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Foundry Machinery and Spares Ltd

Introduces the

# Intelligent Blending System

# IBS

This is a interactive guide and will require you to operate the screen to the intelligent blending system as if you were operating it at the HMI

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- The following page will display a mimic of the Intelligent Blending System's HMI / screen
- The screen will be interactive, this means by pressing the buttons on the HMI / screen you will be sent to that screen as if you were at the HMI, this guide shows you how simple it is to navigate through the mixer control system
- Buttons you can press are: BACK, MORE, MENU and SELECT
- Press ESC to end the slide show anytime
- This interactive guide allows you to navigate through the system but does not allow you to change any of the values within the display as it is for illustration purposes only

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- The opening screen is a language selection screen, by pressing the required flag the language of that flag will be displayed throughout the whole HMI (presentation in English only)
- Press any of the flags to continue, (only English can be displayed)
- Pressing any keys outside of the selection field will only move to the next page, this will navigate incorrectly

Sand Temperature. → 56.0°C

Sand weights as calibrated to the system. → 23456 Kg/Min

Mixer image with indication of operation. → [Mixer Image]

Sand Program. → Prog 6

Blend → Sand Solenoids with indication of operation.

Ambient 56.0°C → Ambient Temperature.

Adj. Temp 56.0°C → Temperature system operates to.

Chemical percentage & Addition Rate with indication of operation.

|       | %     | g/min  |
|-------|-------|--------|
| RESIN | 56.00 | 3456.0 |
| FAST  | 56.00 | 3456.0 |
| SLOW  | 56.00 | 3456.0 |

Back      15/Mar/14 20:26      Menu

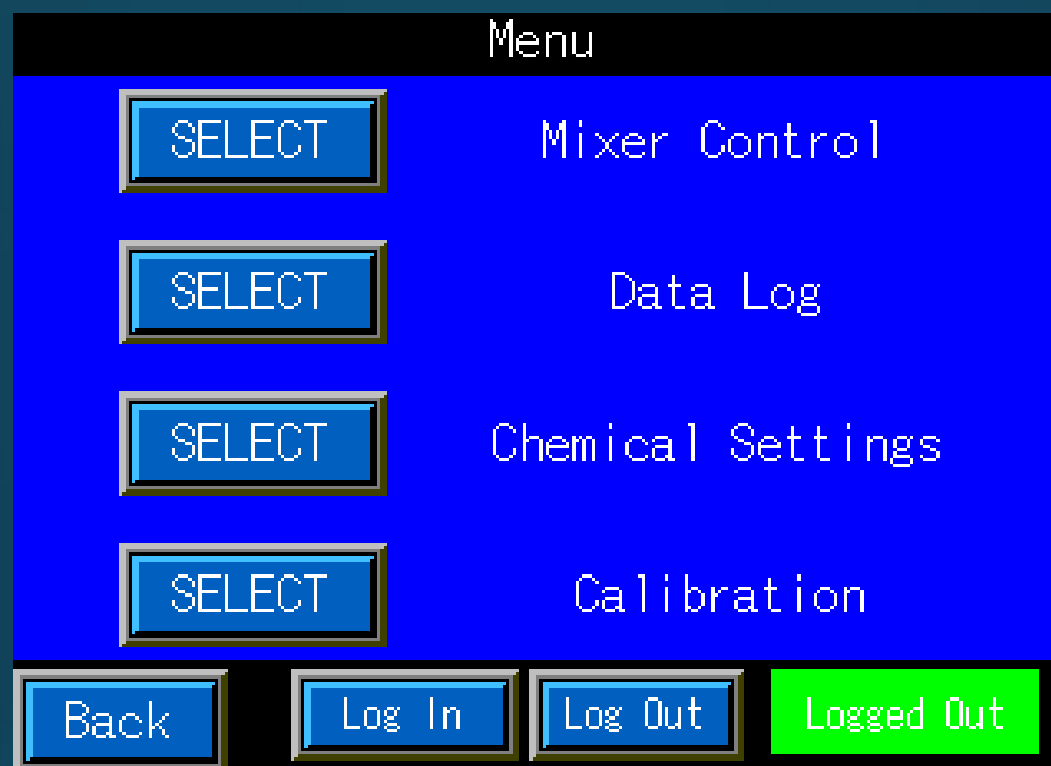
Faults

- By pressing the Back button this will return you to the Language Selection Screen.
- By pressing the Menu button this will take you to the Main Menu.

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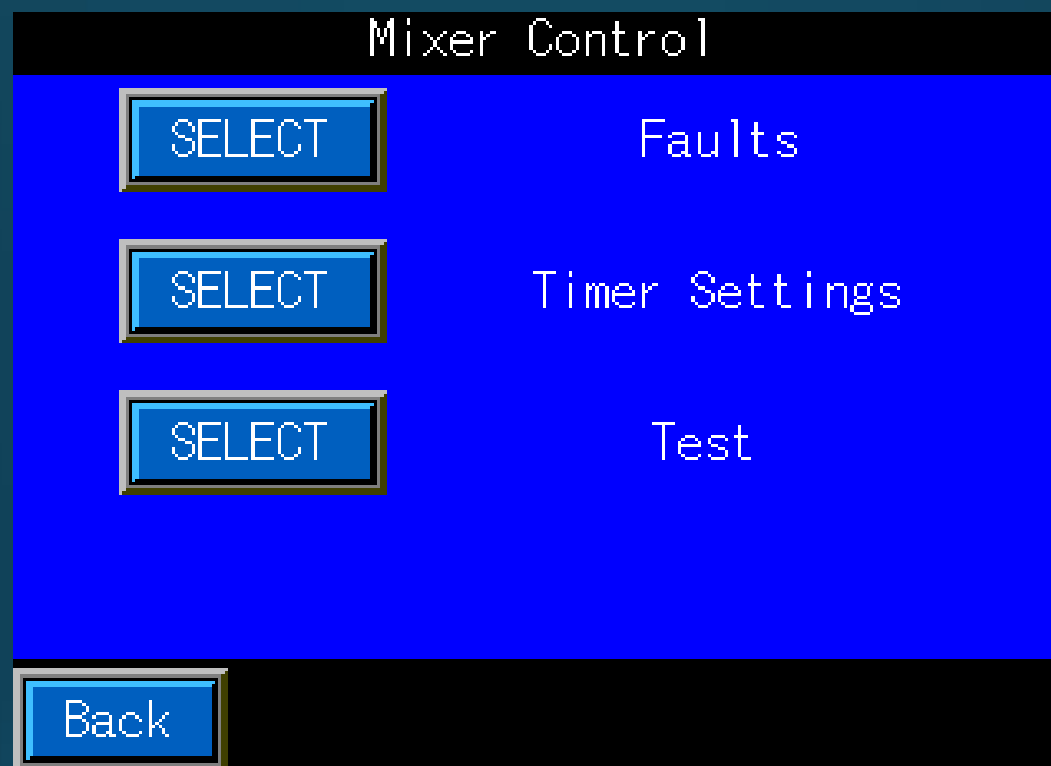
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- Simplified **Menu** for easy navigation of the system
- Press any of the SELECT buttons or the Back button to navigate to that screen



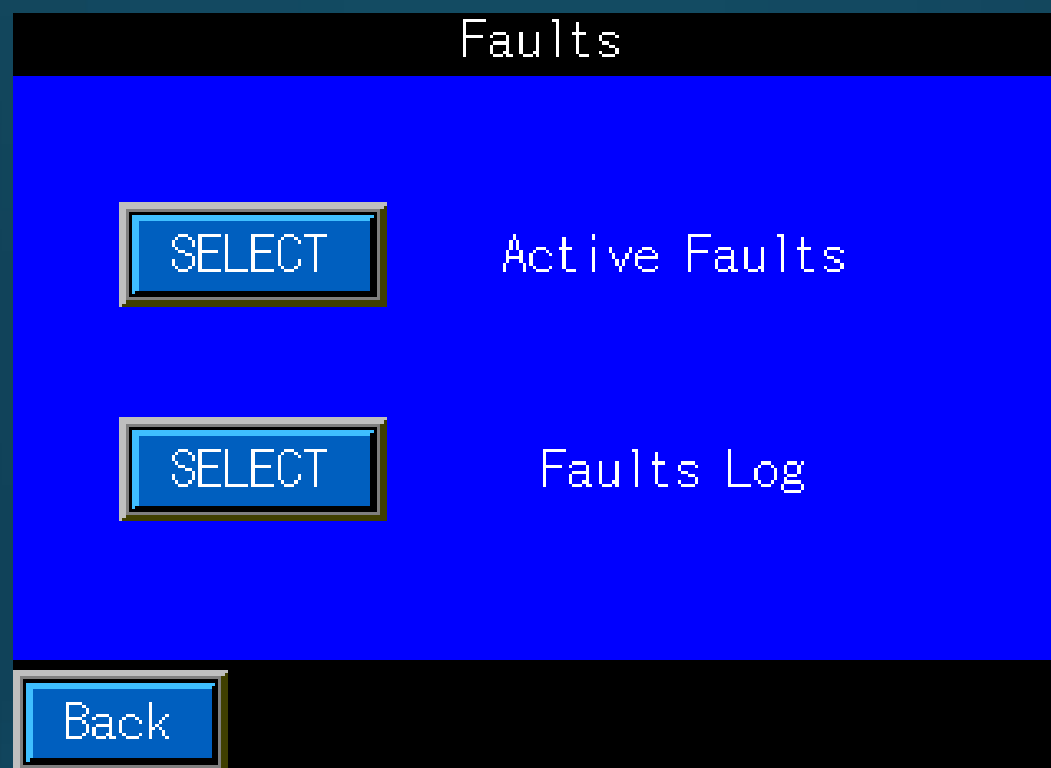
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- **Mixer Control** Menu, press SELECT to navigate to the required screen or Back to return to the previous screen



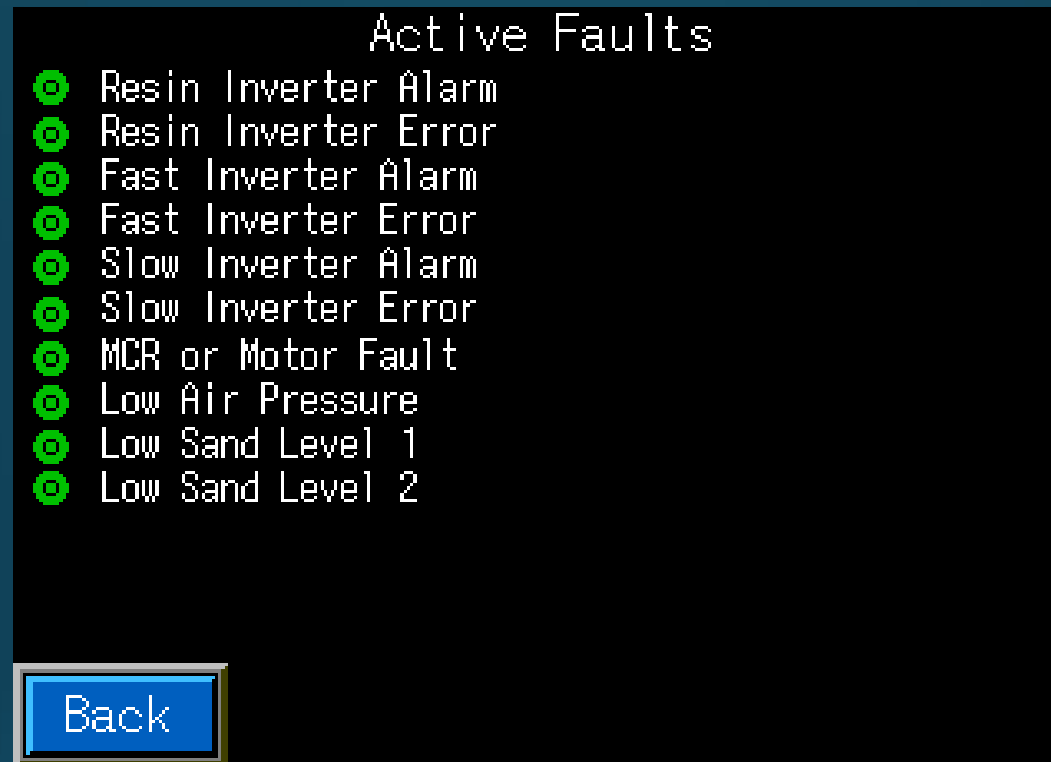
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- **Faults Menu**, press SELECT to navigate to the required screen or Back to return to the previous screen



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- **Active Faults**, this displays the status of the system, anything with errors will display a red lamp, green is no faults or errors
- Press the Back to return to the previous screen



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| Faults Log        |                           |          |
|-------------------|---------------------------|----------|
| OCCURRED          | MESSAGE                   | RESOLVED |
| 14/03/15 20:25:21 | Low Sand Level 1          | 20:25    |
| 14/03/15 20:25:21 | Low Sand Level 2          | 20:25    |
| 14/03/15 20:25:21 | MCR or Motor Fault        | 20:25    |
| 14/03/15 20:25:21 | Low Air Pressure          | 20:25    |
| 14/03/15 20:25:21 | Fast Inverter Alarm       | 20:25    |
| 14/03/15 20:25:21 | Fast Inverter Error       | 20:25    |
| 14/03/15 20:25:21 | Medium Inverter Alarm     | 20:25    |
| 14/03/15 20:25:21 | Medium Inverter Error     | 20:25    |
| 14/03/15 20:25:21 | Slow Inverter Alarm       | 20:25    |
| 14/03/15 20:25:21 | Slow Inverter Error       | 20:25    |
| 14/03/15 20:25:21 | Resin Inverter Alarm      | 20:25    |
| 14/03/15 20:25:21 | Resin Inverter Error      | 20:25    |
| 14/03/15 20:25:21 | Binder Pt2 Inverter Alarm | 20:25    |
| 14/03/15 20:25:21 | Binder Pt2 Inverter Error | 20:25    |
| 14/03/15 20:25:21 | Mixer Blocked             | 20:25    |
| <div>Back</div>   |                           |          |

- **Faults Log**, this displays the status of the system, anything with errors will display in yellow, when displayed in green the faults is cleared, also displays the time the fault was cleared
- Press the Back to return to the previous screen

|             | Start | Pause | Re-Start | Discharge |
|-------------|-------|-------|----------|-----------|
| Mixer Screw | 56.0  | 56.0  | 56.0     | 56.0      |
| Sand        | 56.0  | 56.0  | 56.0     | 56.0      |
| Pause Alarm |       |       | 456.0    |           |

Back

More

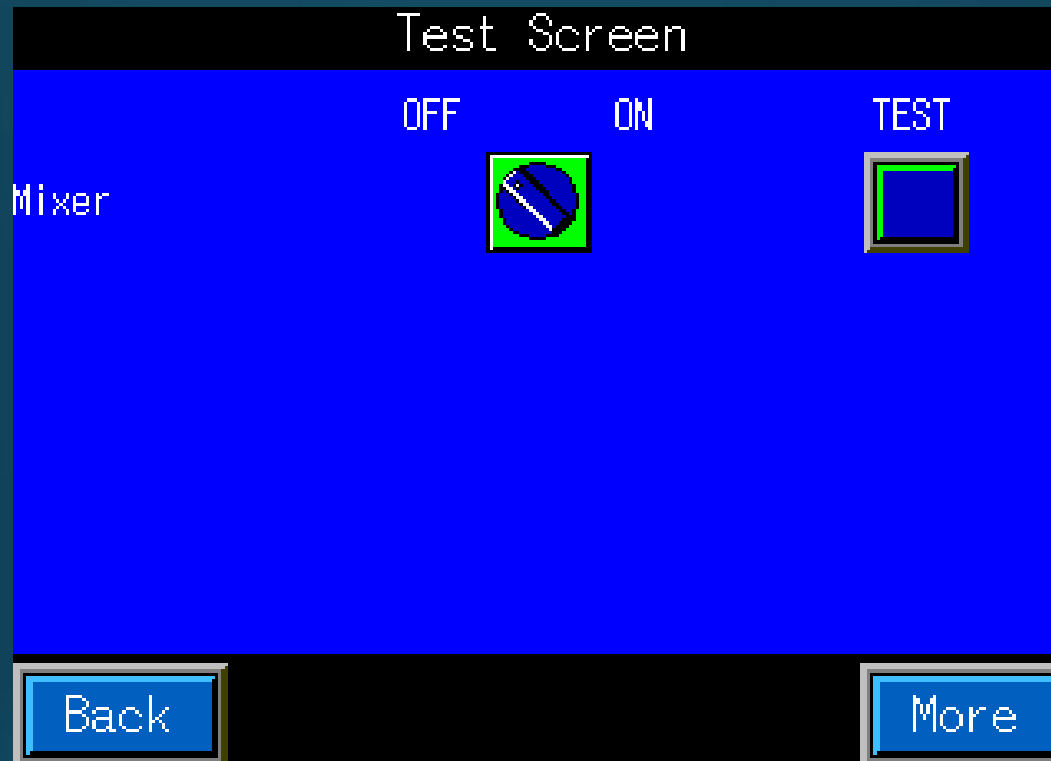
- **Timer Settings** are a set of adjustable timers used to ensure you have fully usable sand in the mixer trough. Start and Re-Start are delay timers and Pause and Discharge are over-run timers, timer values are retentive and retain their value even if the panel is turned off
- Press the Back to return to the previous screen and pressing More takes you to more timers settings

|       | Start | Pause | Re-Start | Discharge |
|-------|-------|-------|----------|-----------|
| Resin | 56.0  | 56.0  | 56.0     | 56.0      |
| Fast  | 56.0  | 56.0  | 56.0     | 56.0      |
| Slow  | 56.0  | 56.0  | 56.0     | 56.0      |

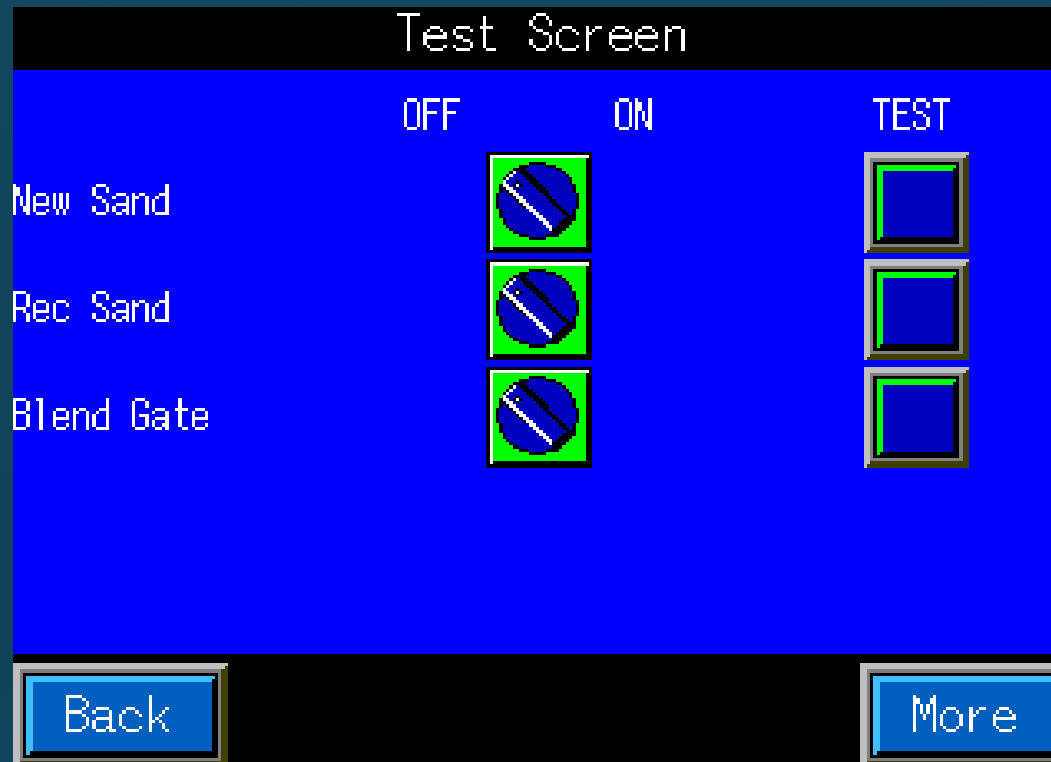
Back

Menu

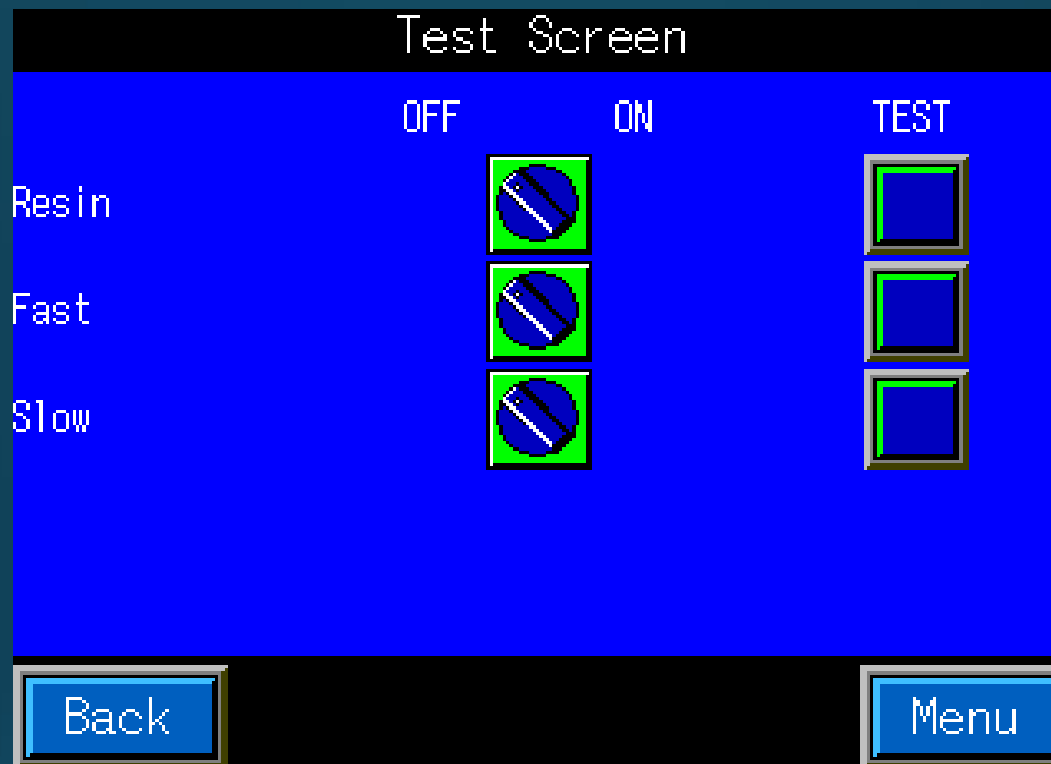
- **Timer Settings** are a set of adjustable timers used to ensure you have fully usable sand in the mixer trough. Start and Re-Start are delay timers and Pause and Discharge are overrun timers, timer values are retentive and retain their value even if the panel is turned off
- Press the Back to return to the previous screen and pressing Menu takes you back to the Main Menu.



- **Test Screen** is used to either isolate the operation or to test it's operation, the switch is stay put operation and retentive, this means the switch will remember its position even if it is turned off
- The test button is momentary operation and only operates for the duration it is pressed
- Pressing Back will return you to the previous screen and pressing more will take you to further test Screens



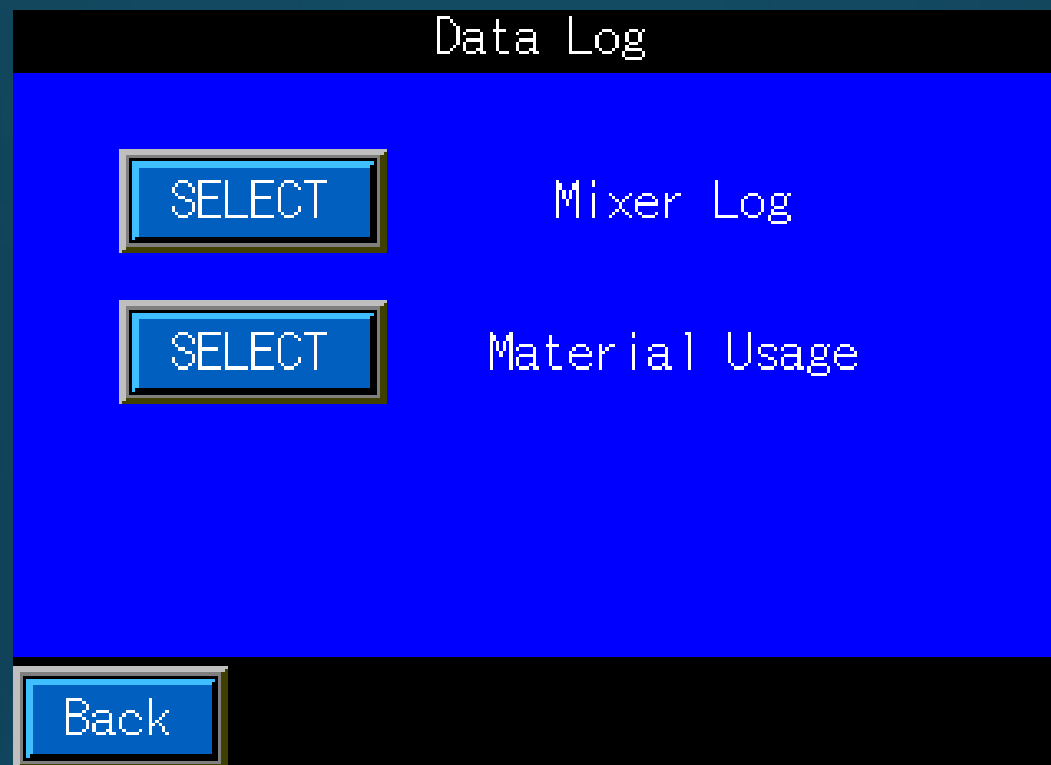
- **Test Screen** is used to either isolate the operation or to test it's operation, the switch is stay put operation and retentive, this means the switch will remember its position even if it is turned off
- The test button is momentary operation and only operates for the duration it is pressed, when testing the sands the mixer will operate to discharge any sand dispensed from the sand gate before automatically stopping
- Pressing Back will return you to the previous screen and pressing more will take you to further test Screens.



- **Test Screen** is used to either isolate the operation or to test it's operation, the switch is stay put operation and retentive, this means the switch will remember its position even if it is turned off
- The test button is momentary operation and only operates for the duration it is pressed
- Pressing Back will return you to the previous screen and pressing Menu will take you to the Menu Screen



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- **Data Log** Menu, press SELECT to navigate to the required screen or Back to return to the previous screen



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| Mixer Log |          |      |      |           |           |        |
|-----------|----------|------|------|-----------|-----------|--------|
|           | Duration | Sand | Cure | Min Temp. | Max Temp. | Manual |
| 1         | 3456     | 56   | 56   | 56.00     | 56.00     | 6      |
| 2         | 3456     | 56   | 56   | 56.00     | 56.00     | 6      |
| 3         | 3456     | 56   | 56   | 56.00     | 56.00     | 6      |
| 4         | 3456     | 56   | 56   | 56.00     | 56.00     | 6      |
| 5         | 3456     | 56   | 56   | 56.00     | 56.00     | 6      |
| 6         | 3456     | 56   | 56   | 56.00     | 56.00     | 6      |
| 7         | 3456     | 56   | 56   | 56.00     | 56.00     | 6      |
| 8         | 3456     | 56   | 56   | 56.00     | 56.00     | 6      |
| 9         | 3456     | 56   | 56   | 56.00     | 56.00     | 6      |
| Back      |          |      |      |           |           |        |

- **Mixer Log** is a list of the previous 9 sand mixes
- This displays the duration that the mixer was run for, the sand program, the cure program, the minimum and maximum sand temperatures and if manual was selected or not. Press Back to return to previous screen
- This function can be upgraded (at additional cost), to continuous recording to a USB which is downloadable to an excel file, this gives more information, including sand and chemical quantities



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| Material Usage           |           |
|--------------------------|-----------|
|                          | USED      |
| New                      | 123456.00 |
| Rec                      | 123456.00 |
| Resin                    | 123456.00 |
| Fast                     | 123456.00 |
| Slow                     | 123456.00 |
| <div>BackRESETHere</div> |           |

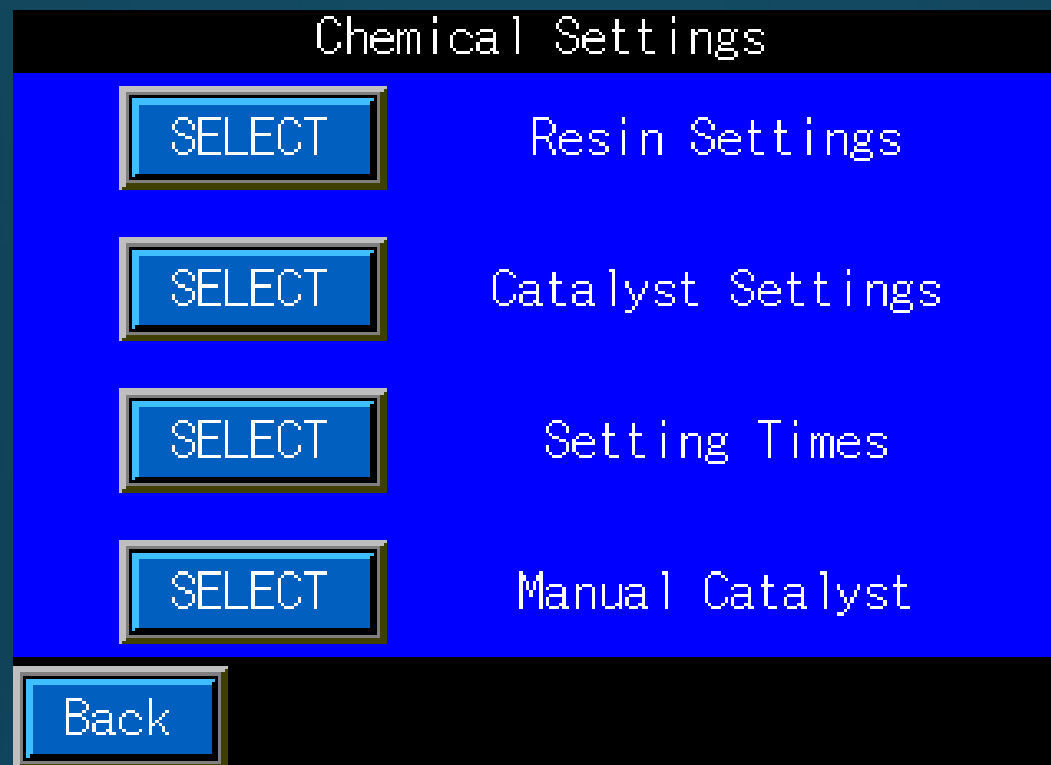
- **Material usage** records in real time the amounts of sand(s) and chemicals that have been used since the last reset
- Easy Reset button, this clears all used data recorded
- Press Back to return to previous screen or press More for further Material Usage information

| Material Usage |   |           |         |   |           |
|----------------|---|-----------|---------|---|-----------|
|                |   | ALARM     | ADD     |   | REMAINING |
| New            |  | 123456.00 | 3456.00 |  | 123456.00 |
| Rec            |  | 123456.00 | 3456.00 |  | 123456.00 |
| Resin          |  | 123456.00 | 3456.00 |  | 123456.00 |
| Fast           |  | 123456.00 | 3456.00 |  | 123456.00 |
| Slow           |  | 123456.00 | 3456.00 |  | 123456.00 |
| Back           |   | RESET     |         |   |           |

- **Material Usage** alarms can be set to give the operator a warning of low levels
- An alarm level is set, the operator adds the amount of sand and chemical added and the system will monitor the usage and calculate the values and warn the operator when low levels are reached, these levels should be set to allow for re-order and delivery times as required
- The operator can turn the off monitoring or reset the values at any time if not required



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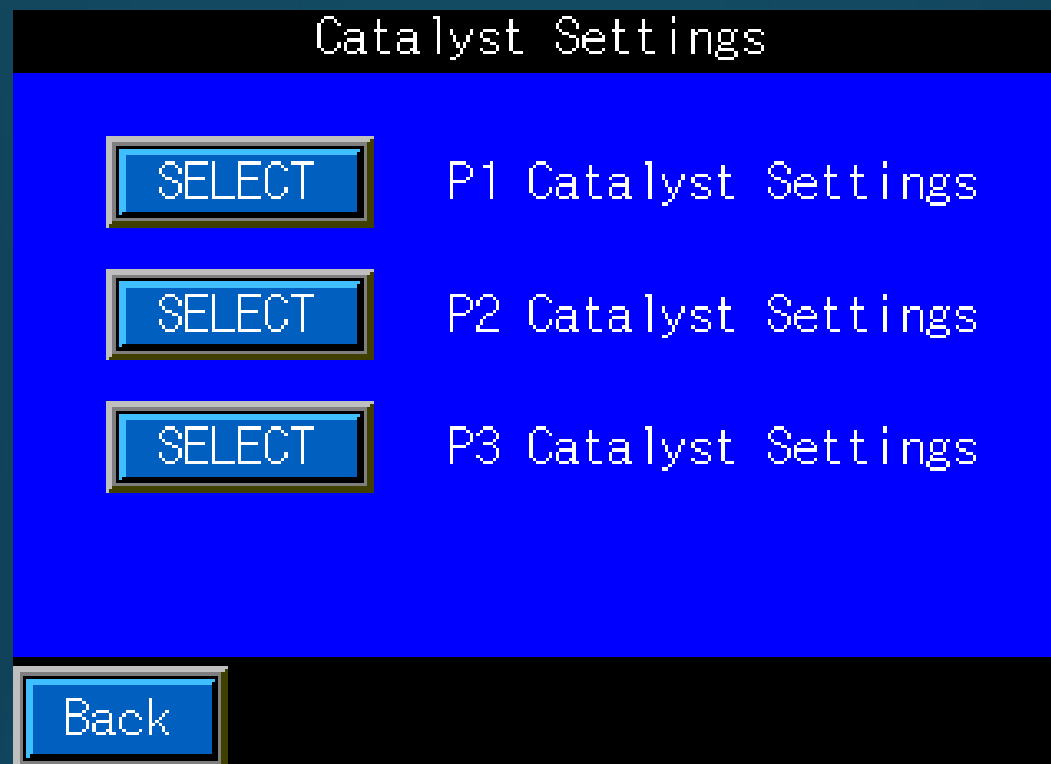
- **Chemical Settings** Menu
- Simplified Menu for easy navigation of the system
- Press any of the SELECT buttons or the Back button to navigate to that screen

### Resin Settings

|        | %      |          |
|--------|--------|----------|
| Prog 1 | 456.00 |          |
| Prog 2 | 456.00 |          |
| Prog 3 | 456.00 |          |
|        | %      | g/min    |
| Prog 6 | 456.00 | 23456.00 |

Back

- **Resin Settings** screen is where you enter the resin percentage for the required sand program



- **Catalyst Settings** Menu, pressing the required SELECT button will take you to the catalyst settings for that sand program, in this case we have 3 sand programmes
- Pressing the Back button will return you to the previous screen

### P1 Catalyst Settings

| Min Temp.   | %     | Mid Temp. | %     | Max Temp. | %     |
|-------------|-------|-----------|-------|-----------|-------|
| <b>FAST</b> |       |           |       |           |       |
| 56.00       | 56.00 | 56.00     | 56.00 | 56.00     | 56.00 |
| <b>SLOW</b> |       |           |       |           |       |
| 56.00       | 56.00 | 56.00     | 56.00 | 56.00     | 56.00 |
|             |       |           |       |           |       |

- **Sand Program 1 Catalyst** Automatic Blending Settings
- In this screen you enter the temperature of the sand and the percentage of chemical you require at that temperature, you have 3 points of control, Minimum Temperature, Mid Temperature and Maximum Temperature, each has a chemical percentage. From the data inputted in this screen the PLC will automatically calculate required chemical required

### P2 Catalyst Settings

| Min Temp. |       | % | Mid Temp. |       | % | Max Temp. |       | % |
|-----------|-------|---|-----------|-------|---|-----------|-------|---|
| FAST      |       |   |           |       |   |           |       |   |
| 56.00     | 56.00 |   | 56.00     | 56.00 |   | 56.00     | 56.00 |   |
| SLOW      |       |   |           |       |   |           |       |   |
| 56.00     | 56.00 |   | 56.00     | 56.00 |   | 56.00     | 56.00 |   |
|           |       |   |           |       |   |           |       |   |

Back

- **Sand Program 2 Catalyst** Automatic Blending Settings
- In this screen you enter the temperature of the sand and the percentage of chemical you require at that temperature, you have 3 points of control, Minimum Temperature, Mid Temperature and Maximum Temperature, each has a chemical percentage. From the data inputted in this screen the PLC will automatically calculate required chemical

### P3 Catalyst Settings

| Min Temp.   | %     | Mid Temp. | %     | Max Temp. | %     |
|-------------|-------|-----------|-------|-----------|-------|
| <b>FAST</b> |       |           |       |           |       |
| 56.00       | 56.00 | 56.00     | 56.00 | 56.00     | 56.00 |
| <b>SLOW</b> |       |           |       |           |       |
| 56.00       | 56.00 | 56.00     | 56.00 | 56.00     | 56.00 |
|             |       |           |       |           |       |

- **Sand Program 3 Catalyst** Automatic Blending Settings
- In this screen you enter the temperature of the sand and the percentage of chemical you require at that temperature, you have 3 points of control, Minimum Temperature, Mid Temperature and Maximum Temperature, each has a chemical percentage. From the data inputted in this screen the PLC will automatically calculate required chemical

| Setting Times |          |      |          |      |
|---------------|----------|------|----------|------|
|               | Fast Set |      | Slow Set |      |
|               | 1        | 2    | 4        | 5    |
|               | °C       |      | °C       |      |
| Cure          |          |      |          |      |
| Prog 1        | 56.0     | 56.0 | 56.0     | 56.0 |
| Prog 2        | 56.0     | 56.0 | 56.0     | 56.0 |
| Prog 3        | 56.0     | 56.0 | 56.0     | 56.0 |

Back

- **Setting Times** are used in conjunction with the Chemical Settings, each sand program has the ability to speed up or slow down the cure of the mould by telling the PLC that the temperature is warmer or cooler therefore increasing or decreasing the cure time
- On the remote station you have a selector switch with 5 positions, position 3 is normal, position 1 and 2 are faster set and positing 4 and 5 are slower set, if we enter a value of 5 in position 2 and 4 and enter a value of 10 in position of 1 and 5 so when you select 1 or 2 on the selector switch the temperature will de-crease by this amount, if you select 4 or 5 the temperature will increase by this amount both changing the amount of Fast and Slow chemical going into the mixer

| Manual Catalyst |      |   |      |   |
|-----------------|------|---|------|---|
|                 | Fast | % | Slow | % |
| P1              | 56.0 |   | 56.0 |   |
| P2              | 56.0 |   | 56.0 |   |
| P3              | 56.0 |   | 56.0 |   |
| P4              | 56.0 |   | 56.0 |   |
| P5              | 56.0 |   | 56.0 |   |

Back

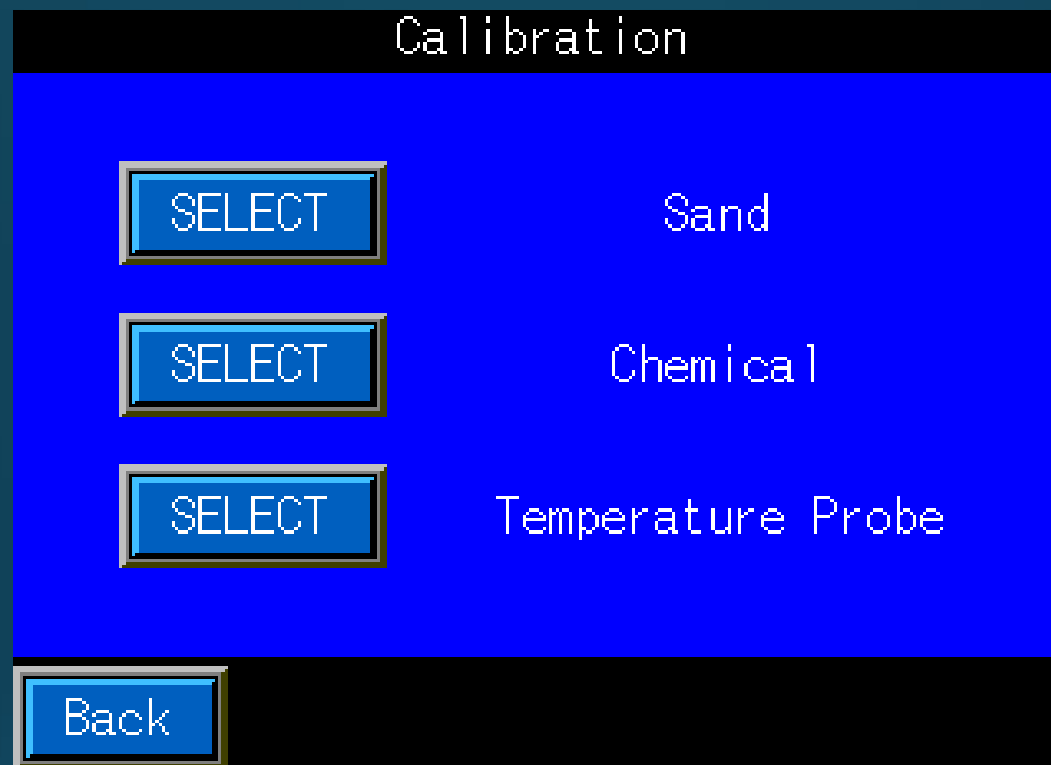
Sand

SP1


SP2

SP3

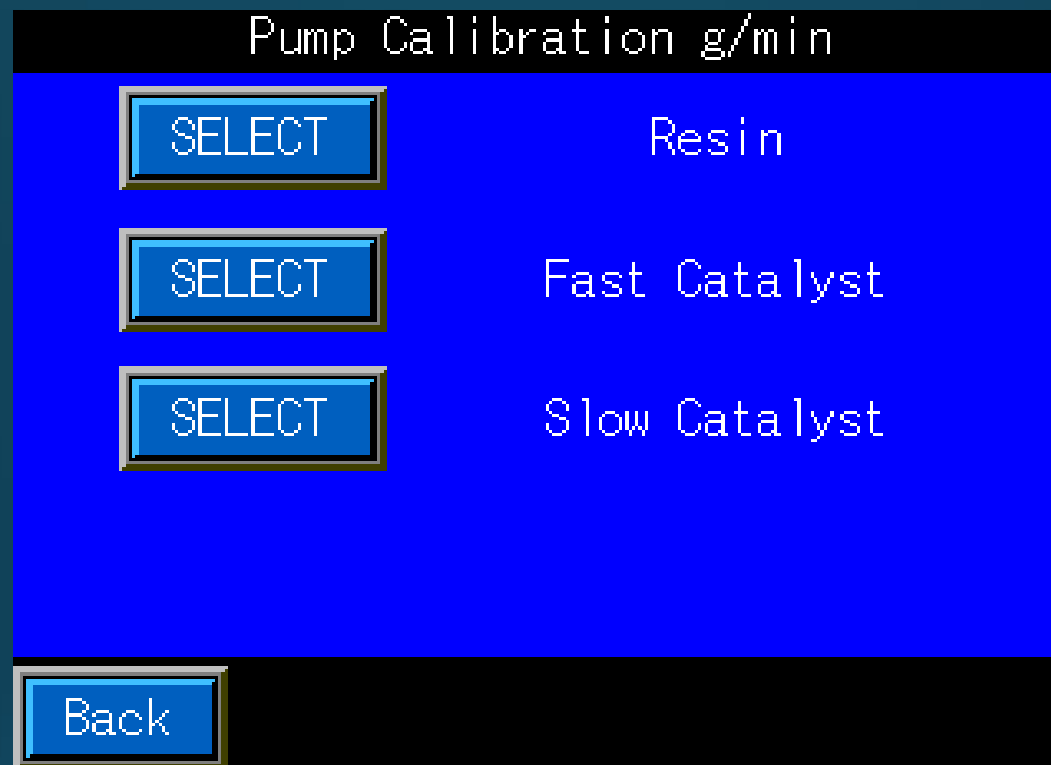
- **Manual Catalyst**, this is manually entered percentages selectable by the same switch used for the setting times, select manual at the remote station and the customers set value will be dispensed
- Each sand program has its own manual catalyst adjustments
- By entering zero into any position the pump will not operate, this allows you to have 100% of Fast or Slow chemical if required



- **Calibration Menu**, press SELECT for the required calibration page

| Sand Calibration Kg/Min |   |          |               |
|-------------------------|---|----------|---------------|
| Delay                   | 456<br>456  | Duration | 456<br>456    |
|                         | 55:55:55  | 55:55:55 |               |
|                         | New   | Rec      |               |
| P1                      | 123456  |          |               |
| P2                      |   | 123456   |               |
| P3                      | 123456  | 123456   |               |
|                         | New   | Rec      | Sand Program6 |
| Back                    |  | Start    | Stop          |

- **Sand Calibration** is now much easier with the new controls, simply select a delay time and a run duration, select the required sand New or Reclaimed then press the START button
- Press START, the mixer will operate and the sand gate will open once the delay timer times out, the sand gate will close once the duration timer times out, the mixer will continue to operate until all sand is dispensed and then the mixer will stop, the calibration engineer will then weigh all sands dispensed and enter the values into the required sand program (ensure tonnages are within machine specifications)



- **Pump Calibration** Menu, press the required SELECT button to go to the required pump calibration
- Press Back to return to Calibration Menu

Pump Calibration g/min

RESIN

|      |      |      |      |       |       |       |
|------|------|------|------|-------|-------|-------|
| 5%   | 10%  | 20%  | 40%  | 60%   | 80%   | 100%  |
| 3456 | 3456 | 3456 | 3456 | 23456 | 23456 | 23456 |

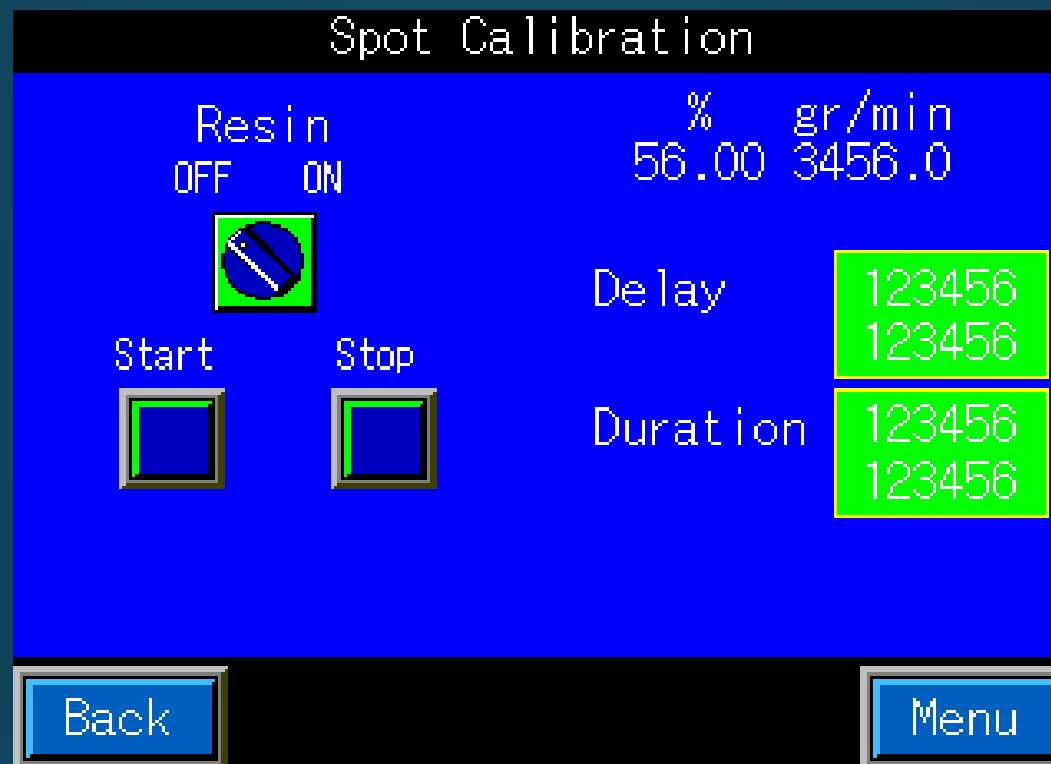
Delay      Duration      Selected %

|            |              |     |
|------------|--------------|-----|
| 456<br>456 | 456<br>456.0 | 456 |
|------------|--------------|-----|

56:56:56 56/56/56      Spot Calibration ☐

Back      Start      Stop

- Spot Calibration is used to check accuracy of the pump after full calibration. Pressing START will operate the pump, collect chemical dispensed and compare with required amount displayed in top right side of screen
- Delay and Duration timers to assist during calibration
- Back button returns to previous screen and Menu will return to Main Menu



- **Spot Calibration** is used to check accuracy of the pump after full calibration. Pressing START will operate the pump, collect chemical dispensed and compare with required amount displayed in top right side of screen
- Delay and Duration timers to assist during calibration
- Back button returns to previous screen and Menu will return to Main Menu

Pump Calibration g/min

FAST

|      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|
| 5%   | 10%  | 20%  | 40%  | 60%  | 80%  | 100% |
| 3456 | 3456 | 3456 | 3456 | 3456 | 3456 | 3456 |

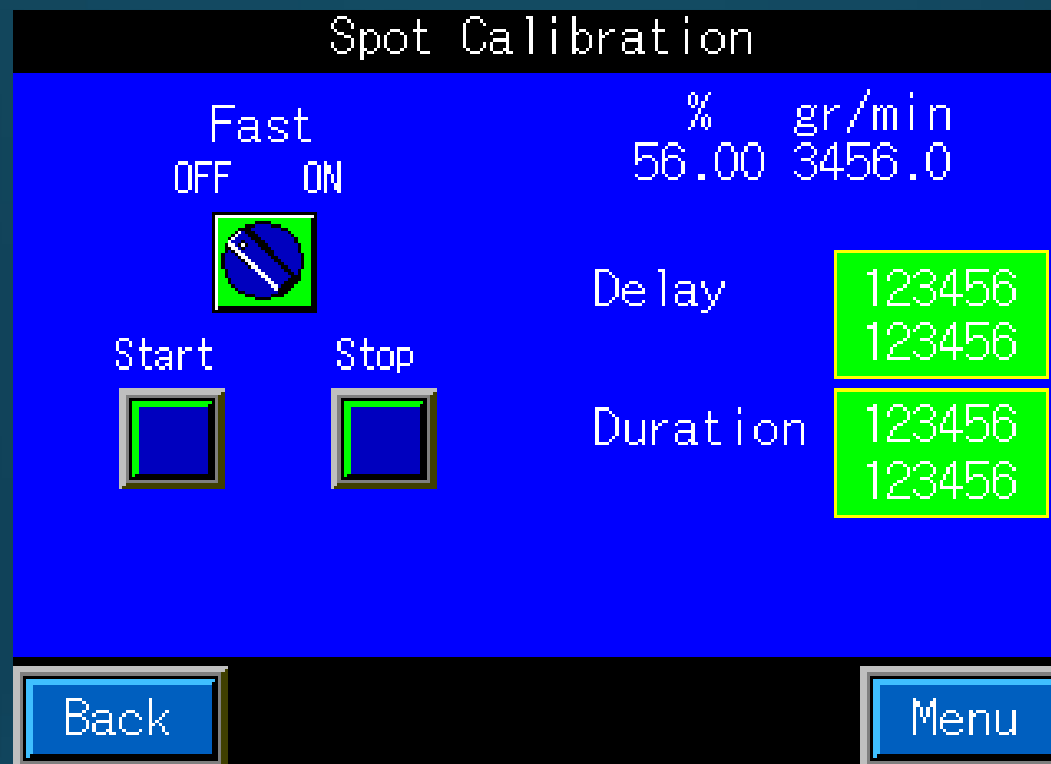
Delay      Duration      Selected %

|            |              |     |
|------------|--------------|-----|
| 456<br>456 | 456<br>456.0 | 456 |
|------------|--------------|-----|

56:56:56 56/56/56      Spot Calibration ☐

Back      Start      Stop

- **Spot Calibration** is used to check accuracy of the pump after full calibration. Pressing START will operate the pump, collect chemical dispensed and compare with required amount displayed in top right side of screen
- Delay and Duration timers to assist during calibration
- Back button returns to previous screen and Menu will return to Main Menu



- **Spot Calibration** is used to check accuracy of the pump after full calibration. Pressing START will operate the pump, collect chemical dispensed and compare with required amount displayed in top right side of screen
- Delay and Duration timers to assist during calibration
- Back button returns to previous screen and Menu will return to Main Menu

Pump Calibration g/min

SLOW

|      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|
| 5%   | 10%  | 20%  | 40%  | 60%  | 80%  | 100% |
| 3456 | 3456 | 3456 | 3456 | 3456 | 3456 | 3456 |

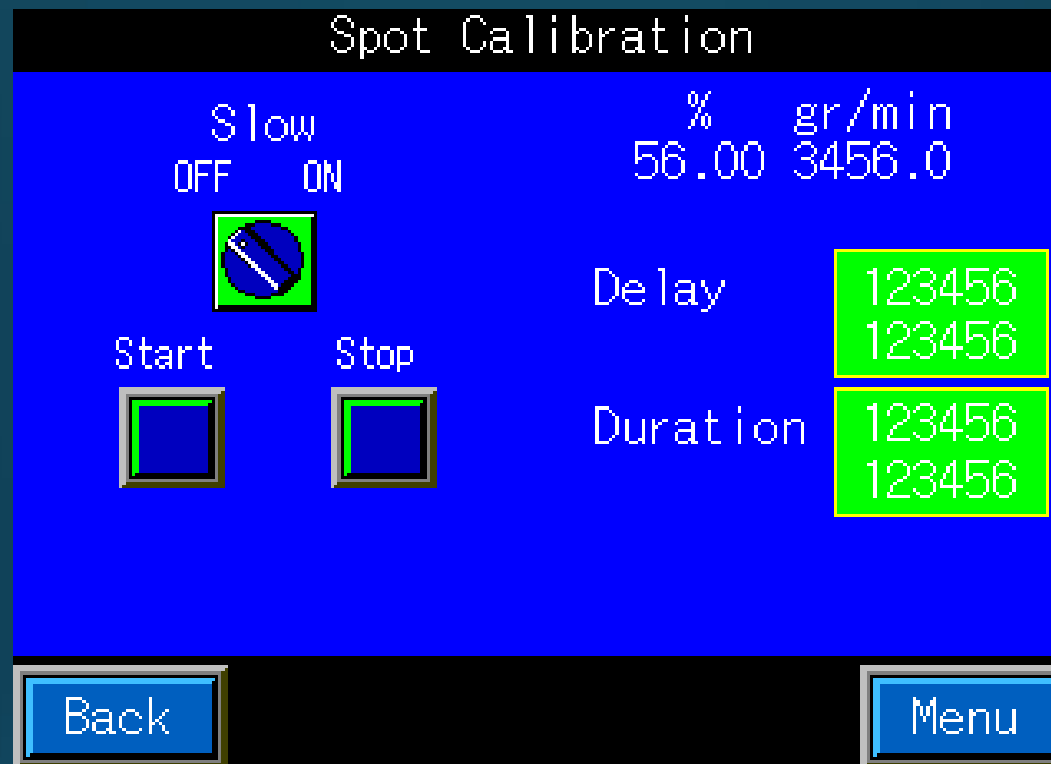
Delay      Duration      Selected %

|            |              |     |
|------------|--------------|-----|
| 456<br>456 | 456<br>456.0 | 456 |
|------------|--------------|-----|

56:56:56 56/56/56      Spot Calibration ☐

Back      Start      Stop

- **Spot Calibration** is used to check accuracy of the pump after full calibration. Pressing START will operate the pump, collect chemical dispensed and compare with required amount displayed in top right side of screen
- Delay and Duration timers to assist during calibration
- Back button returns to previous screen and Menu will return to Main Menu



- **Spot Calibration** is used to check accuracy of the pump after full calibration. Pressing START will operate the pump, collect chemical dispensed and compare with required amount displayed in top right side of screen
- Delay and Duration timers to assist during calibration
- Back button returns to previous screen and Menu will return to Main Menu

| Calibration |             |           |
|-------------|-------------|-----------|
| New Sand    | Actual Temp | Adj. Temp |
| 56.0 °C     | 56.0 °C     | 56.0 °C   |
| Rec Sand    |             |           |
| 56.0 °C     | 56.0 °C     | 56.0 °C   |
| Ambient     |             |           |
| 56.0 °C     | 56.0 °C     | 56.0 °C   |

Back

- **Temperature Calibration** is used to ensure Sand and Ambient temperatures are correct