of the rear door to the front side controls.
Type: This field is not currently used.

8.3.66 Rear Control

LED: This field is not currently used.
Relay: This field is not currently used.
Input: Enter the number corresponding to the rear control input. When the dryer control sees contact between this switch and the input common, it will switch control of the front door to the rear side controls.
Type: This field is not currently used.

8.3.67 Rear Tilt Safety

LED: This field is not currently used.
Relay: This field is not currently used.
Input: If your machine is equipped with a rear safety input, enter the number corresponding to the rear safety input. When the dryer control sees contact between this switch and the input common, it will allow the machine to tilt.
Type: This field is not currently used.

8.3.68 Movement Alarm

LED: This field is not currently used.
Relay: Enter the number corresponding to the movement alarm output. When the dryer control sees the dryer moving (jogging or tilting), it sounds this alarm.
Input: This field is not currently used.
Type: This field is not currently used.

8.3.69 Blower Door

LED: This field is not currently used.
Relay: Enter the number corresponding to the blower door relay. The dryer control will energize this output two minutes after the dryer reaches the end of the drying cycle.
Input: Enter the number corresponding to the blower door input. This switch tells the dryer control that the blower door is closed.
Type: This field is not currently used.

8.3.70 Fire Alarm/High Limit

LED: This field is not currently used.
Relay: This field is not currently used.
Input: Enter the number corresponding to the fire alarm input. When the dryer control sees this input energized, it sounds an alarm.
Type: This field is not currently used.

8.3.71 Main Power On/MCR

LED: This field is not currently used.
Relay: This field is not currently used.
Input: Enter the number corresponding to the main power on (main control relay) input. This input tells the dryer control that the dryer is ready for operation.
Type: This field is not currently used.

8.3.72 Low Gas Pressure

LED: This field is not currently used.
Relay: This field is not currently used.
Input: Enter the number corresponding to the low gas pressure input. This input energized indicates that the minimum gas pressure is achieved.
Type: This field is not currently used.

8.3.73 Burner Motor Overload

LED: This field is not currently used.
Relay: This field is not currently used.
Input: Enter the number corresponding to the blower motor overload relay contact. If the contact is normally closed, enter the input number plus 100.
Type: This field is not currently used.

8.3.74 Input Power On

LED: This field is not currently used.
Relay: This field is not currently used.
Input: Enter the number corresponding to the input power on input. This input energized indicates that the 24 volt DC is supplied.
Type: This field is not currently used.

8.3.75 Burner Pressure

LED: This field is not currently used.
Relay: This field is not currently used.
Input: Enter the number corresponding to the burner pressure input. This switch indicates that the air pressure in the burner is good.
Type: This field is not currently used.

8.3.76 Sprinkler System Cutoff

LED: This field is not currently used.
Relay: This field is not currently used.
Input: Enter the number corresponding to the sprinkler system cutoff input. This switch energized turns off the sprinklers. The control will display an error if the sprinkler system is disabled while the dryer is running.
Type: This field is not currently used.

8.3.77 Cooldown Light

LED: Enter the number corresponding to the cooldown LED. There is no default for this field. The cooldown LED will flash whenever the cooldown relay is active.
Relay: Enter the number corresponding to the cooldown light output. There is no default for this field. The dryer control will activate this light when the dryer is cooling down as part of a cooldown step or when the dryer has been stopped.
Input: This field is not currently used.
Type: This field is not currently used.

8.3.78 Vari-Air

LED: Enter the number corresponding to the Vari-Air LED. There is no default for this field. The Vari-Air LED will flash whenever the Vari-Air relay is active.
Relay: Enter the number corresponding to the Vari-Air relay. There is no default for this field. On machines equipped with the Vari-Air system, the control will activate this relay during heat steps when the temperature is below setpoint by the number of degrees set in the Vari-Air Offset option setting.
Input: This field is not currently used.
Type: This field is not currently used.

8.3.79 Pilot Safeties

LED: Enter the number corresponding to the Pilot Safeties LED. The Pilot Safeties LED will come on whenever the conditions for lighting the pilot are met (burner and exhaust blower pressure switches made, no over temperature alarm, incoming gas pressure switches OK).
Relay: This field is not currently used.
Input: This field is not currently used.
Type: This field is not currently used.

8.3.80 Dryer Ready

LED: Enter the number corresponding to the Dryer Ready LED. The Dryer Read LED will come on when all of the conditions for starting the dryer are met (front and rear doors closed, machine in run position, no motor overloads tripped, power on).
Relay: This field is not currently used.
Input: This field is not currently used.
Type: This field is not currently used.

8.3.81 Flame Control Error

LED: Enter the number corresponding to the flame control enable LED.
Relay: Enter the number corresponding to the flame control enable relay. The dryer control will energize this output whenever it wishes to use the burner.
Input: Enter the number corresponding to the flame control enabled input. The dryer control looks for this input to indicate that the burner has been lit and that the flame is within specifications.
Type: This field is not currently used.

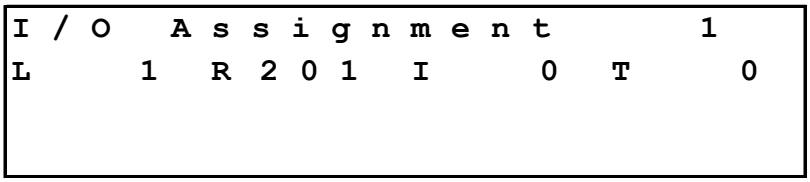
8.4 Multi Relay Assignments

Under normal conditions, the control only assigns one relay output per logical output-for example, it will only activate one relay on the I/O unit to start or stop the blower. Multi I/O Assignments become necessary when you are in a situation where you need to activate or deactivate more than one relay to properly control the machine. The dryer control allows as many as four relays to be assigned to each Multi I/O Assignment.

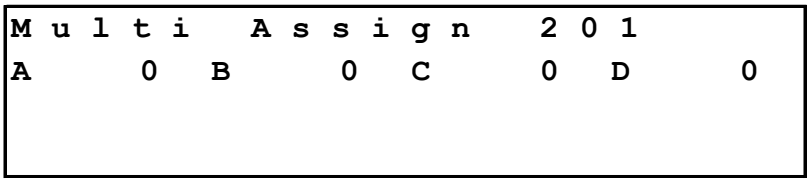
Setting up a Multi I/OAssignment is a two stage process. First, you must figure out which I/O Assignment corresponds to the function you need to control. Then, you need to decide which relay outputs you need to control, and whether they need to be normally open or normally closed.

Caution: Be very careful that you do not assign a relay output in both the Multi I/O Assignments and the regular I/O Assignments. If you do assign an output in more than one place, the control will behave unpredictably.

1. In the I/O Assignment section, select the I/O Assignment that requires multiple relays. In the relay field for that I/O Assignment, enter the number that corresponds to the Multi I/O Assignment you wish to use.
Note: The Multi Relay Assignments are numbered 201 through 216. Each of these Multi I/O Assignments may be used with only one I/O Assignment.



Exit the I/O Assignment section and enter the Multi I/O Assignment section. Select the Multi I/O Assignment you just entered in the Relay section of the I/O Assignments.



3. Press the the ENTER key. The cursor will begin flashing on the number to the right of the letter A. Use the Multi-Function keys to enter the number of the first relay that you wish to assign. If you wish to have the relay be normally closed instead of normally open, add 100 to the relay number.

4. Press the ENTER key to move to the next field and enter the number of the second relay you wish to assign. Repeat this process for the third and fourth relays.

5. When finished adding relays to the Multi I/O Assignments, press the STOP key to return to the Factory Options section.

8.5 Machine Configuration

8.5.1 Display Average

Used to set the number of temperature and humidity readings averaged together for the display.

8.5.2 Inlet Proportional Band

Used to set the width of the proportional band for PID control of the inlet temperature on machines equipped with a modulating gas valve.

8.5.3 Inlet Integral Constant

Used to set the integral constant for PID control of the inlet temperature on machines equipped with a modulating gas valve.

8.5.4 Inlet Derivative Constant

Used to set the derivative constant for PID control of the inlet temperature on machines equipped with a modulating gas valve.

8.5.5 Outlet Proportional Band

Used to set the width of the proportional band for PID control of the outlet temperature on machines equipped with a modulating gas valve.

8.5.6 Outlet Integral Constant

Used to set the integral constant for PID control of the outlet temperature on machines equipped with a modulating gas valve.

8.5.7 Outlet Derivative Constant

Used to set the derivative constant for PID control of the outlet temperature on machines equipped with a modulating gas valve.

8.5.8 Flame Control Timeout

This setting is used to set the amount of time that the dryer control will wait for an input from the flame control indicating that the pilot light and main flame have been lit when starting the dryer.

8.5.9 Inlet Valve Offset

This setting is used to set the PID valve offset for the modulating gas valve when using PID control for the inlet temperature. The inlet valve offset is used to set the midpoint of the valve travel when controlling by inlet temperature.

8.5.10 Outlet Valve Offset

This setting is used to set the PID valve offset for the modulating gas valve when using PID control for the outlet temperature. The outlet valve offset is used to set the midpoint of the valve travel when controlling by outlet temperature.

8.5.11 Basket Rotation Time

This setting tells the dryer control how long it should wait between inputs from the basket rotation sensor before sounding an alarm. Set this field to 0 if the dryer does not have a rotation sensor.

8.5.12 Motor Starter Time Delay

This setting is used to tell the dryer control how long it should wait at the beginning of a cycle between starting the blower motor and starting the basket motor.

8.5.13 Fire Alarm Startup Delay

This setting is used to tell the dryer control how long it should wait between starting the dryer and looking at the fire alarm input.

8.5.14 Lint Trap Blowdown Time

This setting is used to tell the dryer control how long it should energize the lint trap blowdown output when it calls for a lint trap blowdown.

8.5.15 Lint Trap Blowdown Frequency

This setting is used to tell the dryer control how often it needs to call for a lint trap blowdown while running.

8.5.16 Lint Trap Blowdown On Start

This setting is used to tell the dryer control to perform a lint trap blowdown when the machine is started.

8.5.17 Lint Trap Blowdown On Stop

This setting is used to tell the dryer control to perform a lint trap blowdown when the machine is stopped.

8.5.18 Lint Trap Blowdown At Formula End

This setting is used to tell the dryer control to perform a lint trap blowdown at the end of the cycle.

8.5.19 Lint Trap Blowdown Delay At End

This setting is used to tell the dryer control how long it should wait after it has shut down the main blower before performing the blowdown. This delay allows the pressure in the exhaust duct to drop, increasing the effectiveness of the blowdown. This option cannot be set to less than 15 seconds.

8.5.20 Inlet Temperature Offset

This setting is used to set the number of degrees of offset used for the inlet temperature.

8.5.21 Outlet Temperature Offset

This setting is used to set the number of degrees of offset used for the outlet temperature.

8.5.22 Minimum High Fire Valve Time

This setting is used to tell the dryer control the shortest period of time that it can keep the high fire valve open.

8.5.23 Temperature Debounce Time

This setting is used to tell the dryer control how long the actual dryer temperature has to be below the setpoint before it opens the high fire gas valve.

8.5.24 Hysteresis

This setting is used to set the number of degrees of temperature band around the setpoint. The default setting for this field is -5. When hysteresis is set to -5, the dryer control will open the high fire gas valve once the temperature has fallen below five degrees under the setpoint, and will leave it on until the temperature has reached the setpoint again. When hysteresis is set to 0, the dryer control will open the high fire gas valve when the temperature drops below the setpoint, and leave it on until the temperature passes the setpoint. When hysteresis is set to +5, the dryer control will open the high fire gas valve when the temperature drops below the setpoint, and leave it on until the temperature is five degrees higher than the setpoint.

8.5.25 A/D Converter Resolution

This setting is used to tell the dryer control what kind of resolution does the digital to analog converter has, eight or ten bit.

8.5.26 Jog Delay Time

This setting is used to tell the dryer control how many seconds is basket to rotate after the jog button is released.

8.5.27 Use Initial Purge

This setting is used to tell the dryer control if the initial purge is to be used. Initial purge lasts 10 seconds.

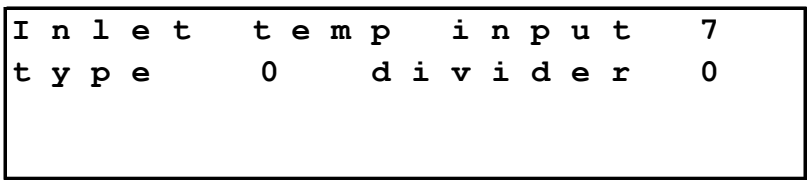
8.5.28 Inlet-Outlet Switch @

This setting tells the control when to switch from inlet temperature control to outlet temperature control during the initial heating stage of a heat step.

8.5.29 RS-485 Network Address

This setting is used to configure the control's RS-485 network address. Normally, for use with a WashComm cable and laptop, this option would be set to 1. If you have your washer and dryer controls daisy-chained, with a fixed WashComm setup, you will need to give each machine a unique address.

8.5.30 Inlet Temperature Input/Type/Divider



The inlet temp input/type/divider screen is used to tell the control which analog channel to use for reading the inlet temperature, what type of inlet temperature sensor is being used, and what divider to use on the input.
The input setting selects the analog input channel on the I/O board. J11-J17 are the connectors for the analog input channels. J11 corresponds to channel 1, J12 corresponds to channel 2, etc.
The type setting tells the control what type of temperature sensor is being used:
0: RTD (2- or 3-wire)
1: Thermocouple (J-type)
2: Temperature transducer (active device with 0-2.56V output, where 0.01V = 1°F)
The divider setting is used to match the range of the analog input channel and the resolution of the analog input channel.

8.5.31 Outlet Temperature Input/Type/Divider

The outlet temp input/type/divider screen is used to tell the control which analog channel to use for reading the outlet temperature, what type of outlet temperature sensor is being used, and what divider to use on the input.
The input setting selects the analog input channel on the I/O board. J11-J17 are the connectors for the analog input channels. J11 corresponds to channel 1, J12 corresponds to channel 2, etc.
The type setting tells the control what type of temperature sensor is being used:
0: RTD (2- or 3-wire)
1: Thermocouple (J-type)
2: Temperature transducer (active device with 0-2.56V output, where 0.01V = 1°F)
The divider setting is used to match the range of the analog input channel and the resolution of the analog input channel.

8.5.32 Ambient Humidity Input/Type/Divider

The ambient humidity input/type/divider screen is used to tell the control which analog channel to use for reading the humidity in the inlet air, what type of humidity sensor is being used, and what divider to use on the input.
The input setting selects the analog input channel on the I/O board. J11-J17 are the connectors for the analog input channels. J11 corresponds to channel 1, J12 corresponds to channel 2, etc.
The type setting is currently not used.
The divider setting is used to match the range of the analog input channel and the resolution of the analog input channel.

8.5.33 Outlet Humidity Input/Type/Divider

The outlet humidity input/type/divider screen is used to tell the control which analog channel to use for reading the humidity in the exhaust air, what type of humidity sensor is being used, and what divider to use on the input.
The input setting selects the analog input channel on the I/O board. J11-J17 are the connectors for the analog input channels. J11 corresponds to channel 1, J12 corresponds to channel 2, etc.
The type setting is currently not used.
The divider setting is used to match the range of the analog input channel and the resolution of the analog input channel.

8.5.34 Ambient Temperature Input/Type/Divider

The ambient temperature input/type/divider screen is used to tell the control which analog channel to use for reading the temperature of the inlet air, what type of temperature sensor is being used, and what divider to use on the input.
The input setting selects the analog input channel on the I/O board. J11-J17 are the connectors for the analog input channels. J11 corresponds to channel 1, J12 corresponds to channel 2, etc.
The type setting is currently not used.
The divider setting is used to match the range of the analog input channel and the resolution of the analog input channel.

8.5.35 Panel Temperature Input/Type/Divider

The panel temperature input/type/divider screen is used to tell the control which analog channel to use for reading the air temperature in the electrical panel, what type of temperature sensor is being used, and what divider to use on the input.
The input setting selects the analog input channel on the I/O board. J11-J17 are the connectors for the analog input channels. J11 corresponds to channel 1, J12 corresponds to channel 2, etc.
The type setting is currently not used.
The divider setting is used to match the range of the analog input channel and the resolution of the analog input channel.

8.5.36 Valve Position Input/Type/Divider

The valve position input/type/divider screen is used to tell the control which analog channel to use for reading the position of the modulating gas valve, what type of gas valve position sensor is being used, and what divider to use on the input.
The input setting selects the analog input channel on the I/O board. J11-J17 are the connectors for the analog input channels. J11 corresponds to channel 1, J12 corresponds to channel 2, etc.
The type setting is currently not used.
The divider setting is used to match the range of the analog input channel and the resolution of the analog input channel.

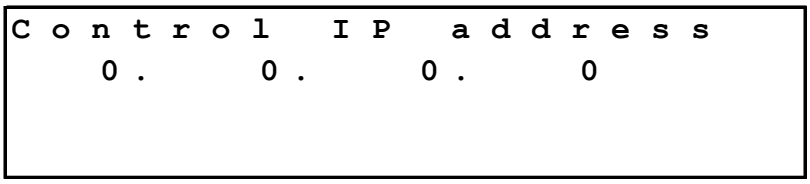
8.5.37 Metric Measurements

The metric measurements option switches displays (as well as the temperatures programmed in dry formulas and any temperature-related options) from English (° Fahrenheit) to Metric (° Celsius).

Please note that this option does not perform any conversion on formulas and settings already entered into the control – in other words, if you have a safety temperature set to 130°F, it will be set to 130°C after changing this option to "Yes". It is up to the user to enter settings appropriate for the measurement system being used.

8.5.38 Network Configuration

The network configuration section is used only on controls connected to an Ethernet network.



The Control IP Address setting sets the IP network address of the control. To change this setting, press the EDIT key. The cursor will begin flashing on the first section of the address. Use the number keys to enter the value for the first octet, then press the ENTER key to move to the second number. When finished setting the control IP address, use the ↑ key to move to the Reporting System IP address setting. The Reporting System IP address tells the control the network address of the computer that collects reporting information from the dryer control. It can be set using the same procedure used for setting the control IP address.

When finished, press the STOP key to return to the machine configuration list.

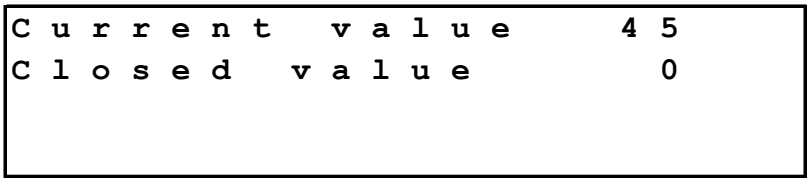
8.5.39 Calibrate Gas Valve

The dryer controls have a convenient mode for setting up the control to work with the modulating gas valve. To determine which kind of modulating valve your dryer has, check the type field of the Modulating Valve Open I/O Assignment (section 8.3.27, page 41).

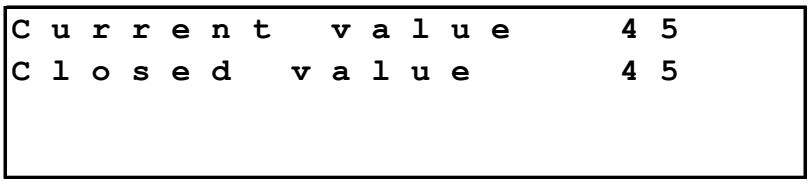
8.5.39.1 Gas Valve Calibration for modulating motor-driven gas valves

1. To use the calibration mode, go to the machine configuration section of the Options mode, select "Calibrate Gas Valve" and press the EDIT key.

The display will now read:

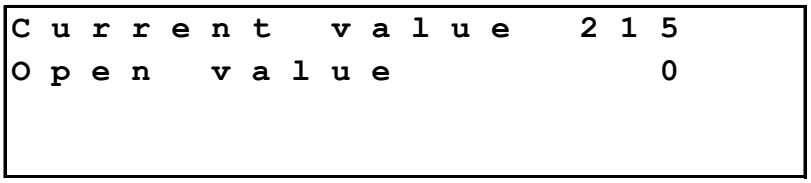


2. The control will energize the output to close the gas valve. When the current value shown on the display stops decreasing, verify that the gas valve is in the fully closed position and press the ENTER key. The display will now read:

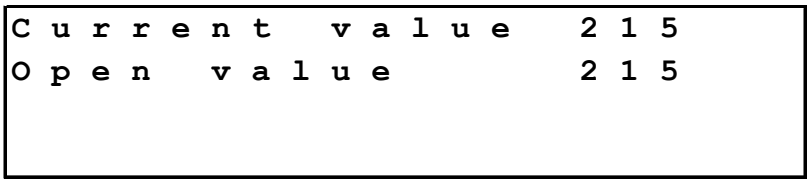


If you wish to manually enter a value for the closed position, type in the number using the multifunction keys.

3. When you are finished setting the closed value for the valve, press the STOP key. The display will now read:



4. The control will energize the output to open the gas valve. When the current value shown on the display stops increasing, verify that the gas valve is in the fully open position and press the ENTER key. The display will now read:



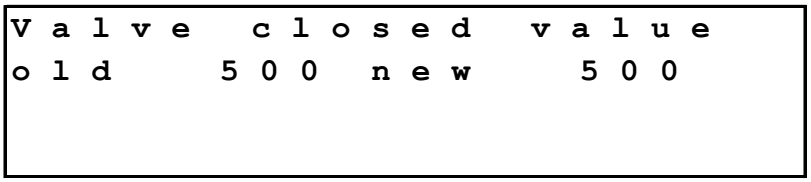
If you wish to manually enter a value for the open position, type in the number using the multifunction keys.

5. When you are finished setting the open value for the valve, press the STOP key, which will exit the valve calibration mode.

8.5.39.2 Gas Valve Calibration for analog-controlled gas valves

1. To use the calibration mode, go to the machine configuration section of the Options mode, select "Calibrate Gas Valve" and press the EDIT key.

The display will now read:



2. The control will send the analog output corresponding to the value in the "new" field on the display to the modulating valve. To enter a new value for the closed position, enter the number you wish to use and press ENTER. When you have arrived at the value you want, press the ENTER key again to save the value. You will see the value you just entered appear by the word "old" on the display. Press STOP to move to the valve open position.

The display will now read:

```
Valve  open  value
old  1500  new  1500
```

3. Follow the same procedure as in step 2 to set the open position value. When finished, press the ENTER key twice to save the value, then press the STOP key to leave the valve configuration section.

8.5.40 Purge Unused Operation Names

Whenever you enter a custom step name, the control adds that name to a list in memory. If you later decide not to use that custom name, the name remains in the list for future use. If you run out of custom step names, you can use the Purge Unused Operation Names operation to clear out the custom step names not in use.

8.5.41 Clear Formulas

The clear formulas operation will clear all programmed dry formulas out of the control. Use this operation only if you are certain that is what you want to do! To clear all formulas, press the EDIT key. The control will ask for a password; use the number keys to enter 2428 and press ENTER. The control will then display "Clear Formulas: 'Clear' / 'Exit'. To clear the formulas, press the CLEAR key. Otherwise, press the STOP key.

If you have selected "clear", the control will then proceed to clear all formulas, then display "memory cleared" and return to the machine configuration list.

8.6 Input Indicator Assignments

The input indicator assignments allow you to use an LED on the front panel of the dryer control to indicate the status of an input on the I/O unit. The input indicator assignment number is the number of the input you are assigning an LED to. The LED field is the number of the LED you wish to assign as a front panel indicator.

8.7 Clearing Entire Memory

This function will clear all configuration, setting and formula information in the dryer control. **Be absolutely certain you wish to clear all information out of the control before proceeding.**
To clear entire memory:

1. Press the EDIT key.

2. Press the YES NO key to select “Yes” on the display.

3. Press the ENTER key to clear the memory.

8.8 Exiting Factory Options

To exit the factory options section, press the STOP END key. You will be returned to the Options Mode.

9 Troubleshooting

This section discusses the various fault messages displayed by the control, possible reasons why they may have occurred, and some ways to resolve the problems.

9.1 Inlet temp too high

Explanation: The dryer control automatically detects conditions when the inlet temperature is too high. Either the inlet temperature limit (section 7.3.14, page 32) has been exceeded, or the inlet temperature has risen 20% higher than the inlet setpoint programmed in the step.

Troubleshooting: Verify that the inlet temperature programmed does not exceed the inlet temperature limit option.
Check the minimum and maximum gas valve positions. If the gas valve is set up to open too far, the inlet temperature will rise faster than the control can respond to it.

9.2 Outlet temp too high

Explanation: The dryer control automatically detects conditions when the outlet temperature is too high. Either the outlet temperature limit (section 7.3.15, page 32) has been exceeded, or the outlet temperature has risen 20% higher than the outlet setpoint programmed in the step.

Troubleshooting: Verify that the outlet temperature programmed does not exceed the outlet temperature limit option.
Check the minimum and maximum gas valve positions. If the gas valve is set up to open too far, the outlet temperature will rise faster than the control can respond to it.
Note that if you are running the dryer without a load in it, you are more likely to encounter this fault because the dryer is not pumping energy into the water held in the goods.

9.3 Front door switch failure

Explanation: The dryer control has received inputs from both the front door open switch (see I/O Assignment 44, section 8.3.44, page 44) and front door closed switch (see I/O Assignment 45, section 8.3.45, page 44). Since the door cannot be both open and closed at the same time, the control assumes that one of those switches has failed or is out of adjustment.

Troubleshooting: Inspect the front door open and closed switches; make sure that they are both adjusted correctly and that both of them are in good working order.
Check the settings in I/O Assignments 44 and 45 and make sure that they are configured for the correct inputs.

9.4 Rear door switch failure

Explanation: The dryer control has received inputs from both the rear door open switch (see I/O Assignment 55, section 8.3.55, page 46) and rear door closed switch (see I/O Assignment 56, section 8.3.56, page 47). Since the door cannot be both open and closed at the same time, the control assumes that one of those switches has failed or is out of adjustment.

Troubleshooting: Inspect the front door open and closed switches; make sure that they are both adjusted correctly and that both of them are in good working order.
Check the settings in I/O Assignments 55 and 56 and make sure that they are configured for the correct inputs.

9.5 Temperature timeout

Explanation: The dryer failed to reach the programmed outlet temperature in the amount of time set in the Temperature Timeout option (see section 7.3.6, page 31).

Troubleshooting: Make sure that the temperature timeout is set to a reasonable amount of time. It typically takes several minutes for the dryer to reach temperature.
Make sure that the gas valve is adjusted correctly. The dryer control may not be able to deliver enough heat to bring the temperature up quickly enough.

9.6 Flame control timeout

Explanation: When the dryer control starts the dryer, it checks the status of a number of inputs (such as gas pressure, exhaust duct pressure and so forth), then sends a signal to the flame control, telling it to light the pilot and open the main gas valve. It then waits the amount of time set in the Flame Control Timeout option (see section 8.5.8, page 52) for an input from the flame control telling the dryer control that the flame has been lit. If the dryer control does not receive an input from the flame control in the allotted time, it stops the dryer and displays this message.

Troubleshooting: Inspect the flame control and gas train, and make sure that everything is in adjustment.
Manually reset the flame control.

9.7 Flame control pilot lost

Explanation: Once the dryer control has started the dryer on a heat step, it will send an enable signal to the flame control. Once the flame control has satisfied its safeties, lit the pilot, and opened the main gas valve, it sends a signal back to the dryer control to indicate that all is well. If the flame control detects an error condition once it has lit the main burner, it will take this signal away, and the dryer control will stop the dryer and display this fault message.

Troubleshooting: Inspect the flame control and gas train, and make sure that everything is in adjustment.
Manually reset the flame control.

9.8 Flame control needs reset

Explanation: The dryer control has received a fault signal from the flame control.

Troubleshooting: Manually reset the flame control.

9.9 Excessive backpressure

Explanation: The dryer has a pressure switch in the exhaust duct that is set for a high pressure. If this pressure is exceeded, due to a blockage of the exhaust duct, it sends a signal to the control.

Troubleshooting: Verify that the exhaust duct is not plugged, and that the outlet is clear.

9.10 Basket not rotating

Explanation: To reduct the risk of fire, the dryer's basket needs to be kept rotating any time that the heat is active. If you get this error, it means that the dryer control was unable to tell if the basket was rotating.

Troubleshooting: Make sure that the basket motor overload is not tripped.
Make sure that the basket rotates freely, and at the correct speed.
Check the rotating switch and make sure that it is operating correctly.

9.11 Inlet temp sensor failure

Explanation: The dryer control monitors the temperature measured by the inlet temperature sensor. If the temperature drops to 32 degrees Fahrenheit or lower, the control will assume that the sensor has failed or has been disconnected, and will display this error.

Troubleshooting: Check the inlet temperature probe; make sure that it is in good working order and has a good electrical connection to the control.

9.12 Outlet temp sensor failure

Explanation: The dryer control monitors the temperature measured by the outlet temperature sensor. If the temperature drops to 32 degrees Fahrenheit or lower, the control will assume that the sensor has failed or has been disconnected, and will display this error.

Troubleshooting: Check the outlet temperature probe; make sure that it is in good working order and has a good electrical connection to the control.

9.13 Sprinkler system disabled

Explanation: The dryer has a sprinkler system that is used to suppress a basket fire. The sprinkler system operates independently of the dryer control, but must be in operation for the dryer to operate safely.

Troubleshooting: Check the sprinkler system; make sure that it has not been disabled with the manual disable switch, and that it has proper water pressure.

9.14 Blower motor starter failure

Explanation: The motor starter for the blower motor has an auxiliary contact that closes at the same time the starter is energized. If, for some reason, the starter is jammed or the coil of the starter has failed, this auxiliary contact will not close, and the dryer control will stop the dryer and display this error.

Troubleshooting: Check the blower motor starter for proper operation.
Make sure that the auxiliary contact is in good working order.

9.15 Burner pressure too low

Explanation: The dryer has a pressure switch on the duct where it takes in air to feed the burner. If this switch is not made within 20 seconds of starting the blower, the dryer control will stop the dryer and display this error.

Troubleshooting: Verify the operation of the combustion blower.
Verify the operation and adjustment of the combustion blower pressure switch.
Make sure that the suction filter is clean, and that there is good airflow into the burner.

9.16 Exhaust pressure too low

Explanation: There is a pressure switch in the exhaust duct of the dryer that is used to verify proper airflow. If this switch is not made within 20 seconds of starting the main blower, the dryer control will stop the dryer and display this message.

Troubleshooting: Check the exhaust duct for leaks.
Verify the operation of the main blower.
Check the adjustment and operation of the pressure switch.

9.17 Front door open switch failure

Explanation: If the dryer control receives a signal from the front door open switch while running, it will assume that either the dryer door is open, or that the switch has failed, and stop the dryer.

Troubleshooting: Check the adjustment and operation of the front door open switch.

9.18 Rear door open switch failure

Explanation: If the dryer control receives a signal from the rear door open switch while running, it will assume that either the dryer door is open, or that the switch has failed, and stop the dryer.

Troubleshooting: Check the adjustment and operation of the rear door open switch.

9.19 Front door closed switch failure

Explanation: If the dryer control loses the signal from the front door closed switch while the dryer is running, it will assume that either the door has opened, or the switch has failed.

Troubleshooting: Check the adjustment and operation of the front door closed switch.

9.20 Rear door closed switch failure

Explanation: If the dryer control loses the signal from the rear door closed switch while the dryer is running, it will assume that either the door has opened, or the switch has failed.

Troubleshooting: Check the adjustment and operation of the rear door closed switch.
On dryers without a rear door, verify that the jumper is firmly seated in the terminal block.

9.21 Gas pressure too low

Explanation: The dryer control monitors the pressure in the main gas line that feeds the dryer. If this switch is lost, it will indicate that the pressure in the gas line is too low to maintain combustion, and the dryer control will stop the dryer.

Troubleshooting: Check the pressure in the gas line feeding the dryer.
Make sure that the gas pressure regulator is properly adjusted.

9.22 Gas pressure too high

Explanation: The dryer control monitors the pressure in the main gas line that feeds the dryer. If this switch is lost, it will indicate that the pressure in the gas line is too high for the burner, and the dryer control will stop the dryer.

Troubleshooting: Check the pressure in the gas line feeding the dryer.
Make sure that the gas pressure regulator is properly adjusted.

9.23 Blower motor overload tripped

Explanation: The dryer control monitors the state of the blower motor overload heater. If the overload heater is tripped, the dryer control will stop the dryer and display this message.

Troubleshooting: Check that the overload is not tripped.
Make sure that someone has not manually switched the overload heater off.

9.24 Dryer not in level position

Explanation: While running, the dryer control looks for a signal from the “dryer level” switch to indicate that the dryer is firmly seated on its base. If the control loses this signal while running, it will stop this dryer and display this error.

Troubleshooting: Make sure that the dryer is sitting down firmly in its cradle.
Make sure that the dryer level switch is operating and is adjusted properly.

9.25 Basket motor overload tripped

Explanation: The dryer control monitors the state of the basket motor overload heater. If the overload heater is tripped, the dryer control will stop the dryer and display this message.

Troubleshooting: Check that the overload is not tripped.
Make sure that someone has not manually switched the overload heater off.

9.26 Machine power lost

Explanation: The dryer control monitors the state of the Master Control Relay circuit. If MCR drops out at any point after being latched in (using the control power button on the front of the dryer), the control will stop the dryer and display this error.

Troubleshooting: Verify the proper operation of the Master Control Relay.

9.27 Main fan door opened

Explanation: The dryer control monitors the state of the safety switch on the main fan door. If it loses the signal from the main fan door closed switch, it will stop the dryer and display this error.

Troubleshooting: Verify that the main fan door is closed and latched correctly.
Verify that the main fan door closed switch is in good working order and has been adjusted correctly.

9.28 Exhaust temp too high

Explanation: The dryer has a backup system that monitors the temperature in the exhaust duct, separate from the dryer control's temperature probes. If this system detects a temperature that is too high in the exhaust duct, it sends a signal to the dryer control, which then stops the dryer.

Troubleshooting: Check the temperature setting on the auxiliary fire alarm system.
Make sure that the auxiliary fire alarm system is working correctly.

9.29 Lint temperature too high

Explanation: The dryer has a temperature switch that monitors the temperature in the lint trap. If the temperature gets too high, it sends a signal to the dryer control, which stops the dryer.

Troubleshooting: Check (and clean) the lint trap.
Make sure that the temperature switch is adjusted properly and in good working order.

9.30 DC input power lost

Explanation: The dryer has a 24V DC power supply that provides power to its proximity switches. If this power supply fails, the dryer control will lose the signals from all of the machine's proximity switches, and will also lose the input verifying that the power supply is working.

Troubleshooting: Check the 24V DC power supply for correct output voltage.
Make sure that the power supply's fuse is good.

10 Character Set

Provided below is a partial list of the available characters used in programming formula and step names. To access this list, you must be programming or editing a formula or step name. Press the the  or  keys to scroll through the set of characters.

See Editing the Formula Name, section 5.5, page 18, and Step Name, section 5.6.9.3, page 22, for more details.

! “ # $ % & ‘ ( ) * + , - . /

0 1 2 3 4 5 6 7 8 9 : ; < = > ? @

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

[\ ] ^ _ ‘

a b c d e f g h i j k l m n o p q r s t u v w x y z

{ | } ~

11 Preprogrammed Step Names

The dryer control has a list of pre-programmed step names. These names cannot be edited or erased. However, new step names may be added in the Program Mode by simply entering the new name according to the instructions in section 5.6.9.3, page 22.

Blowdown
Cooldown
Dry
Humid/Time
Temp Diff
Temp/Time

12 Settings Charts

12.1 I/O Assignment Chart

Number	Name	LED	Relay	Input	Type
1	High Fire		49		
2	Low Fire				
3	Recirculation	15	18		
4	Signal		21		1
5	Basket Forward	8	14		
6	Basket Reverse	17	15		
7	Unassigned				
8	Unassigned				
9	Unassigned				
10	Unassigned				
11	Unassigned				
12	Unassigned				
13	Auxiliary 1				
14	Auxiliary 2				
15	Auxiliary 3				
16	Auxiliary 4				
17	Gas Blower				
18	Exhaust Blower		16	15	
19	Lint Trap Blowdown	24	5		
20	Delinter				
21	Flame control	14	17	16	
22	Exhaust Pressure Switch			13	
23	High Gas Pressure Switch			11	
24	Excessive Backpressure Switch				
25	Lint Thermal Switch			104	
26	Enable Modulating Valve				
27	Open Modulating Valve				1
28	Close Modulating Valve				
29	Start	1			
30	Stop	2			
31	Formula Up	3			
32	Formula Down	4			
33	Hold	5			
34	Communication				
35	Basket Motor Overload			108	
36	Blower Motor Overload			10	
37	Basket Rotation	20		1	1
38	Supervisor Key				
39	Safety / Tilt Function Front			34	
40	Jog				

Number	Name	LED	Relay	Input	Type
41	Run Position Front			45	2
42	Load Position Front			50	
43	Unload Position Front			42	
44	Door Open Front			25	
45	Door Closed Front			18	
46	Raise Door Front		7	47	1
47	Lower Door Front		8	56	
48	Raise Rear	10	13		
49	Lower Rear				
50	Raise Front	19	11		
51	Lower Front		12	9	1
52	Run Position Rear			30	2
53	Load Position Rear				
54	Unload Position Rear			27	
55	Door Open Rear			26	
56	Door Closed Rear			19	
57	Raise Door Rear		9	28	1
58	Lower Door Rear		10	29	
59	Jog Forward Front			31	1
60	Jog Forward Rear				
61	Jog Reverse Front			32	
62	Jog Reverse Rear				
63	Cycle End		51		
64	Soil Brush				
65	Front Control				
66	Rear Control				
67	Safety / Tilt Function Rear				
68	Movement Alarm		6		
69	Blower Door		1	106	
70	Fire Alarm/High Temperature			105	
71	Main Power On/MCR			7	
72	Low Gas Pressure				
73	Burner Motor Overload				
74	Input Power On			3	
75	Burner Pressure			14	
76	Sprinkler System Cutoff			117	
77	Cooldown Light				
78	Variair				
79	Pilot safeties	22			
80	Dryer Ready	21			
81	Flame Control Error				

12.2 Options

Option	Setting
Motor On Time	1:00
Motor Off Time	4.0
Signal On Time	0.5
Signal Off Time	0.5
Display Brightness	75%
Temperature Timeout	5:00
Step Advance	No
Password	5500
Chirp Time	0.05
Low Temperature	135
Raise Machine Time	14
Humidity at Setpoint Time	20
Inlet Temperature Limit	700
Outlet Temperature Limit	250
Wait for Temperature	No
Rotate Basket After Low Temp	Yes
Blowers on in end step	No
Rotate basket in end step	No
Use initial purge	No
Automatically reset display modes	Yes

12.3 Machine Configuration

Option	Setting
Display Average	5
Inlet Proportional	150
Inlet Integral	.100
Inlet Derivative	0
Outlet Proportional	75
Outlet Integral	.650
Outlet Derivative	0
Flame Control Timeout	90
Inlet Valve Offset	60
Outlet Valve Offset	50
Basket Rotation Time	30
Motor Starter Time Delay	4
Fire Alarm Startup Delay	4
Lint Trap Blowdown Time	0:07
Lint Trap Blowdown Frequency	0
Blowdown on Start	No
Blowdown on Stop	Yes
Blowdown at Formula End	Yes
Blowdown Delay	1:00
Inlet Temperature Offset	0
Outlet Temperature Offset	0
A/D Converter Resolution	10
Jog Delay Time	3
Valve Closed Value	1000
Valve Open Value	2200
Switchover @	1
Inlet Temperature Input	6
Inlet Temperature Type	1
Inlet Temperature Divider	2
Outlet Temperature Input	7
Outlet Temperature Type	1
Outlet Temperature Divider	3
Ambient Humidity Input	0
Ambient Humidity Type	0
Ambient Humidity Divider	0
Outlet Humidity Input	5
Outlet Humidity Type	0
Outlet Humidity Divider	2

Option	Setting
Ambient Temperature Input	0
Ambient Temperature Type	0
Ambient Temperature Divider	0
Panel Temperature Input	0
Panel Temperature Type	0
Panel Temperature Divider	0
Valve Position Input	0
Valve Position Type	0
Valve Position Divider	0
Metric Measurements	No

12.4 Input Indicator Assignments

Input	Name	LED
1	Enable Flame Safeguard Off	
2	Flame Safeguard Needs Reset	
3	24VDC Circuit Is Powered	
4	Lint System Temp Is OK	
5	High Limit OK	
6	Fan Door Is Closed	
7	Master Relay In On	
8	Basket Overloads OK	
9	Housing Not Tilted (at level)	11
10	Fans Overloads Fault	
11	Gas Pressure OK	
12	Doors Closed	
13	Main Fan Air Switch	12
14	Burner Fan Air Switch	13
15	Fan Starters Aux Switches	
16	Main Fuel On	23
17	Sprinkler System Disabled	
18	Front Door Is Closed	18
19	Rear Door Is Closed	
20	Lint System Pressure	
21	OK To Load	
22		
23	Front Is Tilted Up	
24	Rear Is Tilted Up	
25	Front Door Is Open	9
26	Rear Door Is Open	
27	Request Rear Tilt Unload	
28	Request Rear Door Open	
29	Request Rear Door Closed	
30	Request Rear Return to Horizontal	
31	Forward Request Pendant Switch	
32	Reverse Request Pendant Switch	

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