

CB-1

Automated Concrete Batch Controller

Version 1.52

Manual Revision Date: 11/29/06

Operation Manual



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About This Manual

This manual provides reference information to install and configure the CB-1 Concrete Batch Controller. All touchscreen and front panel buttons appear in **bold** text. All words from the touchscreen appear in *Prompt Font*.



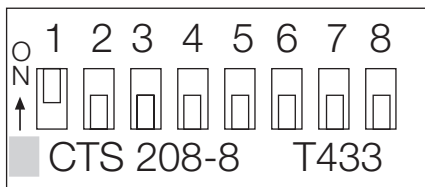
Authorized distributors and their employees can view or download this manual from the Rice Lake Weighing Systems distributor site at www.ricelake.com.

1.0 Introduction

Congratulations on purchasing the most advanced and configurable embedded concrete batch controller in its market today! The CB-1 is powerful yet simple to use. However, we ask you please read this manual completely before getting started.

2.0 DIP Switch Settings

The DIP switch bank on the CPU board includes 8 DIP switches (see graphic below). All are normally in the OFF position. You need only to be concerned with switches 1, 2 and 3.



DIP Switch Numbering

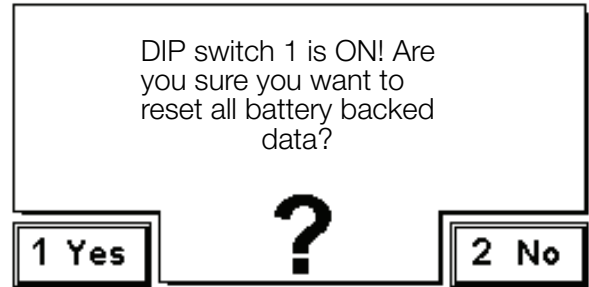
2.1 DIP Switch 1—Initialize Variables

Powering up the controller with DIP switch 1 ON will initialize all system variables to their default settings. All data (mix designs, ingredient names, passcodes, etc.) will be lost and have to be re-entered.



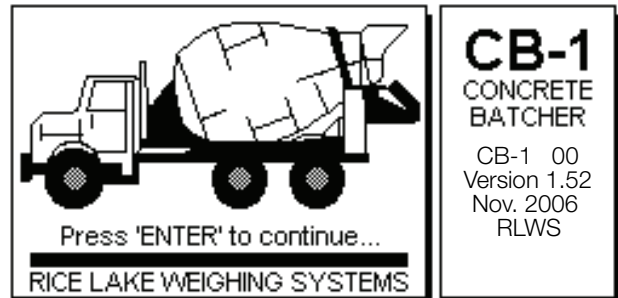
Caution

Under normal circumstances this feature should only be used once on initial power up. The system is shipped from the factory with DIP switch 1 in the on position. Upon start up with switch 1 ON, the touchscreen displays the following screen:



Press the **Yes** button to reset all battery backed data or **No** to delete all battery backed data.

After the CB-1 initializes all variables, the screen prompts: *Move Switch 1 to OFF position*. Move DIP switch 1 back to the OFF position. The screen then displays the current revision information.



From this point forward, all information entered via keypad or touchscreen, including learned values, are stored in battery backed memory. In the event of a battery failure, data will be lost if the system loses external power. Therefore, it's recommended to download the system configuration to a PC using the optional PC software (see Section 4.3 on page 4), once the system is configured and tuned to your satisfaction. Also, system configuration should be printed and stored in a safe place. See Reports menu, selection #3, *Print Configuration*.

2.2 DIP Switch 2—Reset Passcodes

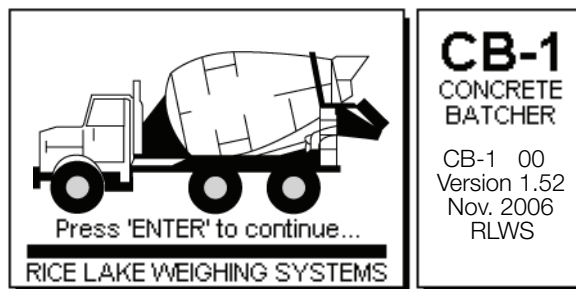
Powering up the controller with DIP switch 2 **ON** initializes the passcodes to their default settings. The default setting for supervisor and operator passcodes is 0 (zero). This DIP switch can be used in the event a passcode is forgotten. The CB-1 doesn't ask the user to verify a passcode if it is set to zero. Setting (or leaving) a passcode to zero, effectively disables passcode protection. Therefore, it is strongly recommended changing the supervisor and operator passcodes to a non-zero number.

2.3 DIP Switch 3— International System of Units (metric)

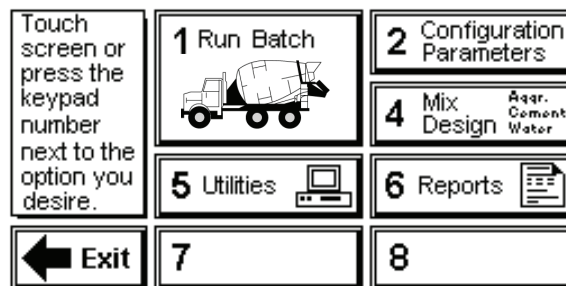
Powering up the controller with DIP switch 3 **ON** will set the primary units to kilograms, liters, and cubic meters instead of pounds, gallons, and cubic yards. It is not necessary to set DIP switch 3 to **ON** for an occasional metric use since the units may be specified per mix design. This manual and all examples are assuming U.S. Units (DIP switch 3 OFF). If your primary units are metric, and you have moved DIP switch 3 to the **ON** position, you can expect to see all prompts that refer to weight or volume, refer to kilograms, liters, and cubic meters instead.

3.0 Main Menu

Once the DIP switches have been checked (after power up), the CB-1 displays a start-up screen (shown below), that displays version information and a redi-mix concrete truck, or concrete blocks for the block version software.



The barrel of the truck should appear to be turning. This indicates that the processor and user-interface are running and communicating. Press **ENTER** on the front panel keypad or touch the screen to continue on to the main menu (shown below).



Touch the screen or press the desired number key on the front panel keypad (1-6) to enter a main menu selection.

4.0 Utilities

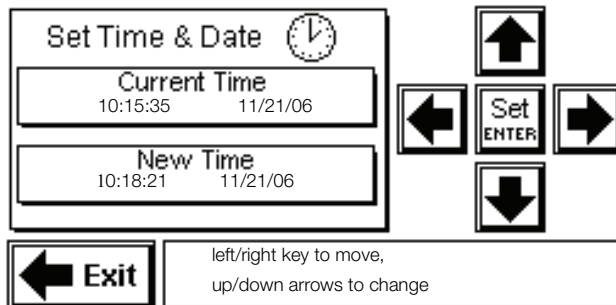
The Utilities menu (shown below), is a place for functions not directly relating to batching concrete. You can set up various parameters by selecting one of the buttons listed below.



4.1 Set Time & Date

The CB-1 should have the current time and date already in place. You can edit the time and date by using the set time & date mode.

Press **Set Time & Date** or the 1 key on the front panel to access the Set Time & Date screen.



Use the following procedure to edit the *New Time* value and display the current time (24-hour format) and date.

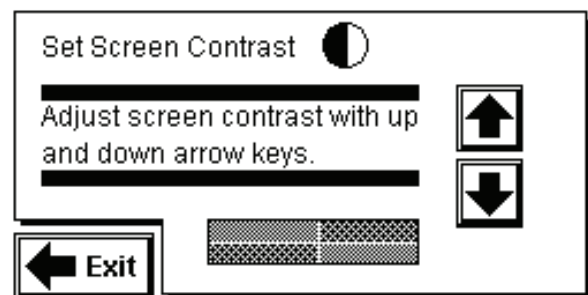
1. Press the **left/right** arrows to move the cursor to select the digit in the new time box.
2. Press the **up/down** arrows to change the value of the selected digit.
3. Press **Set-Enter** when your new time and date values are correct. *Time and Date Set* appears in the bottom right message box.

Note: You must press *Set-Enter* after you enter the new time and date or the system does not save the value.

4. Press **Exit** to return to the main menu.

4.2 Set Screen Contrast

Use the set screen contrast mode to lighten or darken the touchscreen display. Press **Set Cntrst** or the 2 key to access the set screen contrast screen.



Press the **up** arrow to lighten the screen. Press the **down** arrow to darken the screen.

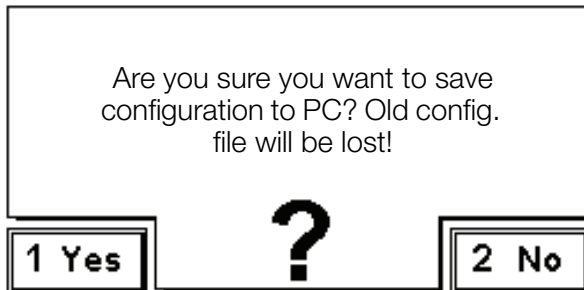
Note: Pressing the up or down arrow too many times makes the screen unreadable. If the screen is ever unreadable (either all black or all white) try repowering the system. Every time the CB-1 is re-started the contrast is automatically adjusted to the default value. The default value is stored in the *Auto Contrast Ticks* parameter in the *Advanced Parameters* menu. The value must be in the range of 0 to 60. Increasing the value makes the screen darker.

Press **Exit** to return to the main menu.

4.3 Backup Configuration File to PC

Note: You need the optional PC software to use this feature, which is explained below.

After selecting this option, you will be asked *Are you sure you want to save configuration to PC? Old config. file will be lost!*



Select **Yes** if you want to save the configuration to the PC. If you select **Yes** then a message box appears and informs you of the progress of the data upload or any errors that might occur. Be patient as this can take up to ten minutes due to extensive data checking.

If you select **No**, no action is taken.

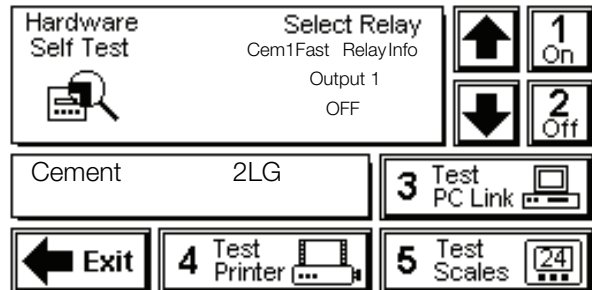
Note:

See Section 9.7 on how to use Data Exchange software on page 46.

4.4 Hardware Test

The CB-1 provides a self test mode which tests the functionality of individual components.

Press **Hardware** from the main menu to access the hardware self test screen.



4.4.1 Relay Test



Warning

The relay test energizes the selected relay, activating any field equipment connected. Take precautions to avoid personal injury and product loss or contamination.

Use the following procedure to test system relays.

1. Press the **up/down** arrows to select a relay to test.
2. Press **On** or the **1** key to energize the relay. Press the **Off** or the **2** key to deenergize the relay.

Note: The CB-1 only monitors the status (On or Off) of the input relays.

If there is a problem with the relay test, check the relay fuse and/or relay connection.

3. Press **Exit** to return to the main menu.

4.4.2 Test Scales

Use the following procedure to test the cement and aggregate scale (and water scale if equipped with the weighed water option).

1. Press **Test Scales** to display the current weight on the cement scale.
2. Press **Test Scales** again to display the current weight on the aggregate scale.
3. Press **Test Scales** again to display the current weight on the water (if so equipped) scale.

Note: If the scale weight does not appear, check that the baud rate and parity settings match. Also check the indicator wiring.

4. Press **Exit** to return to the main menu.

4.4.3 Test Printer

Press **Test Printer** to send the following test string to the printer.

```
TESTING PRINTER 1.....  
WEDNESDAY, AUGUST 09, 2006  
1234567890  
ABCDEFGHIJKLMNQPQRSTUVWXYZ
```

If the test string doesn't print, check that the baud rate and parity settings match and/or check the printer wiring.

Note: *The batch ticket requires an 80 column printer.*

Press **Exit** to return to the main menu.

4.4.4 Test PC Link (For PC Option)

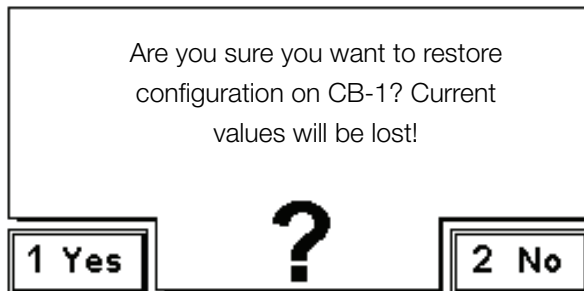
If you have purchased the optional PC software, use **Test PC Link** to test your computer connection.

When you press **Test PC Link**, the CB-1 sends a "PING" to the PC and waits for a response. The CB-1 displays *Sending Ping to PC*. If the ping test is successful, the CB-1 displays *PC communicating*. If the test is not successful, the CB-1 displays *PC not responding*.

4.5 Restore Configuration File to CB-1

Note: You need the optional PC software to use this feature.

After selecting this option, you will be asked, "ARE YOU SURE YOU WANT TO RESTORE CONFIGURATION ON CB-1? CURRENT VALUES WILL BE LOST!"



Select "Yes" if this is what you wish to do. If you select "No", no action will be taken. However, if you select "Yes", then a message box will appear and inform you of the progress of the data download or any errors that might have occurred. Be patient. This may take up to 10 minutes due to extensive data checking.

Note: *See Section 9.7 on how to use Data Exchange software on page 46.*

4.6 Admixture Counter

Press the **Admixture Counter** button from the utilities menu to access the admixture counter screen.

The admixture counter screen provides a way for the user to view the amount of each admix being metered manually. The values displayed are in fluid ounces (or milliliters for SI units). The amount is calculated based on the number of pulses (110 volt signal from pulse meter) multiplied by the volume/pulse conversion parameter that is editable under each ingredient in the configuration parameters menu. The admix counters provided here are primarily used for testing and/or manual batching.

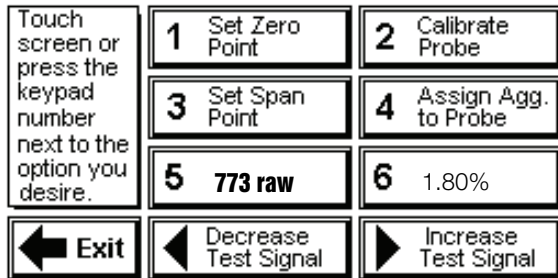


To clear an individual counter, press the button associated with that counter, or press the corresponding number on the keypad. Press button 7 to reset all counter values.

Note: *The admixture counters only accumulate pulses while this screen is displayed.*

4.7 Analog Calibration (Option)

If this feature is enabled, a new menu appears when 7, **Analog Calibration** button is pressed from the utilities menu. The following screen appears.



This feature is available with the “Moisture Probe Interface” option. This option must be specified when purchasing your CB-1 since it requires additional hardware and software.

From the analog calibration menu, the user can:

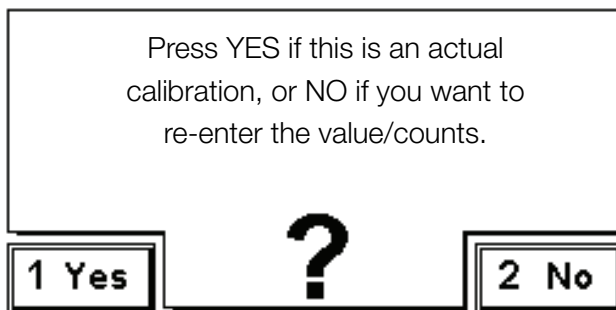
- Calibrate CB-1 4-20 mA input to the corresponding % moisture reading from the moisture probe.
- Assign the probe to an aggregate bin
- View the raw digital counts from the moisture probe
- View calibrated % moisture readings from the moisture probe
- Increase/decrease a 4-20 mA output test signal to simulate probe output.

4.7.1 Set Zero Point

Press this button after the probe has been placed in a sample of dry aggregate and the reading has reached equilibrium. You are prompted to enter the actual moisture % of the dry sample. The moisture % of the dry sample must be between 0-4.

4.7.2 Calibrate Probe

The following screen is displayed when the Calibrate Probe button is pressed. If Yes is selected, the steps in 4.7.2 apply. If No is selected, then the CB-1 prompts the operator to key in the values.



Press this button only after the zero and span values are set. Pressing this button causes the CB-1 to calculate a slope and y-intercept for the linear equation $y = mx + b$, where y is the % moisture, x is the digital counts from the 4-20 mA signal, m is the slope, and b is the y-intercept. A message appears stating whether or not the calibration is successful. The calibration will fail if either the zero or span points haven't been set, or there isn't enough resolution between the two points. There must be at least 2 percentage points and at least 100 raw counts between the zero and span points for the calibration to work. The farther apart the points are, the more accurate the calibration is. Ideally, the points should be on the outer edges of the actual working range for your aggregate.

4.7.3 Set Span Point

Press this button after the probe has been placed in a sample of wet aggregate and the readings have reached equilibrium. You will be prompted to enter the actual moisture % of the wet sample. The moisture % of the wet sample must be between 4-10.

4.7.4 Assign Aggregate to Probe

Use this button to tell the CB-1 which aggregate bin you have installed the moisture probe. This may also be accomplished from the global parameters list under the configuration parameters menu.

If you want to override the moisture probe's reading, set the assigned aggregate to 0. You can then enter the moisture values manually. See “Moisture” button in Section 9.3.

4.7.5 View Raw Digital Counts

Press this button to display the raw digital counts being read from the analog-to-digital converter. The theoretical range of these values is from 0 to 4095 (12 bits). Usually 4 mA will show around 800 counts.

4.7.6 View Calibrated % Moisture

Pressing this button has no effect. It is only used to display the current % moisture.

4.7.7 Decrease Test Signal

The Moisture Probe Interface option also comes with 2 analog outputs. One of these outputs could be used to simulate output from a moisture probe for testing purposes. The button will decrease the test output signal in the range of 4-20 mA.

4.7.8 Increase Test Signal

The same as above but increases the test signal.

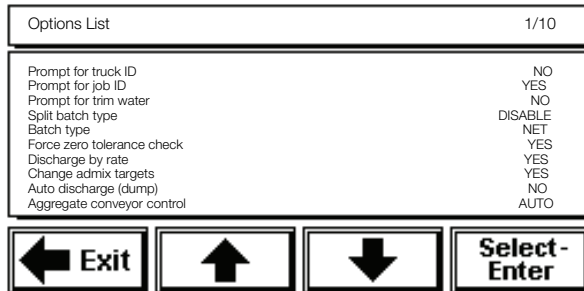
5.0 Configuration Parameters

Use the configuration parameters mode to set values for parameters controlling system operation. Press **Configuration Parameters** or the number 2 key to access the configuration parameters menu.



5.1 Options

The options list contains several choices to configure the batching routine to suit your operation. The options list choices toggle between *Yes* and *No*, or a limited number of selections.



5.1.1 Prompt for Truck ID

Use *Prompt for Truck ID* to enable the CB-1 to prompt for a truck ID during the batch preparation.

Select *Yes* to enable the system to prompt for entry of a truck ID before the batching process. This truck ID then prints on the batch ticket.

Select *No* to bypass the truck ID prompt and not print a truck ID on the batch ticket. See Section 5.7 for more information about the truck database.

5.1.2 Prompt for Job ID

Selecting *Yes* for this option allows the user to enter a 20 character alpha-numeric job identifier at the start of each batch. This job ID is then printed on the batch ticket.

5.1.3 Prompt for Water Adjust

Use *Prompt for Water Adjust* to enable the CB-1 to prompt the operator to adjust the water target during the batch preparation.

Select *Yes* to enable the system to allow the user to adjust the water contribution up or down when preparing to start a batch. The actual water addition for the total batch is then adjusted. The amount of water adjusted is printed on the report and a place for the operator to initial that they adjusted the total water for this batch.

If *No* is selected, the operator does not have an opportunity to change the batch water amount. Moisture compensation and the moisture probe option will operate whether the prompt for water adjust parameter is set for *Yes* or *No*.

5.1.4 Split Batch Type

Every concrete plant has a physical maximum that limits the number of cubic yards or meters the system can batch at one time. Likewise, every plant has a minimum number of cubic yards or meters the system can measure accurately. Batches often require the system to fill multiple drafts to reach the desired target volume.

You can choose between *Disable*, *Optimize*, *Spit Evn*, and *Even 1/4*.

See the following parameter definitions.

Disable

This selection does not allow a batch size greater than “Max Batch Volume” entered under global parameters (5.3.7). This in effect will disable any batch that cannot be delivered in 1 draft.

Optimize

This selection allows batches up to 4 times the size of Max Batch Volume. The system optimizes the drafts by always splitting the batch into drafts at the maximum plant capacity. For example, you have an eight yard plant and you want to batch 12 yards. In this example, the CB-1 would batch one eight yard draft and one four yard draft.

Split Evn

This selection is similar to optimize in that it allows a batch up to four times the size of the plant, but it splits up the drafts differently. **Split Evn** tries to “split even” the draft size. For example, a 19 yard batch would require three 6.33 yard batches. The advantages of this is that all batches are the same size and usually not real small. This is good since consistency usually means accuracy. The disadvantage is that the individual drafts may be an odd number such as 6.33 yards or 3.67 yards.

Even 1/4

This is the same as Split Evn except it rounds the draft yards to the nearest 1/4 yard to prevent odd draft sizes mentioned above. Using the same example as above, a 19 yard batch on an 8 yard plant would be broken up into two 6.25 drafts, and one 6.50 yard draft.

5.1.5 Batch Type

You can choose between three types of batching:

- NET
- GROSS
- SEEKIDL

See the following parameter definitions.

Net

This option causes the indicator to always read the net weight for the ingredient being weighed. This is accomplished by the CB-1 sending a tare command to the appropriate indicator before each ingredient is weighed. In addition, the target and actual weights displayed on the screen during batching and printed on the batch ticket are net values and do not include any starting weight or the weights of any other ingredient weighed in that hopper. The % difference is calculated per ingredient. After all ingredients are weighed up, the CB-1 sends a command to the indicator changing them back into gross mode for discharging.

Gross

In this mode, the indicators always remain in the gross mode and are never tared. For the first ingredient delivered in each weigh hopper, the CB-1 includes any weight on the scale as part of the target weight. After the first ingredient has been delivered, the CB-1 calculates the cumulative target weight for the next ingredient based off the settle weight of the previous ingredient. In both gross and net modes, the net target weight for an individual ingredient is independent of the weight on the scale; however, the gross target weight (weight reading on the indicator) for the 2nd, 3rd and 4th ingredients will include any previous weight on the scale plus the net target weight for the current ingredient.

For example:

AGG1 target=1000 and AGG2 target =1000.

If the aggregate scale starts at 10lb the target for AGG1 will be 1000 for either net or gross modes. Let's say that AGG1 was overfilled to 1020. In net mode, the scale will be tared and will display 0 (net), so the target weight for AGG2 would be 1000 ($0 + 1000 = 1000$).

In Gross mode, the target weight for AGG2 would be 2020 ($1020 + 1000 = 2020$). Of course the individual target weight for AGG2 was 1000 in both cases.

As in net mode, gross mode batching displays and prints the individual (net) weights for target and actual net weight delivered on the screen and reports. To avoid confusion between cumulative and net weights on a batch ticket, “target” is replaced with “req'd” (required) for individual net weights and “actual” weight batched per ingredient.

Seek Idl

Seek Idl targets is like gross mode in the fact that all indicators are never tared and remain in gross mode during batching. One difference is that the cumulative “ideal” targets are calculated for all ingredients and do not compensate for over and under amount of previous ingredients. The purpose of this is to make sure the total aggregate and cement amounts are accurate. This, however, has a tendency to change the proportions of sand to rock, or cement to fly ash. In the previous example, the target for AGG1 would be 1000 and the target for AGG2 would be 2000, regardless of the fact that AGG1 actual delivered was 1010. Another difference is that the tolerance is then calculated based on the total aggregate weight. If we were allowed 2.0 % tolerance on aggregates then in “Seek Idl” mode we would be allowed 20 lbs. on AGG1 and 40 lbs. on AGG2 since the target was 2000 ($2000 \times 0.02 = 40$). Another difference is that all values for target and actual that are displayed or printed are the true cumulative values that should appear on the indicator.

5.1.6 Force Zero Tolerance Check

Setting this value to Yes does not allow a batch to begin until the scale is within zero tolerance as defined in Section 5.3 under “Zero Tolerance.”

5.1.7 Discharge by Rate

The CB-1 has the ability to discharge in one of two ways. One way is a semi-auto mode where the operator controls the rate of discharge by using the up/down arrow keys on the keypad. The other way is a fully automatic mode where the CB-1 maintains independent configurable rates of discharge for the aggregates and cements. Choose *Yes* if you want the CB-1 to control the discharge rate.

5.1.8 Change Admix Targets

Selecting *Yes* enables the user to temporarily change one or all of the admixture contribution to a mix design just before batching. Selecting *Yes* enables the **F1** key while waiting to start a batch. When the **F1** key is pressed, provided Change Admix Targets is set to *Yes*, the admix targets for the selected mix design will display on the screen. The user is free to make changes for the present batch and not worry about permanently changing the mix design.

5.1.9 Auto-Discharge (Dump)

In the default mode of operation, the CB-1 pauses after all material is weighed. The user must press the **DISCHARGE** button to start the discharge cycle. The system also checks that the aggregate conveyor is running before starting the discharge. If Auto-Discharge (Dump) is set to *Yes*, the CB-1 does NOT pause but starts the discharge cycle right after ingredients have been weighed (it will still check that the aggregate conveyor is running). Use this option with caution.

5.1.10 Aggregate Conveyor Control

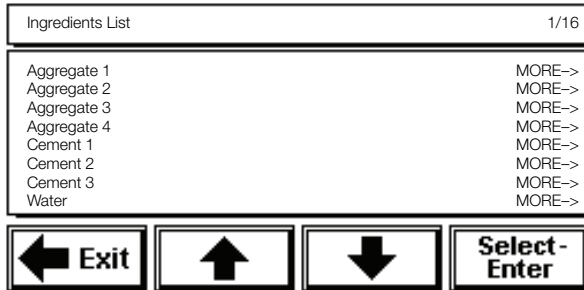
Toggle between *Manual* or *Automatic Control* of the aggregate discharge conveyor. If *Manual* is selected, then the CB-1 does not attempt to start the conveyor. It does still check the conveyor running input to make sure the conveyor is running before discharging aggregates and cements. In *Automatic* mode, the CB-1 turns the aggregate discharge conveyor *On* and *Off* as needed. If *Automatic* is selected, **it is critical that an audible alarm and light be wired to the system alarm output to warn that the conveyor will be started**. It is also important that the *Discharge Warning Time* parameter under Global parameters is set to a long enough period of time.

5.1.11 Moisture Probe Mode (Optional)

This option is available only when the “Moisture Probe Interface” option has been installed. This option controls when and how the moisture probe is read. At this point, only one selection is available. The *LAST BCH* selection stands for “last batch” and means that at completion of weighing the sand (or whichever aggregate is assigned to the probe), the moisture percentage is read and saved for use in the next batch. The only other time the value is automatically read is on power-up. See Section 4.7 for more information on the moisture probe.

5.2 Ingredients

The CB-1 allows you to control attributes of 14 different ingredients (16 if 4 of 6 aggregate options are installed). Press the **Ingredients** button or press 2 on the keypad to view ingredients.



You should be viewing the *Ingredients List* screen displaying the names of the first 8 (eight) ingredients. The *MORE ->* on the right hand side of the screen indicates that for each ingredient there is a list of parameters associated with that ingredient.

Press the **up/down** arrows to scroll to the other *Ingredients List* screen. Each ingredient has its own list of parameters to edit. Refer to Section 9.6 - *Automatic aeration of the cement silo when 2-speed filling is not required*. Highlight and select the ingredient to edit.

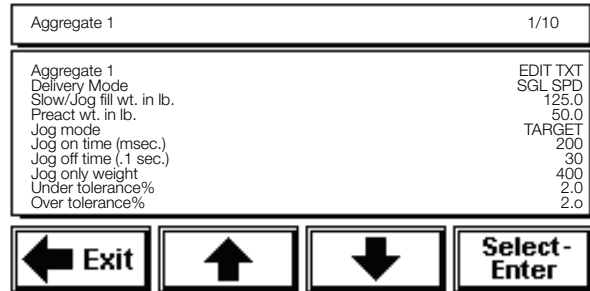
See the following sections for individual ingredient descriptions.

5.2.1 Aggregates/Cements/Weighed Water

The first four ingredients are aggregates, (If you have more than four aggregate bins, consult the factory for an option to allow any four from up to six aggregate bins to be used per mix design). The system weighs the aggregates sequentially according to the order they appear in *Ingredients List*. The next 3 are cements, followed by water and admixtures.

Select the parameter you wish to edit by highlighting that item then press **Select-Enter**. The system prompts for the new setting with either a numeric or alphanumeric keypad screen. Enter or edit the parameter, then press **Enter** to store the new setting and return to the previous list.

Parameters with limited choices require you to toggle through selections by pressing **Select-Enter**. The displayed setting is the selected setting.



See the following parameter definitions.

Label (Ingredient Name)

Alphanumeric name for this ingredient. Highlight and select to access the keypad screen. The system prompts: *Enter a new label*. Enter a new label or edit the existing name using the keypad screen, then press **Enter** to store the new name. There is a maximum of 22 characters.

Delivery Mode

You may select single speed, dual speed, or 2-concurrent as the filling method.

Single Speed (SGL SPD) - Only the fast fill output is used. This output is used to control the feed during the initial drop weighing and the jog.

Dual Speed (DUAL SPD) - Both the fast fill output and the slow fill output relays are used to fill the weigh hopper. The fast fill output is on until the slow fill weight value is reached. The fast fill output is then shut off and the slow fill output is turned on until the target is reached. With this selection, the fast fill and slow fill output relay is used. See the description of *slow/jog fill weight in lb* parameter in Section 5.2.1 of the manual to understand how the fast and slow cutoff values are determined.

2-Speed Concurrent (2 CONCUR) - As with the dual speed, both the fast fill output and slow fill output are used to fill the weigh hopper. The difference is that both outputs are on until the slow fill weight value is reached. The fast fill output is then shut off. The slow fill output stays on until the target is reached. When jogging, the slow fill output relay is used. See the description of *slow/jog fill weight in lb* parameter in Section 5.2.1 of this manual to understand how the fast and slow cutoff values are determined. This mode can also be used to Auto-Aerate the cement or flyash silos. Please refer to Section 9.6 for a more detailed description of how to do this.

Slow/Jog Fill Weight in Lb.

This value is an offset (in addition to the preact) which is subtracted from the target weight when the CB-1 is determining at what point to “cutoff” the fill output. Its purpose depends on whether the filling is single speed or dual speed. In dual speed filling (DUAL SPD or 2-CONCUR), the value entered for “Slow/Jog Fill Weight” is the weight that will be delivered at the slow speed (dribble). In single speed filling (SGL SPD), the value entered for “Slow/Jog Fill Weight” is the amount of weight short of the target that the CB-1 stops filling. If auto-jogging is turned on, then the CB-1 can make one or more jog cycles to meet (or be within tolerance of) the desired target weight.

For example, let's say the target weight is 1000lb, the “Preact Weight” is 50lb, and “Slow/Jog Fill Weight” is 100lb. The CB-1 will fast fill until it sees the scale weight reach 850lb. What happens next is contingent on what fill mode has been selected.

In Single speed filling (SGL SPD), the fast fill output would have been shut off at 850lb and 50lb of material should have “free fallen.” The settle weight on the scale should now read 900lb. This is 100lb below the target weight and exactly the amount specified in “Slow/Jog Fill Weight.” This additional 100lb. buffer is good when you want to be sure not to exceed a target weight.

Using the same example for Dual speed filling (DUAL SPD, or 2-CONCUR), after turning off the fast fill output at 850lb., the slow fill relay would be turned on (or remain on in the case of 2-CONCUR filling) until the scale reads 950lbs. At 950lb., the CB-1 turns off the slow fill relay and waits for the scale to settle. The scale settles out of motion and reads 1000lb. This also confirms the setting of 50lbs for the preact weight.

Small Preact Wt.

The small preact weight is the same as the “Preact Weight” except the small preact weight is used for batches considered “small.” See *small batch cutoff* in Section 5.3.11 for an explanation on how to set the small batch limit.

Preact Weight in Lb.

The preact weight is an empirical value representing the weight of material that falls into the weigh hopper after the controller initiates action to close the feed gate, and is dependent on many factors. It is often referred to as “freefall.” Therefore, the preact value should be estimated and entered here. The CB-1 subtracts this value from the actual cutoff value (the point at which the feed gate is closed). The CB-1 has an advanced automatic preact compensation algorithm. See Section 5.3.3 for a more detailed description.

Jog Mode

The CB-1 provides the ability to turn “jogging” on/off and the ability to choose from two different jogging modes. Highlighting (selecting) the Jog Mode option and pressing the **Select/Enter** button repeatedly causes the CB-1 to cycle through these options:

JOG OFF - selecting this option disables all jogging for this ingredient.

UPTO TOL - selecting this option causes the CB-1 to jog only up to a weight that is considered within tolerance. See Under Tolerance % on page 12. The *Up to Tol* selection might be chosen for an expensive ingredient like cement, to ensure that the target is not exceeded.

TARGET - selecting this option causes the CB-1 to jog until the target weight has been met or exceeded.

Jog On Time (millisecond)

Automatic jogging or auto-jog involves feeding small amounts of material by opening up the feed gate for a specified amount of time, closing the feed gate, waiting a specified amount of time, then checking the weight against the setpoint. This cycle is repeated until the desired weight is achieved. The unique thing about jogging is that the weight isn't looked at while material is feeding. The *Jog On Time* is the amount of time the feed gate is held open in milliseconds. For example, if this value is set to 200, then the feed gates are held open for 200 millisecond or 1/5 of a second.

Jog Off Time (.1 sec.)

Similar to Jog On Time, but this is the amount of time the CB-1 waits before looking at the weight. This gives more control than waiting for an out-of-motion condition to occur.

Jog Only Weight

This is the weight at which the CB-1 can no longer deliver accurately by conventional means. Whenever the target weight for this ingredient or the weight remaining to deliver after a pause or error condition, is less than this weight, the CB-1 jogs this entire amount up to the desired weight, provided jogging is active. The need for this parameter arises because there is a fixed minimum amount that the system can accurately deliver by opening up the feed gate, checking the weight for setpoint, closing feed gate and allowing for preact.

Under Tolerance%

For each ingredient an over/under tolerance percentage can be specified independently. This value is a percentage of the target value for this ingredient. The lower tolerance weight is calculated by the following formula: tolerance lower limit = target value - ((target value) * (under tolerance%)/100). If the actual delivered amount for this ingredient is less than the lower tolerance limit, the CB-1 pauses and alerts the user that an under-tolerance condition has occurred. The user can press the **Tol Accept** key if this is okay, he/she may manually add the difference and then press the **Tol Accept** key, or he/she may choose to abort the batch by pressing the **Abort** key.

Note: If auto-jogging is set to Up to Tol, the Under Tolerance% is used to decide when to stop jogging. If auto jogging is turned on, an under tolerance alarm can NEVER occur.

Note: If an out of tolerance weight is manually brought into tolerance and then TOL ACCEPT is pressed, the CB-1 will use the new weight. The batch ticket will not mark that ingredient as out of tolerance.

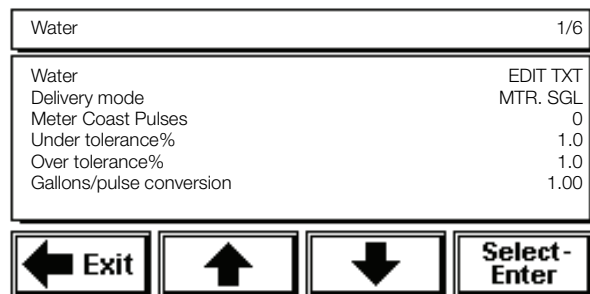
Over Tolerance%

This value is similar to Under Tolerance % except it is calculated by the following formula: tolerance upper limit = target value + ((target value) * (over tolerance%)/100).

5.2.2 Water (if water is metered)

The system delivers water using a pulse meter (consult factory for availability of a weighed water option). To deliver a specified amount of water, the CB-1 first calculates the number of pulses (from the pulse meter) required to deliver the target weight of water in gallons or liters. The CB-1 then turns on the water fill output relay and begins checking for pulses. The system can meter and discharge water simultaneously when needed, or first meter the water into a reservoir. The system opens valves on the reservoir to deliver the first and second (washout) water additions. If you are using a reservoir the amount of washout water is a fixed amount dependent upon the reservoir capacity.

Water has a list of parameters to edit in the water screen.



Highlight and select the item from the list to edit. The system prompts for the new setting with either a numeric or alphanumeric keypad screen. Enter or edit the parameter, then press **Select-Enter** to store the new setting and return to the previous list.

Parameters with limited choices require you to toggle through selections by pressing **Select-Enter**. The displayed setting is the selected setting.

See the following parameter definitions.

Label (Water)

Alphanumeric name for the water. You cannot change this parameter.

Delivery Mode

The CB-1 delivers water using a metered single-speed mode. You cannot change this parameter.

Water Coast Pulses

A coast value is the amount of this ingredient that flows after the pump/valve has been shut off or closed. Because valves are usually closed slowly to prevent water “hammer,” the CB-1 might deliver too much water. To prevent this, a coast value can be entered. The CB-1 uses this value to shut off the water early to compensate for “coasting.” This value is similar to a preact for weighed ingredients and should be entered as the number of pulses the meter sends after start of close.

Under Tolerance%

For each ingredient an over/under tolerance percentage can be specified independently. This value is a percentage of the target value for this ingredient. The lower tolerance weight is calculated by the following formula: tolerance lower limit = target value - ((target value) * (under tolerance%)/100). If the actual delivered amount for this ingredient is less than the lower tolerance limit, the CB-1 pauses and alerts the user that an under tolerance condition has occurred. The user may press the **Tol Accept** key if this is okay, he/she may manually add the difference and then press the **Tol Accept** key, or he/she may choose to abort the batch by pressing the **Abort** key.

Note: If auto-jogging is set to Up to Tol, the Under Tolerance% is used to decide when to stop jogging. If auto jogging is turned on, an under tolerance alarm can NEVER occur.

Note: If an out of tolerance weight is manually brought into tolerance and then TOL ACCEPT is pressed, the CB-1 will use the new weight. The batch ticket will not mark that ingredient as out of tolerance.

Over Tolerance%

This value is similar to Under Tolerance% except it is calculated by the following formula: tolerance upper limit = target value + ((target value) * (over tolerance%)/100).

Gallons/Pulse Conversion

Because the CB-1 uses pulse inputs from a pulse meter to deliver water and admixtures, the CB-1 needs to know how much water or admixture is delivered for every pulse from the pulse meter. Enter the amount delivered per pulse from the meter here. The default is 1.00 and this is common in the industry since most meters have a summing board inside them and can be set so 1 pulse = 1 gallon, or 1 pulse = 1 ounce.

5.2.3 Admixtures

Like water, the system measures admixtures by means of a pulse meter. There are a maximum of six admixtures, and each requires a unique pulse meter input. You can deliver admixtures manually or use another system sold for this purpose. The system measures admixtures in ounces or milliliters. Enter the desired target value in the mix design. You can base this value on one yard or per “100 weight of cement,” which you configure independently in each admix ingredient list.

The CB-1 meters all admixtures used in a given mix design at the same time. If the delivery mode is *BOTTLE*, then the admixtures are metered into their bottle (sight tubes) during the “Weigh-Up” phase. If the delivery mode is *DIRECT*, the admixtures are metered directly into the mix during the discharge cycle. Any admix metered into a bottle are discharged at the same time. Admixtures that shouldn’t be mixed, for fear of coagulation, should be configured to add each admixture with either the first or second (washout) water addition. To actually discharge the admixtures, the CB-1 must open an output relay and monitor an input relay to signal that the admix has been discharged.

Admix 1	1/11
Label (Admix)	EDIT TXT
Delivery mode	SGL MTR
Meter coast pulses	2
Under tolerance%	.25
Over tolerance%	.10
Value/100 wt. of cement	1.00
Ounces/pulse conversion	.75
Add with water add #	1
Admix delivery mode	BOTTLE
Admix discharge mode	STAYFULL
Admix blowout time (s)	20

← Exit ↑ ↓ Select-Enter

Each admixture has its own list of parameters to edit in the Admixture screen.

Note: Press the up/down arrows to scroll to the next screen of parameters.

Highlight and select the item from the list to edit. The system prompts for the new setting with either a numeric keypad or alphanumeric keypad screen. Enter or edit the parameter, then press **Select-Enter** to store the new setting and return to the previous list.

Parameters with limited choices require you to toggle through selections by pressing **Select-Enter**. The displayed setting is the selected setting.

See the following parameter definitions.

Label (Admix 1)

Alphanumeric name for the admixture. Highlight and select to access the keypad screen. The system prompts: *Enter a new label.* Enter a new label or edit the existing name using the keypad screen, then press **Enter** to store the new name. There is a 22 character maximum ingredient name.

Delivery Mode

The CB-1 delivers admixtures using a metered single-speed mode. You cannot change this parameter.

Meter Coast Pulses

A coast value is the amount of this ingredient that flows after the pump/valve has been shut off or closed. The CB-1 uses this value to shut off the admix early to compensate for “coasting.” This value is similar to a preact for weighed ingredients.

Under Tolerance%

For each ingredient an over/under tolerance percentage can be specified independently. This value is a percentage of the target value for this ingredient. The lower tolerance weight is calculated by the following formula: $\text{tolerance lower limit} = \text{target value} - ((\text{target value}) * (\text{under tolerance\%})/100)$. If the actual delivered amount for this ingredient is less than the lower tolerance limit, the CB-1 pauses and alerts the user that an under tolerance condition has occurred. The user may press the **Tol Accept** key if this is okay, he/she may manually add the difference and then press the **Tol Accept** key, or he/she may choose to abort the batch by pressing the **Abort** key.

Note: *if auto-jogging is set to Up to Tol, the Under Tolerance% is used to decide when to stop jogging. If auto jogging is turned on, an under tolerance alarm can NEVER occur.*

Note: *If an out of tolerance weight is manually brought into tolerance and then TOL ACCEPT is pressed, the CB-1 will use the new weight. The batch ticket will not mark that ingredient as out of tolerance.*

Over Tolerance%

This value is similar to Under Tolerance% except it is calculated by the following formula: $\text{tolerance upper limit} = \text{target value} + ((\text{target value}) * (\text{over tolerance\%})/100)$.

Value/100 wt. of cement

Amounts of admixtures required for a specific mix design are often based on how much cement is in the mix. The CB-1 can be configured to use the mix design admix target value as either the amount per yard or the amount per 100lbs of cement. (the CB-1 uses the total weight of all cementitious material when calculating how much admix to add). Press **Select-Enter** to toggle the setting between *Yes* and *No*. If *Yes*, the system measures the admixture per 100 weight of cement. If *No*, the system measures the admixture per one yard of cement.

Ounces/Pulse Conversion

Because the CB-1 uses pulse inputs from a pulse meter to deliver water and admixtures, the CB-1 needs to know how much water or admixture is delivered for every pulse from the pulse meter. Enter the amount delivered per pulse from the meter here. The default is 1.00 and this is common in the industry since most meters have a summing board inside them and can be set so 1 pulse = 1 gallon, or 1 pulse = 1 ounce.

Add with Water Add #

This value determines with which water addition the system delivers the admixture. Press **Select-Enter** to toggle the setting. Select *1* to deliver the admixture with the first water addition. Select *2* to deliver the admixture with the second (washout) water addition.

Admix Delivery Mode

Admixes can be metered into a bottle (sight tube) before discharging into the water line, or may be metered directly into the water line. Press **Select-Enter** to toggle between *Bottle* and *Direct*.

Admix Discharge Mode

If you chose *Bottle* as the admix delivery mode, then this parameter is relevant. *Bottle* admixtures can be discharged using a bottle empty signal only (*Stay Full*) or they can be discharged using a bottle empty signal and a timer (*Blow Out*). If you are concerned about the admixture freezing in the line, then you want to blow out the line (select *Blow Out*). If not, you probably want to only discharge the admix from the bottle and leave the line filled with admixture (select *Stay Full*). Press **Select-Enter** to toggle between *Blow Out* and *Stay Full*. This parameter has no effect on direct feed admixtures.

Admix Blowout Time (s)

If you have admixtures configured as *BOTTLE* and have configured the lines to *BLOW OUT*, to prevent freezing in colder climates, then this is the amount of time this bottle is blown out for.

5.3 Global Parameters

The Global Parameters allow you to configure those variables that control system operation. There are a total of 17 items in the global parameters list, many with parameters of their own to edit.

Global Parameters List		1/17
Aggregate Scale		
Cement Scale		
Water		
Admixture		
Reporting		
Min Batch (cubic yds)		1.00
Min Batch (cubic mtrs)		1.00
Max Batch (cubic yds)		12.00
Max Batch (cubic mtrs)		12.00
Min Aggregate Lb/Yd		0.00
Max Aggregate Lb/Yd		5000.00
Min Cement Lb/Yd		0.00
Max Cement Lb/Yd		1200.00
Min Water per Yard		0.00
Max Water per Yard		400.00
Small Batch Cutoff		0.00
Discharge Warning Time (s)		0

← Exit
↑
↓
Select-Enter

Note: Press the up/down arrows to scroll to the other Global Parameters screens.

5.3.1 Aggregate Scale, Cement Scale

Use the *Aggregate/Cement Scale* parameters to edit those variables associated with the aggregate or cement scale. These lists contains 10 items. Here is the Aggregate scale list for example. The Cement scale list is the same.

Aggregate		1/11
Discharge delay (.1 sec)		10
Shock wt. delay (.1 sec)		30
Second burst wt. (lb)		20
Begin vibrator wt. (lb)		25
Settle time (.1 sec)		10
Min. flow rate (lb/sec)		30
Zero tolerance (primary)		40
Zero tolerance (secondary)		40
Post zero time (.1s)		50
Discharge control list		MORE->
Preact compensation		MORE->

← Exit
↑
↓
Select-Enter

Note: Press the up/down arrows to scroll to the other Aggregate Scale screen.

Highlight and select the item from the list to edit. The system prompts for the new setting with either a numeric keypad or alphanumeric keypad screen. Enter or edit the parameter, then press **Select-Enter** to store the new setting and return to the previous list.

Parameters with limited choices require you to toggle through selections by pressing **Select-Enter**. The displayed setting is the selected setting.

See the following parameter definitions.

Discharge Delay (.1 sec)

The amount of time the system waits before starting the discharge from this hopper. The maximum value is 6000 (600 seconds).

Shock Wt Delay (.1 sec)

The amount of time the system waits after opening the feed gate to take a weight reading. This delay prevents errors from spike weights (the force of the initial drop of material onto the scale).

Second Burst Wt. (Lb.)

During the discharge cycle, as the weigh hopper empties, there will be a point at which the material barely flows out of the inch gate at the current opening. The *Second Burst Weight* is the weight remaining in the weigh hopper when the CB-1 opens the inch gate (hold the Open input on for the time configured in Secondary Burst (under the Discharge Control List)), a little further. The secondary burst is only used when the discharge rate is adjusted manually, since it would already be compensating for changes in flow rate when discharging by RATE.

Begin Vibrator Wt. (Lb.)

During the discharge cycle, as the weigh hopper empties, there is a point at which the material no longer flows out of the inch gate at the current opening. The begin vibrator weight is the weight remaining in the weigh hopper when the CB-1 opens the inch gate (hold the OPEN input on for time configured in *Full Open Time* - under the Discharge Control List) all the way open and start the vibrator. This is used to clear all material from the weigh hopper to achieve a weight within zero tolerance.

Settle Time (.1 sec.)

Settle time is the maximum amount of time the system should wait to take a weight reading after adding this type of ingredient. The CB-1 will be waiting for the weigh indicator to show the weight is out-of-motion before accepting the weight as valid. In the event out-of-motion condition does not occur, then the weight is taken after the expiration of the *Settle Time*.

Minimum Flow Rate (Lb./S.)

The minimum amount of weight that must be delivered per second. If the minimum amount is not being delivered, a no-flow error is displayed.

Zero Tolerance (Primary)

The weight under which the system considers the scale empty. The scale weight must be below this value before the system will start a batch/draft, if *Force Zero Tolerance Check* is set to *Yes*. Also when discharging, the CB-1 considers the scale empty when the weight drops below this value.

In normal operation, primary units are in pounds.

Zero Tolerance (Secondary)

The weight under which the system considers the scale empty. The scale weight must be below this value before the system will start a batch/draft, if *Force Zero Tolerance Check* is set to *Yes*. Also when discharging, the CB-1 considers the scale empty when the weight drops below this value.

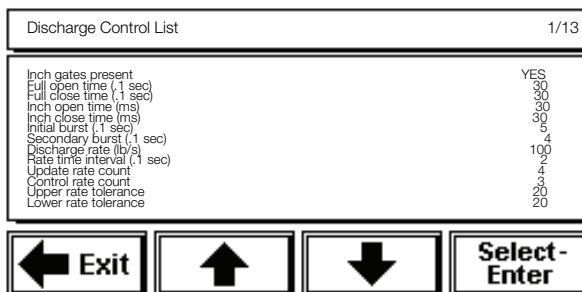
In normal operation, secondary units are in kilograms. See Section 2.3 for more information.

Post-Zero Time (.1s)

The amount of time that the system keeps the discharge gate open, the vibrator running, and the conveyor running after the zero band has been reached at the end of a discharge.

5.3.2 Discharge Control List

Highlight and select *Discharge Control List* to access the associated parameters screen shown below.



Highlight and select the item from the list to edit. The system prompts for the new setting with either a numeric keypad or alphanumeric keypad screen. Enter or edit the parameter, then press **Select-Enter** to store the new setting and return to the previous list. Parameters with limited choices require you to toggle through selections by pressing **Select-Enter**. The displayed setting is the selected setting.

See the following parameter definitions.

Inch Gates Present

Inch Gates are gates that may be open or closed with two different outputs, and hold their position after both outputs are de-energized. Press **Select-Enter** to toggle the setting from *Yes* to *No*. Select *Yes* if your operation has discharge inch gates. Select *No* if your system does not have inch gates. The displayed setting is the selected setting.

Full Open Time (.1 sec)

The amount of time it takes for the system to fully open the inch gate from the closed position (in 1/10 seconds).

Full Close Time (.1 sec)

The amount of time it takes the system to close the inch gate from the full open position (in 1/10 seconds).

Inch Gate Open Time

During discharge, you can press the front panel **FAST** (up arrow) button to open the inch gate and discharge faster. The *Inch Gate Open Time* determines how long the system energizes the relay to open the inch gate for every press of the **FAST** key (in milliseconds). This is also the amount of time the CB-1 automatically opens the inch gate when trying to maintain the “Discharge by Rate” if discharge control has been selected to *Yes* (Section 5.1.7).

Inch Gate Close Time

During discharge, you can press the front panel **SLOW** (down arrow) button to close the inch gate to discharge slower. The *Inch Gate Close Time* determines how long the system energizes the relay to close the inch gate for every press of the **SLOW** key (in milliseconds). This is also the amount of time the CB-1 automatically closes the inch gate when trying to maintain the “Discharge by Rate” if discharge control has been selected to *No* (Section 5.1.7).

Initial Burst (.1 sec)

This parameter controls how far the system opens the inch gate at the start of the discharge. The system energizes the relay for the amount of time listed as the *Initial Burst* value (in 1/10 seconds).

Secondary Burst (.1s)

This is the amount of time the discharge gate OPEN output is held on for after the weigh hopper has emptied to the *Secondary Burst Weight*.

Discharge Rate (Lb./S.)

This value is only used when discharging by RATE, see Section 5.1.7. The value entered here represents the desired discharge rate (flow measured in Lb/s) from this weight hopper during the discharge cycle. If configured to discharge by rate, the CB-1 automatically opens and closes the discharge inching gate to maintain this rate. If the truck database is used, the target discharge rate may be increased or decreased to accommodate the truck being loaded.

Rate Time Interval (.1s)

The *Rate Time Interval* is the amount of time used as a reference for measuring how much weight has discharged and calculating the flow rate. For example, if this value is set to 2, then every 2/10th seconds (5 times per second), a new discharge flow rate is calculated. How often this new discharge rate is displayed, or how often the system corrects (when discharging by rate) are defined by multiples of this interval.

Update Rate Count

This value is a number of time intervals between updating the calculated discharge rate on the screen. The value also represents the number of discharge rates that are averaged to make up the displayed rate. This is a type of filtering.

Control Rate Count

This value represents the number of discharge rates that are averaged and used to make a decision to open or close the inch gates when discharging by rate. The larger the value, the slower the CB-1 will make adjustments to the discharge rate.

Upper Rate and Lower Rate Tolerance

The *Upper and Lower Rate Tolerance* values provide a window within the CB-1 and will not make corrections to the inch gates to control the discharge rate. These values are needed to inhibit the CB-1 from making constant changes to the inch gate positioning based on minute changes in the discharge rate.

5.3.3 Preact Compensation

You can choose to enable or disable the automatic preact compensation under *Preact Compensation* in the *Aggregate/or Cement Scale List* screen.

Preact Compensation List		1/6
Auto preact active		ON
Coarse preact tolerance%		50
Coarse preact compensation%		50
Fine preact tolerance%		20
Fine preact compensation%		20
# out of tolerance allowed		3

← Exit ↑ ↓ Select-Enter

Highlight and select the item from the list to edit. The system prompts for the new setting with either a numeric keypad or alphanumeric keypad screen. Enter or edit the parameter, then press **Select-Enter** to store the new setting and return to the previous list.

Parameters with limited choices require you to toggle through selections by pressing **Select-Enter**. The displayed setting is the selected setting.

See the following parameter definitions.

Auto Preact Active

Select to enable or disable the auto-preact function. Press **Select-Enter** to toggle the settings between on and off.

If you turn the auto-preact *Off*, the CB-1 never modifies the preact value you entered under the individual ingredient parameters.

If you turn the auto-preact *On*, the CB-1 automatically adjusts the preact every time it fills an ingredient to ensure the most accurate fill. The parameters controlling the adjustment algorithm are explained next.

Coarse Preact Tolerance%

The auto-preact function uses coarse and fine adjustment bands to more accurately reach the target weight. The *Coarse Preact Tolerance Percentage* defines the coarse range outside of which the system does not adjust the preact.

If the ingredient weight is outside of the coarse preact tolerance percentage band, the CB-1 does not adjust the preact but displays a warning that the weight is not within the tolerance.

If the ingredient weight is within the coarse preact tolerance percentage band, the CB-1 adjusts the preact using the coarse preact compensation percentage.

Coarse Preact Compensation%

If the ingredient weight is within the coarse preact tolerance band, the CB-1 adjusts the weight by this percentage of the difference to fill closer to the target.

Fine Preact Tolerance%

The auto-preact function uses coarse and fine adjustment bands to more accurately reach the target weight. The *fine preact tolerance percentage* defines the fine range within which the system does not adjust the preact.

If the ingredient weight is outside of the fine preact tolerance percentage band, the CB-1 does not adjust the preact (unless the weight is within the coarse adjustment percentage) but displays a warning that the weight is not within the tolerance.

The CB-1 then keeps adjusting automatically to reach the target weight.

Fine Preact Compensation%

If the ingredient weight is within the fine preact tolerance band, the CB-1 adjusts the weight by this percentage of the difference to fill closer to the target.

Out of Tolerance Allowed

Set how many out of tolerance messages the system must encounter before going into an error condition.

Preact Compensation Example

The following example uses the data listed below

Preact Compensation List		1/6
Auto preact active	ON	
Coarse preact tolerance%	50	
Coarse preact compensation%	25	
Fine preact tolerance%	25	
Fine preact compensation%	20	
# out of tolerance allowed	5	

← Exit ↑ ↓ Select-Enter

Our example ingredient, sand, has a preact of 50 lb and a target weight of 1000 lb. The CB-1 fills the sand, then shuts the feed gate when the aggregate hopper scale reads 950 lb.

After the *Scale Settle Time* expires (or the scale reaches standstill), the weight for the delivered sand is 1030 lb (after the preact material settles). This is 30 lb (or 3%) over the target weight. The fine adjustment band is 0–25%, and the coarse adjustment band, 26–50%.

In this case, the CB-1 would adjust the preact by 20% of the difference (the *Fine Preact Compensation Percentage*), which is 6 lb. The new adjusted preact would be 56 lb.

Note: *Increasing the preact decreases the weight delivered. Decreasing the preact increases the weight delivered.*

The auto-preact function adjusts the preact every time the system uses the ingredient. After a short time, the CB-1 delivers the ingredient exactly to the target weight. Thereafter, the auto-preact function only alters the preact when the flow characteristics of the ingredient change.

5.3.4 Water

Select *Water* to edit those variables associated with water. If your system is equipped with the weighed water option, the list will look quite different.

Water		1/9
Discharge delay (.1 sec)	10	
Water reservoir	NO	
Water to truck first	YES	
Wash/tailwater gallons	20	
Pulse time/no flow (.1 sec.)	10	
Max. reservoir discharge time	5	
Empty reservoir input state	ON	
Washout H2O delay (.1 sec.)	10	
% delivered to discharge	60	

← Exit ↑ ↓ Select-Enter

Discharge Delay

The amount of time the system waits before starting the water metering (or water discharge if using a reservoir).

Water Reservoir

Designate whether or not your operation uses a water reservoir during batching. Press **Select-Enter** to toggle the setting between *Yes* and *No*. The displayed setting is the selected setting.

If you select no, the system meters the target amount of water minus the washout value for the first addition. The system then delivers the remaining amount for the second (washout) addition.

If you select yes, the system fills the reservoir to the specified target value while metering the admixture at the start of a batch. The system then opens the hi/low water outputs sequentially for the first and second (washout) additions.

Water to Truck First

If this value is set to *Yes*, then the water is added at the beginning of the discharge cycle, and the aggregates and cements will NOT start discharging until all water (not including the washout/tailwater) has been added. If this value is set to *Yes*, the discharge delay parameter is ignored.

If this valve is set to NO, then the water, cements, and aggregates are all added after their respective discharge delay times.

F2 for Water Start

The **F2** key can be used to preload the water for the current batch **MAKE SURE A TRUCK IS IN POSITION BEFORE PRESSING THE F2 KEY!** Setting this value to *Yes* enables the F2 key and will start the water addition. If set to *No*, the F2 key has no effect.

For the F2 key to be active, a number of conditions need to be met.

- The F2 FOR WATER START parameter must be set to *YES*.
- The system is configured to meter water

directly into the truck (not a reservoir).

- A batch must be “prepared” and ready to run, or in the weighing cycle, or waiting for the “discharge” key to be pressed.

If there are admixtures that are configured as bottle, they will be metered into their bottles first.

Wash/Tailwater Gallons

This is the number of gallons that are delivered after the aggregates and cements have been discharged (weigh hoppers are zero). The washout, or “holdback” water is used to wash off the “boot” and truck orifice.

Pulse Time/No Flow (.1s)

When metering admixtures, the system considers it a No Flow error if the time between pulses exceeds this value.

Max. Reservoir Discharge Time (s)

This is the maximum amount of time allowed for a water reservoir to empty. The system detects an input sensor. If this time is exceeded, then the CB-1 generates a no discharge error condition.

Empty Reservoir Input State

This is the state of the sensor on the water reservoir. Select *On* if the sensor is closed (input relay is ON) when reservoir is empty. Select *Off* if the sensor is open (input relay is OFF) when the reservoir is empty.

Washout H2O Delay (.1s)

This value represents the amount of time delay starting from when the aggregates and cements are completely discharged, and the start of the washout water addition.

% Delivered to Discharge

This value is the percentage of water that will be added before the aggregate and cement discharges are started. The default value is 60%. A value of 100% would wait for all water to be delivered before starting aggregate and cement. 0% would start all of them discharging at the same time. Applicable only if the F2 for water start parameter (see Section 5.3.4) is set to YES and the F2 key is used to start the water.

5.3.5 Admixture

Select *Admixture* to edit those variables associated with all admixtures.

Admixture	1/5
Admix control	AUTO
Discharge Delay (.1 sec)	0
Pulse time/no flow.1s	50
Discharge timeout (s)	60
Empty reservoir input state	ON

← Exit ↑ ↓ Select-Enter

Highlight and select the item from the list to edit. The system prompts for the new setting with either a numeric keypad or alphanumeric keypad screen. Enter or edit the parameter, then press **Select-Enter** to store the new setting and return to the previous list.

Parameters with limited choices require you to toggle through selections by pressing **Select-Enter**. The displayed setting is the selected setting.

See the following parameter definitions.

Admix Control

Toggle between *Auto* and *Manual*. If you don't want the CB-1 to control the admix metering and discharging select *Manual*. When configured for *Manual* admix fill, the CB-1 ignores all admixture additions even if the mix design specifies an admix configuration. Select *Auto* if you want the CB-1 to meter and discharge admixtures.

Discharge Delay (.1sec)

The amount of time the system waits before starting the first admixture discharge. The maximum value is 6000 (600 seconds).

Pulse Time/No Flow.1s

When metering admixtures, the system considers it a NO Flow error if the time between pulses exceeds this value.

Discharge Timeout (s)

This is the maximum amount of time allowed for a water reservoir to empty. The system detects an input sensor. If this time is exceeded, then the CB-1 generates a no discharge error condition.

Empty Reservoir Input State

Select the state of the bottle empty sensor when the bottle is empty. Select *On* if the sensor is closed (input relay is ON) when the bottle is empty.

Select *OFF* if the sensor is open (input relay is OFF) when the bottle is empty.

5.3.6 Reporting

Selections under the *Reporting* list configure what information appears on reports and how this information is formatted).

Reporting	1/8
Custom report header	MORE-->
J.S. units format	LB
Metric units format	MG
Prints units type	LIKE MIX
*Out of tolerance	YES
Print water/cem ratio	YES
Print each batch weights	YES
Usage report has US/SI	NO

← Exit ↑ ↓ Select-Enter

Highlight and select the item from the *Reporting List* to edit.

Custom Report Header

The CB-1 provides an 8 line by 30 character editable header. This header prints on the top of each report. Use this space to enter plant name, address, phone number, etc. Leaving one or more lines blank will cause the CB-1 to not print those lines. If you want a blank line in the header, you must put one or more spaces at the beginning of the line.

U.S. Units Format

When configured to print in U.S. units, the CB-1 needs to know if it should print in tons or pounds. Toggle between *LB/G/OZ* and *TN/G/OZ* for tons or pounds. The system default U.S. units for volume of water is gallons and for admixtures it is ounces. These can not be changed. This is for the Batch Ticket only. Material usage always prints in Tons and Gallons.

Metric Units Format

When configured to print in Metric units, the CB-1 needs to know if it should print in megagrams or kilograms. Toggle between *MG/L/ML* and *KG/L/ML* for tons or pounds. The system defaults Metric units for volume of water is liters and for admixtures it is milliliters. These can not be changed. This is for the Batch Ticket only. Material usage reports are always printed in Megagrams and Liters.

Prints Units Type

Regardless of what system of units you have chose as your primary units (see DIP switch 3 in Section 2.3), U.S. or Metric, you may configure the units that are printed on reports. For example you may batch in U.S. units and print in U.S. or metric or both! By pressing the **Select-Enter** button, you can change between “LIKE MIX” - always print whatever units are specified in the mix design, “US ONLY” - always prints in US units regardless of what primary units are or what units are in mix design, “SI ONLY” - always prints in metric units using format specified in “Metric Units Format”, “BOTH” - this will force both US and metric units to be printed on all reports.

Note: When printing “Both” units on the Batch Ticket, some information is omitted for space concerns.

*Out of Tolerance

Select *Yes* if you want *Out of Tolerance* ingredients to be marked with an asterisk.

Print Water/Cem Ratio

Select *Yes* if you want to print the water/cement ratio on the batch ticket.

Print Each Batch Weights

If set to *Yes*, then the weights for each individual batch is printed, otherwise the weights of the materials for the total load are printed. The default is *No*. Applicable only if the split batch type parameter (see Section 5.1.4) is set for *Optimize*, *Splt Evn*, or *Even 1/4*.

Usage Report has US/SI

Selecting *Yes* will cause the material usage report to show US and SI units.

5.3.7 Minimum/Maximum Batch Volume (cubic yards & cubic meters)

The CB-1 uses the *Min. and Max Batch Volume* values to determine whether or not to use multiple drafts to reach the target weight. These parameters affect the *Split Batch Type* (5.1.4) in the Options List.

Min. Batch Volume

Highlight and select to set the minimum volume that your system can measure accurately.

The *Min. Batch* (cubic yards) parameter is used when batching in U.S. units and the *Min. Batch* (cubic meters) parameter is used when batching in Metric units.

Max Batch Volume

Highlight and select to set the maximum volume that your system can batch at one time. If you try to batch more than the max batch volume value, you will need to enable the multi-draft option or change the mix design formula. If using the truck database, the truck capacity parameter will also determine how large a load may be.

The *Max Batch* (cubic yards) parameter is used when batching in U.S. units and the max batch (cubic meters) parameter is used when batching in metric units.

The CB-1 allows batches that exceed the max batch volume value by breaking up the target number of yards into smaller drafts.

Note: You must have *Split Batch Type* enabled, see Section 5.1.4.

The CB-1 calculates the number of drafts required and the volume per draft required to meet the target weight. The CB-1 then adjusts the last and second-to-last drafts so that they will always be greater than the min. batch volume. This allows you to mix large amounts of concrete without having to reenter the mix design number, batch volume, and trim water for each draft. The CB-1 will pause to make adjustments between drafts, if needed. If this happens, press the front panel **Start** button to continue on to the next draft.

5.3.8 Minimum/Maximum Aggregate Wt/Yard

Highlight and select to set the minimum and maximum weight for aggregates per yard of concrete. The total weight of all the aggregates for one yard of concrete must be within the minimum and maximum aggregate weight per yard values.

5.3.9 Minimum/Maximum Cement Wt/Yard

Highlight and select to set the minimum and maximum weight for cement per yard of concrete. The total weight of all the cement for one yard of concrete must be within the minimum and maximum cement weight per yard values.

5.3.10 Minimum/Maximum Water Per Yard

Highlight and select to set the minimum and maximum amount of water per yard of concrete. The total amount water for one yard of concrete must be within the minimum and maximum water per yard values.

5.3.11 Small Batch Cutoff

The small batch cutoff is the maximum batch size the system will consider “small” and use the small preact weight (see Section 5.2.1)

5.3.12 Discharge Warning Time (s)

This is a configurable pause between pressing the **Discharge** key and the system actually starting the discharge cycle. This serves as a warning time and gives the operator a moment to press **Pause** if he/she didn't really want to start discharging. During this pause, the system alarm output relay will be energized - a connected buzzer or light will serve as a warning that the aggregate conveyor will be starting.

5.3.13 Aggregate w/ Moisture Probe (Optional)

This option is only available when the “Moisture Probe Interface” option has been installed. For the moisture probe interface option to work, the CB-1 needs to know what aggregate bin the moisture probe has been installed in. Press **Select-Enter** and enter the correct aggregate number. Usually this will be the fine aggregate or sand bin. You may have named your aggregates instead of using the defaults like “Aggregate 1” or “Aggregate 2”. The number you should enter here must correspond to the position of the aggregate in the ingredients list.

5.4 Systems Passcodes List

The CB-1 provides a two-level passcode protection system—supervisor, and operator. Passcodes are numeric entries with a maximum range of zero to 9,999,999. The default supervisor and operator passcode is 0. The CB-1 doesn't ask the user to verify a passcode if it is set to zero. Setting (or leaving) a passcode to zero, effectively disables passcode protection. Therefore, we strongly recommend changing the supervisor and operator passcodes to a non-zero number as part of the initial system setup. To change the passcodes, highlight and select *System Passcodes List* from the master variables list.

Enter the supervisor password to access the *System Passcodes List*.

System Passcode List		1/2
Supervisor passcode		xxx xx
Operator passcode		xxx xx

← Exit	↑	↓	Select-Enter
--------	---	---	--------------

Note: The system allows three attempts when you enter a passcode. After the third try, the system aborts the passcode entry screen and returns to the previous screen

Use the **up/down** arrows to highlight the desired passcode to edit. Press **Select-Enter** to access the numeric keypad screen. Enter the existing passcode, then press **Enter**. The system prompts for the new passcode (seven digits maximum). Enter the new passcode, then press **Select-Enter** to store the new passcode. The system prompts you to verify the new passcode by entering it again. Re-enter the new passcode and press **Enter** to store the new passcode.

All configuration screens and mix designs are supervisor-level passcode protected. The system requires an operator to enter their passcode to abort a batch or change the moisture compensation for aggregates.

5.5 Advanced Parameters

The advanced parameters list is primarily used by the Rice Lake Weighing Systems programmer to access options that control the CB-1 software functions and hardware setup. Some items in this list may be edited if needed under supervision of personnel at RLWS for rare circumstances.

5.6 Serial Communications

Highlight and select to access the *Serial Communications Parameters* list.

Serial Communications	1/5
Computer	MORE->
Printer	MORE->
Cement scale	MORE->
Aggregate scale	MORE->
Water scale (if option enabled)	MORE->

← Exit ↑ ↓ Select-Enter

Each item in the serial communications list has parameters of its own to edit. Highlight and select to access the associated parameters screen.

5.6.1 Computer

The computer parameter contains several variables to edit. This is only relevant if you have the optional PC program to backup/restore the configuration file.

Computer	1/3
Baud rate	9600
Data bits/parity	8/NONE
XON/XOFF enabled	OFF

← Exit ↑ ↓ Select-Enter

Baud Rate

Select the baud rate you are using to connect the PC and CB-1. Press **Select-Enter** to toggle through the baud rate settings. Possible baud rate choices are 600, 1200, 2400, 4800, 9600, or 19200. The displayed setting is the selected setting. The default baud rate setting is 9600.

Data Bits/Parity

Select the data bits and parity you are using with the PC connection. Press **Select-Enter** to toggle through the data bits/parity settings. The displayed setting is the selected setting. This parameter is fixed at 8/NONE.

XON/XOFF Enabled

This option controls the software handshaking which prevents the computer's communications buffer from overflowing.

Select *On* to enable the CB-1 to use XON/XOFF software handshaking. If *On*, make sure the PC has also enabled handshaking.

Select *Off* to have the CB-1 use a print line delay after each line to prevent overload.

You shouldn't need to change from the default setting of *Off*.

5.6.2 Printer

The printer parameter contains several variables to edit. The following screen illustrates those variables.

Printer	1/4
Baud rate	9600
Data bits/parity	8/NONE
Termination	CR/LF
XON/XOFF Enabled	ON

← Exit ↑ ↓ Select-Enter

Baud Rate

Select the baud rate you are using to connect the printer and CB-1. Press **Select-Enter** to toggle through the baud rate settings. Possible baud rate choices are 600, 1200, 2400, 4800, 9600 or 19200. The displayed setting is the selected setting. The default baud rate setting is 9600.

Data Bits/Parity

Select the data bits and parity you are using with the printer connection. Press **Select-Enter** to toggle through the data bits/parity settings. Possible settings are 8/NONE, 7/ODD, or 7/EVEN. The displayed setting is the selected setting.

XON/XOFF Enabled

This option controls the software handshaking which prevents the printer's communications buffer from overflowing.

Select *On* to enable the CB-1 to use XON/XOFF software handshaking. If *On*, make sure the printer has also enabled handshaking.

Select *Off* to have the CB-1 use a print line delay after each line to prevent overload.

You shouldn't need to change from the default setting of *On*.

5.6.3 Cement/ Aggregate/Water Scale

The *Cement Scale* and *Aggregate Scale and Water Scale* (if option enabled) parameters contain the same variables to edit.

Cement Scale	1/4
Indicator Type	IQ310A
Baud Rate	9600
Data Bits/Parity	8/None
Decimal Places	88888

← Exit ↑ ↓ Select-Enter

Indicator Type

Select the indicator type you are using on the cement scale and the aggregate scale. Indicator choices include: IQ plus 310A, IQ plus 350 (can be used for the 350 or 355), IQ plus 510 (can be used for the 510 or 520), IQ 700, IQ plus 710 or 800, or the 420. Press **Select-Enter** to toggle through the indicator type selections. The displayed setting is the selected setting.

Baud Rate

Select the baud rate you are using to connect the indicator and CB-1. Press **Select-Enter** to toggle through the baud rate settings. Possible baud rate settings are 600, 1200, 2400, 4800, 9600, or 19200. The displayed setting is the selected setting. The default baud rate setting is 9600.

Data Bits/Parity

Select the data bits and parity you are using with the indicator connection. Press **Select-Enter** to toggle through the data bits/parity settings. Possible data bits settings include 8/NONE, 7/ODD, or 7/EVEN. The displayed setting is the selected setting.

Decimal Places

This should match the decimal place format on the indicators. Possible formats include, 88888888, 888888.8, 88888.88, 8888.888, 888.8888, 88.88888, 88888880, 8888800. The CB-1 uses this value to decide if one or more decimal places should be displayed on the screen and on the batch ticket. This value may be different if secondary units are being used to batch in.

5.7 Truck Database

The discharge cycle, or filling of the mixer truck, is the most time consuming step of batching concrete. Time can be saved if each truck is loaded at its maximum rate. When mix trucks in a fleet are of different makes and models, each may have a unique maximum load rate and different capacities. For this reason, it is advantageous to store a specific load rate and capacity for each truck in the fleet. This procedure describes how this can be accomplished using the *Truck Database* feature on the CB-1.

The truck database is located as selection **8** on the configuration parameters menu, shown below.



Select *Truck Database* or press the **8** key on the keypad to access the list of 24 truck entries. It is recommended that the list be used in order, starting with the first entry. The truck number doesn't have to correspond to the position in the list and may be any number between 1 and 32,000. For example, truck number 12345 can be the second truck in the list. Using the arrow keys, highlight the first truck entry and press the **Select-Enter** button. The three truck parameters are now exposed and ready to be edited.

5.7.1 Truck Configuration

The CB-1 has the ability to store 24 truck records. Each record contains a truck number, a discharge ratio, and a capacity.

- **Truck Number** - The truck number can be any number between 1 and 32,000. The default truck numbers are all zero. When a truck number is zero, the system ignores that truck record. Each truck number must be unique. Although uniqueness is not enforced, the CB-1 always uses the first truck record that matches the entered truck number.
- **Discharge Ratio** - This number is multiplied by the target discharge rates for the aggregate and cement hoppers to find the target discharge rate for this truck. The discharge ratio has a range from 0.20 up to 5.00. the default setting is 1.00. When the default is used the discharge rate will be exactly what is entered for the "Discharge Rate (LB/s)" parameter found under the *Discharge Control List*, (Section 5.3.2 on page 16), for both the aggregate and cement scales. To increase the discharge rate by 50% for a certain truck, set the discharge ratio to 1.50. To decrease the discharge rate by 25%, set the discharge ratio to 0.75. Both the target aggregate discharge rate and the target cement discharge rate are multiplied by the discharge ratio.

- **Truck Capacity** - The capacity of each truck can be stored in this parameter. This value is entered in cubic yards if your primary unit of measure is pounds, or entered as cubic meters if measuring in kg. After a mix design, batch quantity, and truck number are entered when preparing a batch, the CB-1 uses the *Truck Capacity* parameter to make sure the selected batch size can fit into the truck.

5.7.2 Using the Truck Database Feature

For the truck database to be used, the CB-1 must get the truck number from the operator when preparing to batch. The CB-1 prompts the operator for the truck number if and only if the parameter *Prompt for Truck ID* is set to *Yes*. The prompt for truck ID parameter is found under the options list on the configuration parameters menu. Confirm that parameter *Prompt for Truck ID* is set to *Yes* (shown in Section 5.1.1 on page 7).

When it comes time to run a batch and the operator presses the **Run Batch** button from the main menu screen, the CB-1 asks the operator to *Please Enter the Truck ID Number*. After the truck ID number is entered, the CB-1 searches the truck database for this exact truck number. If found, two things happen. First, the CB-1 confirms that the entered batch size can physically fit into the selected truck by comparing it to the value entered in for truck capacity. Next the target discharge rates are adjusted by multiplying the value entered in for discharge ratio by the discharge rate parameters.

If the truck ID number entered does not match any of the truck numbers in the database then the CB-1 uses the global discharge rates unadjusted and assumes the truck capacity is large enough to hold the complete batch. The truck ID number prints on the batch ticket as entered.

6.0 Mix Design

The CB-1 allows you to create up to 100 unique mix designs. Each mix design contains 14 numeric values (4 aggregates, 3 cements, 1 water, and 6 admixtures) and 1 alphanumeric string (a user-definable mix design name). The mix design menu provides options to *Create*, *Edit*, *View*, and *Clear* one or more mix designs. Mix designs are based upon one cubic yard (or meter) of concrete.

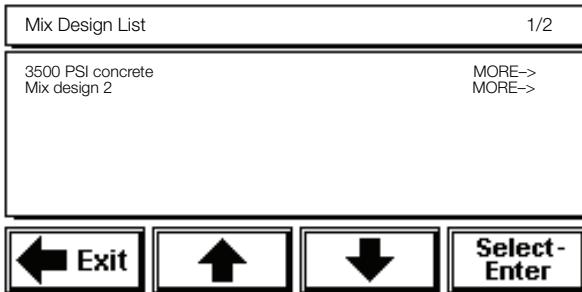
Note: If the 4 of 6 aggregate option is installed, 6 aggregates will appear in the mix design. Only 4 may be used per mix.

Note: The *Create a Mix Design* and *Edit Mix Designs* menu options are supervisor-level passcode protected.

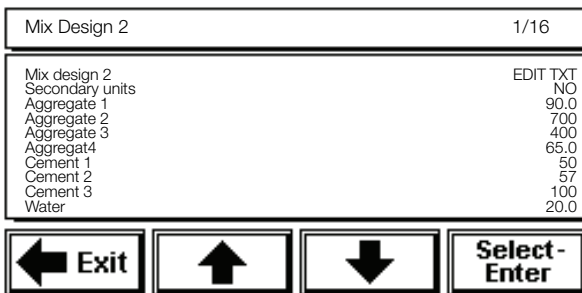


6.1 Create a Mix Design

Press *Create a Mix Design*. Enter the supervisor passcode to access the list of all the current mix designs. The CB-1 automatically adds and highlights a new mix design with a generic name (Mix Design 2, for example).



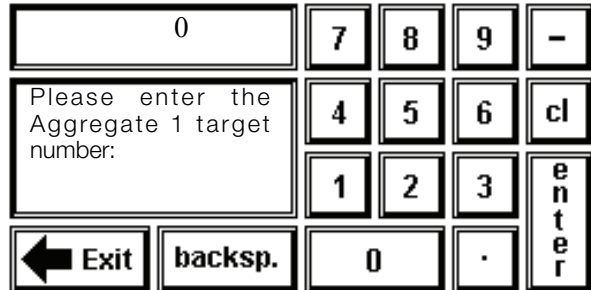
Press **Select-Enter** to edit the new highlighted mix design. The system displays the ingredient list for the mix design.



You may enter a 22 character mix design name by highlighting *EDIT TEXT* and pressing **Select-Enter**.

To batch in secondary units, toggle *No* to *Yes*. This will only effect this mix design. If this mix is setup to run in secondary units, all values entered must be in secondary units.

Press the **up/down** arrows to scroll through the ingredients on the screen. Highlight and select the ingredient to edit the target weight and other ingredient parameters. The system displays a numeric keypad screen.



Enter the ingredient target weight using the touchscreen keypad, then press **Enter** to set the ingredient target weight.

6.2 Edit Mix Designs

You can change any mix design you previously created by entering the edit mix design mode. Press *Edit Mix Designs*. Enter the supervisor passcode to access the list of all the current mix designs.

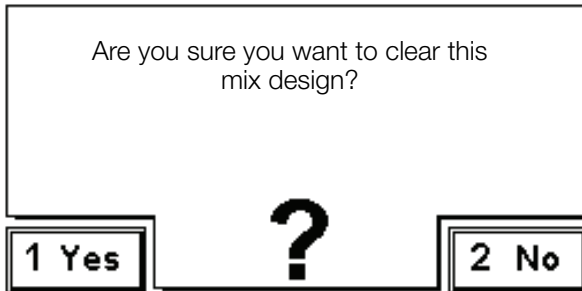
6.3 Clear Mix Designs

You can clear mix designs from the mix design list by using clear mix designs. The CB-1 clears the mix design but does not remove the mix design from memory.

When you choose to clear a mix design, the CB-1 retains the mix design in the mix design list, but resets the mix design label to the default (mix design X) and sets all the associated target values to zero (the same state as when you first create them). You can always edit a cleared mix design and modify it into a new mix design.

Press *Clear Mix Designs*. The system prompts for a supervisor passcode. Enter the passcode and press **Enter**.

The system prompts with the numeric keypad screen. Enter the number of the mix design to delete, or enter zero to clear all mix designs. You can also choose a mix design by pressing **List** and choosing from the list of mix designs. Press **Enter** to delete. The system prompts with the following warning:



Press **Yes** or the **1** key to continue to the numeric keypad screen and delete one or more mix designs.

Press **No** or the **2** key to cancel and return to the Mix Design menu screen.

6.4 View Mix Designs

Press *View Mix Designs* to view the current list of all mix designs. *View mix designs* does not require you to enter a passcode; however, you can only view the mix designs, not edit them. See Section 6.2 to edit mix designs.

7.0 Run Batch

Use *Run Batch* to prepare and run a batch.

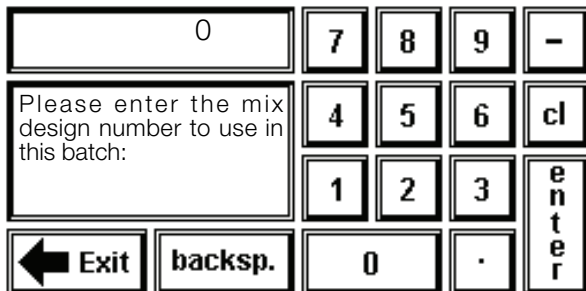
Note: Inputs J2-14 "Okay to Discharge" and J2-19 "Conveyor is Running" must see a 120VAC signal prior to discharging a batch. If physical sensors for the inputs aren't present, you must jumper 120V from J2-20 terminal.

There are several steps to actually running the batch, the first of which is to prepare the batch.

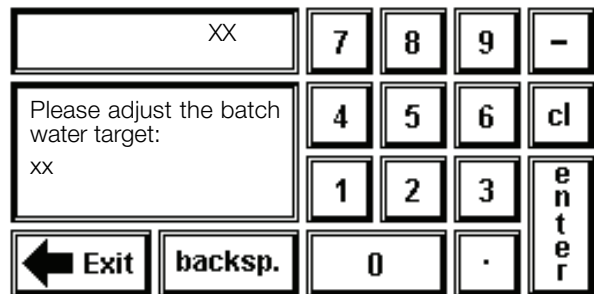
7.1 Preparing a Batch

Use the following procedure to prepare a batch for the batch run.

1. Press **Run Batch** or the **1** key to enter the run mode. The system displays a numeric keypad screen and prompts for the mix design to run. The last mix design used should appear in the window.



2. Enter the mix design number, or press *List* to select the mix design to run from the mix design list. Press **Enter** to continue. If only 1 mix has been created, then the system doesn't prompt for a mix design, it loads the only one created. The mix # is the sequential order it appears in the mix design list. This # cannot be changed.
3. The system displays a numeric keypad screen and prompts for the number of cubic yards to batch. The number of yards last batched will appear in the window.
4. Enter the number of cubic yards to batch, then press **Enter** to continue.
5. The system prompts for a truck ID, if configured to do so. Enter the truck ID, then press **Enter** to continue, see Section 5.1.1 on page 7. The last truck ID entered will appear in the window.
6. The system prompts for a Job ID, if configured to do so. Enter the job ID, then press **Enter** to continue, see Section 5.1.2 on page 7. The last job ID entered will appear in the window.
7. The following screen is displayed when starting a batch if the Prompt for Water Adjust parameter (Section 5.1.3) is set to ON.



The value shown in the top box is the target water amount for this batch already adjusted for moisture compensation and any previous manual water adjustments (entered and displayed on a batch basis but stored and applied on a per yard basis). This value can be changed at this point. If no adjustment was made on the previous batch then this value will equal the value shown in the bottom box. If you do not want to make an adjustment to this batch, then set this value equal to the value in the bottom box.

The value shown in the bottom box is the amount that the CB-1 has calculated for the batch. For example: for a mix design with a 30 gallon water target and running a batch of four yards - 120 will be shown (assuming the free moisture compensation for all aggregates in the batch are 0.0). If the Moisture Probe option is installed, the value will also reflect the reading taken on the previous batch.

7.1.1 Calculating Target Weights

The system uses the global parameters, mix design targets, the batch size, and moisture compensation (see Section 7.1, above) to calculate the target weights. At any time you are in the main menu or in pause mode in the run screen, you can press the front panel **moisture** key to view a list of the aggregates and their moisture compensation percentage values. The default moisture compensation is 0.00% for each aggregate.

If a moisture compensation is greater than 0.00%, the CB-1 adjusts the target weight for that aggregate (by adding more aggregate to compensate for the higher percentage of water). The CB-1 then uses the moisture compensation percentage to calculate an exact target weight (for aggregates) and target volume (for water) for a given draft.

7.2 The Run Screen

After you enter the initial batch information and the CB-1 calculates the exact target values, the display changes to the run screen.

Press 'Start' when ready to begin batch		
Ingredients	Target	Actual
Sand	1500	0
3/4 inch rock	750	0
Cement	450	0
Water	15.0	0.0
Admix status	not initiated	
3500 PSI concrete	1.50 Yd ³ Lb	0

The system checks that the scales are within the zero tolerance if configured to do so, then starts to fill ingredients. As the system fills each ingredient, the run screen monitors the fill process in the message window (top area of the Run screen) with messages such as *Metering Admixtures...and Weighing Cements and Aggregates Concurrently...*

The system monitors the target and actual weights, updating the actual weight values in real time.

When the system is ready to discharge, the discharge screen appears.

For Manual Discharge:

Start discharging		
	Discharge Rate (wt/sec)	
	Target	Actual
C	25	3:00
A	100	4:25
		Open
		Inch Gate
		Close

While discharging, use the **Up/Down** arrow keys to increase or decrease the discharge rate.

For Automatic Control of Discharge

Start discharging		
	Discharge Rate (wt/sec)	
	Target	Actual
C	25	23
A	100	98
		Open
		Inch Gate
		Close

When the system finishes filling and discharging ingredients, the CB-1 automatically prints a batch report (see Section 8.1 for an example report). The screen displays the message: *Done With This Batch...*

7.3 Batch Pause

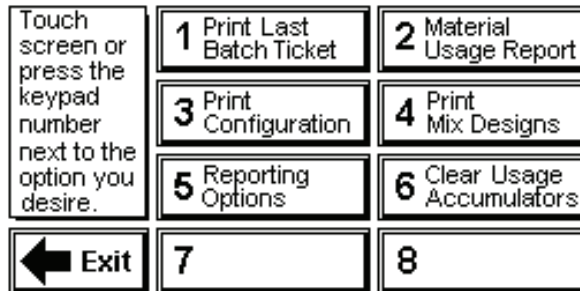
You can pause batching at any time by pressing the **Pause** key on the front panel. The system pauses the batch routine and displays the message: *System is Paused, Press Start to Continue*. At this time, you can abort the batch, or press the front panel **Start** key to continue the batch.

7.3.1 Abort Batch

Press the front panel **Abort** key when the system is paused to abort the batch. The system displays a warning and prompts for the operator passcode. Enter the operator passcode, then press **Enter** to abort the batch.

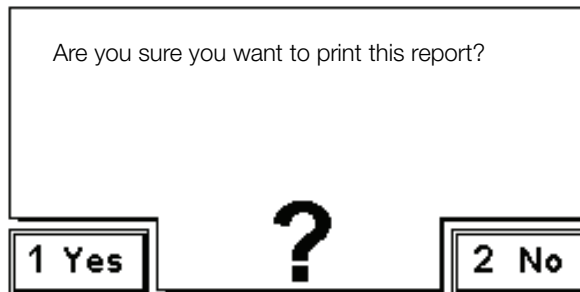
8.0 Reports

The CB-1 provides several report options. Press *Reports* from the main menu to access the reports menu.



Press the touchscreen button or the designated number key to print a report.

The system prompts: *Are You Sure You Want To Print This Report?*



Press **Yes** or the 1 button to print the report, or press **No** or the 2 button to cancel the print request and return to the reports menu.

8.1 Reprint Last Batch Ticket

This button prints a batch ticket for the last batch run. Use this feature to get additional copies of a batch ticket or if the printer jams while printing a report.

Concrete Batch Report – Example #1 – (Batch Type = NET, Print Units Type = LIKE MIX)

ABC Redi-Mix
 1234 Main Street
 Webster, WI 54789
 Phone (715) 456-7890

Serving Northwestern Wisconsin for more than 40 years.

“REPRINT”
 Truck Number: 77
 Time of Discharge: WEDNESDAY, JULY 9, 2006 11:07:09AM

Job ID: WI 12d

Name of Purchaser: _____

Job Name: _____

Job Location: _____

Class: _____

Mix Design Number: (1) 3500 PSI concrete

Batch Number: 1
 Drop: 1 Of 1
 Amount Batched: 3.00 Cubic Yards
 Water Adjust: -5.0 gallons Initials _____

Ingredient	Req'd	Bat'd	Mix	ol%	TWat	%Mst
3/4 inch rock	5250	5250 lb	1750	0.00	0.00	0.00
Sand	5006	5084 lb	1600	1.55	26.2	4.30
Cement	2250	2252 lb	750	0.09	0.00	
Fly Ash	450	451 lb	150	0.22	0.00	
Water	59.2	59 gal	30.0	-0.32	59.0	
Air entrainment	70.2	71.0 floz	2.6	1.14	0.00	
Water reducer	121.5	123.0 floz	4.5	1.23	0.00	

Water/Cement ratio: 0:2629
 *denotes out of tolerance ingredient

End of Report

Concrete Batch Report - Example #2 – (Batch Type = NET, Print Units Type = BOTH)

ABC Redi-Mix
 1234 Main Street
 Webster, WI 54789
 Phone (715) 456-7890

Serving Northwestern Wisconsin for more than 40 years.

Truck Number: 77
 Time of Discharge: FRIDAY, NOVEMBER 3, 2006 11:07:09AM

Job ID: WI 12d

Name of Puchaser: _____

Job Name: _____

Job Location: _____

Class: _____

Mix Design Number: (1) 3500 PSI concrete

Batch Number: 1
 Drop: 1 Of 1
 Amount Batched: 3.00 Cubic Yards
 Amount Batched: 2.29 Cubic Meters
 Water Adjust: -5.0 gallons Initials _____
 Water Adjust: -18.9 Liters

Ingredient	Req'd	Bat'd	Req'd	Bat'd	%Tol	t%Ms
	U.S. Units		S.I. Units			
3/4 inch rock	5250	5250 lb	2381	2381 kg	0.00	0.00
Sand	5006	5084 lb	2271	2271 kg	1.55	4.30
Cement	2250	2252 lb	1021	1021 kg	0.09	
Fly Ash	450	451 lb	204	205	0.22	
Water	59.2	59 gal	224.0	223.3L2	-0.3	
Air entrainment	70.2	71.0 floz	2075.8	2099mL	1.14	
Water reducer	121.5	123.0floz	3592.4	3637ml	1.23	

Water/Cement ratio: 0:2629
 *denotes out of tolerance ingredient

End of Report

8.2 Print Material Usage Report

If you want to print a report of the total accumulated amounts of all ingredients since the accumulators were last cleared, press button number 2. The date last cleared and the current date are printed on the report.

Material Usage Report

ABC Redi-Mix 1234 Main Street Webster, WI 54789 Phone (715) 456-7890	
Material Usage Report	
From: WED, JULY. 8, 2006 1:24:48PM	
To: WED, JULY. 8, 2006 3:06:35PM	
Total CubicYards Batched: 657.5	
Ingredient	Tons
3/4 inch rock	550.66
Sand	487.60
1 1/2 inch stone	33.09
Aggregate 4	0.00
Cement	246.56
Fly Ash	50.51
Slag	0.00
Ingredient	Gallons
Water	17095
A.E. 260 Air	28.89
1000 N water reducer	96.31
2000 RHE Non-chl acc	308.20
1000 HE chloride acc	0.00
Admix	0.00
Admix	0.00
End of Report	

8.2.1 Notes About Material Usage on the CB-1

- If a material is weighed to completion, then it is accumulated.
- Any materials that have not finished when a batch is aborted are not accumulated.
- If a batch is aborted, there is no correction to subtract what has already been accumulated for completed materials.

8.3 Print Configuration

When getting started, it's a good idea to print out the complete list of system parameters with their default values. This may be a helpful reference while setting up the system.

8.4 Print Mix Designs

After pressing the *Print Mix Designs* button, the operator will be asked to enter the mix design number. Press 0 to print reports of all mix designs.

ABC Redi-Mix 1234 Main Street Webster, WI 54789 Phone (715) 456-7890	
Mix Design Report	
Time: WEDNESDAY, JULY 9, 2006 1:24:48PM	
Mix Design number: 1 Mix Design name: 7 Bag Mix	
Ingredient	Target Value
3/4 inch rock	1700 lb
Sand	1410 lb
Cement	620.0 lb
Water	22.0 gal
Air entrapment	2.6 fl oz
Mix Design is based on 1 cubic yard	
End of Report	

8.5 Reporting Options

Access to the reporting options is also available on the reports menu for convenience.

See Reporting under Section 5.3.6 under the Global Parameters section, for a description of these options.

8.6 Clear Material Usage Accumulators

Use *Clear Material Usage Accumulators* to reset the ingredient accumulator values to zero. Press **Clear Material Usage Accumulators** or the number 4 key to clear the accumulators. The system prompts with the following warning: *Are you sure you want to clear the accumulators?*

Press **Yes** or the number 1 key to clear the ingredient accumulators. The system resets the accumulators to zero.

Press **No** or the number 2 key to return to the Reports menu without clearing the accumulators.

9.0 Appendix

9.1 IQ plus 310A Configuration Requirements

For units using the IQ plus 310A digital weight indicator.

```
EDP
  MODE      STREAM*
  BAUD      9600 **
  BITS      8 NONE
  TERMIN    CR/LF*
  EOL DLY   0 MS*
  FORMAT    CC*
```

The settings shown above that are marked with an asterisk are required. The other two parameters, BAUD, and BITS can be set differently but must match the Cement, Aggregate, and Water Scale (if installed) serial communications settings. See Section 5.6.3.

**** Note:** On 3 scale systems the default BAUD rate is 4800.

```
SETUP
  TARE RS   INDUST
```

Setting the TARE RS parameter to INDUST allows any displayable gross weight to be acquired as a tare. Use the INDUST setting when the Batch Type parameter is set for NET. See Section 5.1.5 for more information about the Batch Type parameter.

All other IQ plus 310A settings are at the installer's discretion.

9.2 CB-1 Digital I/O Map

The following table shows the CB-1 input/output relays and their associated numbers. See Section 4.4.1 on page 4 to test the functionality of the inputs and outputs.

1	Cement 1 fast feed/fill	25	Admixture 1 fill
2	Cement 1 slow feed/fill	26	Admixture 2 fill
3	Cement 2 fast feed/fill	27	Admixture 3 fill
4	Cement 2 slow feed/fill	28	Admixture 4 fill
5	Cement 3 fast feed/fill	29	Admixture 5 fill
6	Cement 3 slow feed/fill	30	Admixture 6 fill
7	Aggregate 1 fast feed/fill	31	Admixture 1 discharge
8	Aggregate 2 fast feed/fill	32	Admixture 2 discharge
9	Aggregate 3 fast feed/fill	33	Admixture 3 discharge
10	Aggregate 4 fast feed/fill	34	Admixture 4 discharge
11	Water feed/fill	35	Admixture 5 discharge
12	Cement hopper discharge gate open	36	Admixture 6 discharge
13	Cement hopper discharge gate close	37	Reserved
14	Aggregate hopper discharge gate open	38	Reserved
15	Aggregate hopper discharge gate close	39	Reserved
16	Cement hopper vibrator on	40	Reserved
17	Aggregate hopper vibrator on	41	Reserved
18	Aggregate conveyor	42	Reserved
19	Dust shroud	43	Reserved
20	Water reservoir top discharge valve open	44	Reserved
1	Water reservoir washout discharge valve open	45	Aggregate 1 Slow feed/fill
22	ixer discharge	46	Aggregate 2 slow feed/fill
23	ixer run	47	Aggregate 3 slow feed/fill
24	System alarm	48	Aggregate 4 slow feed/fill
1	Admixture 1 is empty	13	Water reservoir is empty
2	Admixture 2 is empty	14	Okay to discharge
3	Admixture 3 is empty	15	Water pulse meter signal
4	Admixture 4 is empty	16	Cement hopper discharge gate is open
5	Admixture 5 is empty	17	Aggregate hopper discharge gate is open
6	Admixture 6 is empty	18	Manual panel active
7	Admixture 1 pulse per meter signal	19	Conveyor is running
8	Admixture 2 pulse per meter signal	20	Emergency stop is not pressed
9	Admixture 3 pulse per meter signal	21	Reserved
10	Admixture 4 pulse per meter signal	22	Reserved
11	Admixture 5 pulse per meter signal	23	Reserved
12	Admixture 6 pulse per meter signal	24	Reserved

9.3 Front Panel Description

The CB-1 features a 32-key membrane keypad for operator input. The operator can also use the touchscreen for most functions. See the following sections for front panel key function descriptions.

NUMERIC KEYPAD

Use these keys for numeric value entries. The CB-1 prompts with a numeric keypad screen for numeric entries. Use either the touchscreen keypad or the numeric keys on the front panel to enter these numeric values. Press **Exit** to clear an incorrect numeric entry. Press **Exit** a second time to abort the numeric entry function. Press the **Enter** key to store an entered value.

Many touchscreen buttons display a number on them. Press the displayed number to activate the associated touchscreen button.

ALARM SILENCE

The CB-1 activates an alarm whenever there is an Error or Warning condition. The system installer may wire an audible alarm, light, or both to the dedicated alarm output. Press the **Alarm Silence** key to shut off the alarm output. The alarm remains off until activated by a new Error or Warning condition.

This key also functions as a left arrow (>) key when the CB-1 is in edit variables mode.

REPORTS

This key functions the same as the touchscreen *Reports* button, or selecting **6** from the main menu screen. Press **Reports** to access the Reports menu and print any of the available reports (see Section 8.0). The **Reports** key is active when the CB-1 displays the initial startup screen, main menu, and the run, discharge, or mix design screens.

CONFIGURE

This key functions the same as the touchscreen *Configuration Parameters* button, or selecting **2** from the main menu screen. Press **Configure** to access the configuration parameters mode and edit system parameters (see Section 5.0). The configuration parameters mode is supervisor passcode protected. The **Configure** key is active when the CB-1 displays the initial startup screen, main menu, and the run, discharge, or mix design screens.

MOISTURE

Press the **Moisture** key to display a list of the aggregates and their associated free moisture compensation percentages. This key is supervisor passcode protected and is active when the CB-1 displays the initial startup screen, the main menu, and the run, discharge, mix design, and reports screen.

The default free moisture percentage for each aggregate is 0.0% - the CB-1 does not perform any moisture compensation at this setting. The free moisture range is -5.0% to 20%. To edit the moisture percentage, highlight and select the desired aggregate from the list. See Section 7.1.1 for more information on how the system used moisture compensation.

START

Use the **Start** key to start the batching sequence after you have prepared a batch (selecting the mix design number and entering the volume).

The **Start** key also serves as a re-start key if the system is paused after you press the **Pause** key, after an error condition occurs, or some other user input is required.

The **Start** key functions the same as selecting **1** run batch from the main menu. In this case, the CB-1 begins batching by displaying the prompts for the mix design number, volume, and other batch preparation screens.

ABORT

When the CB-1 is in pause mode and displaying either the run or discharge screen, press the **Abort** key to abort the current batch.

Note: *You must Pause the batch in order to abort. Pressing the ABORT key while the batch is running has no effect. This abort function requires a supervisor passcode. If you abort a batch, the CB-1 warns you that aborting a batch may leave material in the weigh hoppers. Some used ingredients may not be recorded for accumulation when you abort a batch.*

PAUSE

Use the **Pause** key to pause the batching sequence. The pause mode closes all gates, but mixers, augers, and belts continue to run. All material stops filling or discharging. The CB-1 enters a pause mode if it detects an error condition or some other user input is required (between drafts, for example).

UNITS

Press the **Units** key to change the units on the IQ plus 310A indicators from Lbs to Kgs, or vice versa. The **Units** key is active in the initial startup screen, the main menu, and the run and discharge screens if the batch is not running.

Note: *The units displayed on the Run screen represent the units you configured for the mix design. See 2.3 "DIP Switch 3" for using Metric as your primary unit. Before beginning a batch, the CB-1 checks that the units you configured for the mix design is the same as the units the indicator is displaying. If not, the CB-1 displays a warning.*

The **Units** key also functions as an up arrow key (s) in edit variables mode.

TOLERANCE ACCEPT

Use the **Tolerance Accept** key to allow the CB-1 to accept what is outside the preset tolerance band.

Note: You can configure the upper and lower tolerance values separately in the *Ingredients list*.

When the CB-1 encounters an out of tolerance condition, the system pauses and displays an error message. Press the **Tolerance Accept** key to accept the out of tolerance weight and continue batching.

Note: The only other option for out of tolerance weights is press the **ABORT** key and abort the batch.

The **Tolerance Accept** key also functions as the down arrow key (t) when in edit variables mode.

FAST/OPEN RATE CONTROL

While the CB-1 is discharging the ingredients, use the **Fast/Open** key to inch open the gates on the aggregate and cement hoppers to fill faster. Each time you press this key, the CB-1 energizes the gate open relay for a specified amount of time (see Section 5.3.1).

The **Fast/Open Rate Control** key also functions as an up arrow key (s) while in edit variables mode.

SLOW/CLOSE RATE CONTROL

While the CB-1 is discharging the ingredients, use the **Slow/Close** key to inch close the gates on the aggregate and cement hoppers to fill slower. Each time you press this key, the CB-1 energizes the gate close relay for a specified amount of time (see Section 5.3.1).

The **Slow/Close Rate Control** key also functions as a down arrow key (t) while in edit variables mode.

POWER ON/OFF TURN KEY

This turn key controls the power to the two IQ plus 310A indicators (if installed), the LCD touchscreen, the two 5-volt power supplies, and the CB-1 board set.

EMERGENCY STOP

The **Emergency Stop** or **E-Stop** is a large red mushroom push-button located on the front of the CB-1 enclosure. Press the **E-Stop** button to immediately pause the current batch sequence and deenergize all outputs.

Once you press the **E-Stop** button, you have two options:

1. Release the **E-Stop** button (push in and turn), then press the **Start** key. The CB-1 then resumes batching from that point at which you pressed the **E-Stop**.
2. Leave the **E-Stop** button pressed, then press the **Abort** key. This allows you to abort the current batch and reset the system.

Note: You must manually discharge any materials remaining in the weigh hoppers from a partial batch. If you do not clear the remaining materials, the dead weight will cause a zero tolerance alarm.

EXIT

This key is mapped to the **Exit** button on the screen. Its purpose is to quit what ever editing function or menu is currently displayed and return to the previous screen. The exit key is only active when the exit button on the screen is displayed.

F1

Function key **F1** is used to tweak admixture targets for the current batch. For the F1 key to be active (it must be active otherwise pressing it will have no effect), “Change Admix Targets” under the Option List (see Section 5.1.8) must be set to Yes and a batch is ready to run. If active, pressing the F1 key will show all the admixes and their amount for 1 yard of the current mix design. At this point, the user is free to edit how much of each admix he/she wants in this, and only this, batch. The target values for admixes are changed, for the current batch only, but the mix design remains un-edited.

F2

Function key **F2** is used to preload the water for the current batch. **MAKE SURE A TRUCK IS IN POSITION BEFORE PRESSING THE F2 KEY!**

If active, pressing the **F2** key will start the water addition.

For the F2 key to be active a number of conditions need to be met.

- The F2 FOR WATER START parameter (see Section 5.3.4) must be set to *Yes*.
- The system is configured to meter water directly into the truck (not a reservoir). (see Section 5.3.4).
- A batch must be “prepared” and ready to run, or in the weighing cycle, or waiting for the “Discharge” key to be pressed.

If there are admixtures that are configured as bottle, they will be metered into their bottles first.

F3

Function key **F3** is used to resynchronize the touchscreen to the CPU and set the contrast to the default if the screen begins displaying unusual data. The display may appear to be showing several screens overlaid on each other or text may be in the wrong location. The **F3** key can be used while a batch is running or at any of the menus. It cannot be used when editing variables.

A screen synchronization problem is a rare occurrence but this feature is included in the software mainly so that a batch can be successfully completed if a problem does occur.

F4

Function key **F4** is reserved for future use.

LCD TOUCHSCREEN

The CB-1 uses a 256 x 128 pixel (16 x 32 character) backlit LCD touchscreen to display information and as an input device. You can enter most input either by using the front panel or the keypad; however, alphanumeric entries require the use of the alphanumeric screen available only on the touchscreen display. You can adjust the screen contrast by selecting 2 or **Set Contrast** from the Utilities menu (see Section 4.0).

9.4 System Error Messages

Any one of the following messages may appear on the screen within a “pop-up” window. Some messages may appear for the duration of the message delay (in the Advanced Variables List) then disappear, while others stay displayed until the user touches the screen, presses the **Exit** button, or presses the **Start** button.

9.4.1 Aggregate/Cement/Water Scale Communication Error!

CAUSE:

The CB-1 is not receiving a valid weight string from the indicator. This is most likely because the indicator is not streaming the weight string, improper wiring, communication parameters are different, or weight format is not “CC”.

SOLUTION:

First verify that the IQ plus 310A configuration parameters are set to the required settings as defined in Section 9.1 of this manual. If your CB-1 came from the factory supplied with indicators mounted in the panel, the wiring was tested in the factory; however, verify that no wires have been cut or came loose. If you purchased your CB-1 without indicators, make sure your wiring is correct from the indicator’s EDP port to the CB-1 terminal strip.

9.4.2 Agg/Cement/Water Scale Units Differ From The Mix Design Units!

CAUSE:

After the operator selects a mix design to batch, the CB-1 compares the units specified in the mix design with the units being sent from the indicator. If the units differ, you get this message.

SOLUTION:

If the indicator is truly reading in the wrong units, press the units key on the CB-1 or on each indicator. If the indicator is correct, then view the mix design and see that the “Secondary Units” entry is correct.

9.4.3 No Mix Designs Setup

CAUSE:

The user tries to start a batch before any mix designs have been entered.

SOLUTION:

Select *4 Mix Design* from the main menu and enter a mix design.

9.4.4 Aggregates/Cements/Water Exceed Maximum!

CAUSE:

The total weight (or volume for water) of all the aggregates, or cements, or water has exceeded the values entered under the reporting section of the Global Parameters. The value, for example, in “Max Cement LB/Yard” is entered in primary units. If your mix design specified secondary units, this value will be converted. If the value in “Max Cement LB/Yard” is 1200 Lb and the mix design uses 800 Lb of cement and 450 Lb of fly ash (total of 1250 Lb/Yard), you will get this error message.

SOLUTION:

Check that the mix design is accurate. If it is, the solution is to increase the value in “Min. Aggregate/Cement/Water LB/Yard”.

9.4.5 Aggregates/Cements/Water Below Minimum!

CAUSE:

The total weight (or volume for water), of all the aggregates, or cements, or water is smaller than the values entered under Global Parameters. The value, for example, in “Min. Aggregate Lb/Yard” is entered in primary units. If your mix design specified secondary units, this value will be converted. If the value in “Min. Aggregate Lb/Yard” is 500 Lb and the mix design uses 500 Lb of 3/4 inch rock and the operator forgot to enter the sand in the mix, then you would see this error message.

SOLUTION:

Check that the mix design is accurate. If it is, the solution is to decrease the value in “Min. Aggregate/Cement/Water Lb/Yard”.

9.4.6 More Than 4 Aggregates!

CAUSE:

Purchased the 4 of 6 aggregate option, and entered a mix design with more than 4 aggregates.

SOLUTION:

Only 4 aggregates can be used per mix design. Change mix design and re-try.

9.4.7 Data Restore Error!

CAUSE:

This error means that the CB-1 did not completely restore the configuration parameters and mix designs from the file stored on the PC. This error will be accompanied by text explaining the reason for the error. The most likely cause for this problem is the CB-1 and PC are not communicating. The second most likely reason is the configuration file saved on the PC has been corrupted. The following are a list of reasons:

- PC is not responding
- Bad CRC value returned
- Response contained wrong command
- PC is only Making commands
- Data exchange not initialized
- Unknown exchange type
- Unknown variable type
- At last variable
- Prompt string is empty
- Unknown return status character
- File line doesn't start with LINE
- Unknown line identifier in file
- Unable to open file
- File doesn't exist
- Could not read line from file
- Failure while re-sending line
- File is missing lines
- Delete file command failed
- Save file command failed
- Unknown error code returned

SOLUTION:

If the PC is not responding, check wiring and communication parameters at both the CB-1 and on the PC.

9.4.8 File Backup Error!

CAUSES:

Similar to those listed above.

SOLUTION:

Similar to those listed above

9.4.9 Calibration Error! Be Sure to Set Zero and Span Values

CAUSE:

The calibration of the moisture probe will fail if either the Zero or Span points haven't been set, or there isn't enough resolution between the two points. There must be at least 2 percentage points, and at least 100 raw counts between the Zero and Span points for the calibration to work. The farther apart the points are, the more accurate the calibration is. Ideally, the points should be on the outer edges of the actual working range for your aggregate. It may also be possible that the moisture probe is not wired properly.

SOLUTION:

If you didn't set both the Zero Point and the Span Point, you must do so first. If you did, then try again with a larger span (the points must be at least 2% apart). Also be sure to notice the raw count value when you calibrate. There must be at least 100 counts between the Zero and Span values. Ideally there should be at least 1000 count difference. If the raw counts are not increasing, then either the probe is not wired properly, or the CB-1 analog-to-digital conversion isn't functioning. Check wiring and jumper setting described in this manual. If okay, test the 4-20 mA signal coming into the CB-1 (from the moisture probe) with a multi-meter. If the readings are in the range of 4-20 mA for a wide range of aggregate moisturize, the probe is working.

9.4.10 Data Corrupt in Segment 1, See Manual Before Starting

CAUSE:

This is a catastrophic failure and the system should not be used until the problem is corrected. This is caused when some data in the specified memory segment has been corrupted. This could only be caused by a software upgrade without NVM initialization, battery failure, power spike or surge, or program data overrun.

SOLUTION:

If this error occurs, the integrity of all the data is suspect. The non-volatile data will have to be initialized (using DIP switch 1). But first, try to print the configuration from the reports menu if you don't have a copy of the latest configuration. If you have purchased the "Data Exchange" PC software and had previously backed-up your configuration, this would be a good time to restore it. Whenever restoring the configuration with "Data Exchange", always initialize the non-volatile data using DIP switch 1 first.

9.4.11 Error Calculating Batch Volume...!

CAUSE/SOLUTION:

Consult factory

9.4.12 Nothing to Batch in Mix!

CAUSE:

The ingredients in the Mix Design that you are trying to run are set to zero. This may have happened because a Mix Design was created but none of its parameters were edited.

SOLUTION:

Configure the Mix Design to include acceptable values for at least one ingredient.

9.4.13 Data Corruption in Mix Design

CAUSE:

This can happen if the memory used to store the Mix Design information becomes corrupted.

SOLUTION:

Go to the Mix Design menu, select Edit Mix Designs, inspect the specific Mix Design for errors. Fix any errors and then start the batch again.

9.4.14 ABORT-Fatal System Error!

You must record this information and cycle power

CAUSE:

The software has encountered an internal error.

SOLUTION:

Record any information given with the error message and then cycle power on the CB-1.

9.4.15 ABORT-Fatal Message Lib. Error

You must record this information and cycle power

CAUSE:

The software has encountered an internal error.

SOLUTION:

Record any information given with the error message and then cycle power on the CB-1.

9.4.16 ABORT-Fatal Bounds Error

You must record this information and cycle power

CAUSE:

The software has encountered an internal error.

SOLUTION:

Record any information given with the error message and then cycle power on the CB-1.

9.4.17 ABORT-Isn't Type

You must record this information and cycle power

CAUSE:

The software has encountered an internal error.

SOLUTION:

Record any information given with the error message and then cycle power on the CB-1.

9.4.18 ABORT–Stack Overflow Error

You must record this information and cycle power

CAUSE:

The software has encountered an internal error.

SOLUTION:

Record any information given with the error message and then cycle power on the CB-1.

9.4.19 Emergency Stop Pressed!

CAUSE:

The input J2-20 is not getting 120VAC.

SOLUTION:

Make sure the E-STOP is pulled out. Also make sure that there is 120VAC power supplying the I/O power to the CB-1. This power is connected to terminal R & S.

9.4.20 Waiting for “OK to Discharge” Signal

CAUSE:

The input J2-14 is not getting 120VAC.

SOLUTION:

This input is for a precast or block plant with a mixer vessel. For transit mix (trucks) just jumper 120VAC from J2-20 to satisfy this interlock.

9.4.21 Load Size Exceeds Truck Capacity!

CAUSE:

The truck capacity stored under the entered truck ID is smaller than the total yards requested.

SOLUTION:

Increase the “capacity” parameter under “truck number xx” in the truck database if the truck can hold more. The other alternative is to not use the truck database for this large load, or break the load into two separate loads.

9.4.22 Truck Number Not Found in the Database!

CAUSE:

The truck number entered wasn’t found in the “truck database.”

SOLUTION:

Select “truck database” from the configuration parameters menu and enter this truck number, capacity, and discharge rate ratio.

9.4.23 Aggregate/Cement/Water/Admix NoFlow

CAUSE:

The CB-1 is trying to weigh or meter this ingredient but senses no change in the weight or number of pulses. This could be caused by a lack of material, a blown fuse, improper wiring, or inaccurate parameter settings.

SOLUTION:

If this occurred during a jog cycle, then the “Jog On Time” is set too small. See Section 5.2.1 for further details.

If this error occurred on the initial drop of a dry ingredient then it’s possible the “minimum flow rate (lb/s)” is set too high. See Section 5.3.1 for further details.

9.4.24 Scale Not Zero

CAUSE:

If the parameter “Force Zero Tol Check” (see Section 5.1.6), is *Yes*, then the starting weight in each hopper must be below the zero tolerance primary (see Section 5.3.1).

SOLUTION:

If you want to include the weight in the hopper in the batch then set the force zero tol check to *No*. Otherwise you can increase the value in zero tolerance primary or zero the indicator using its zero key on the indicator.

9.4.25 Aggregate/Cement Discharge Gate Open

CAUSE:

Input J2-16 (cement discharge gate closed sensor), or J2-17 (aggregate discharge gate closed sensor), isn’t seeing 120V. Either the discharge gate is actually open, the sensor doesn’t work, needs adjustment, or doesn’t exist.

SOLUTION:

If there is no gate closed limit switch, jumper 120VAC from J2-20 to J2-16 and/or J2-17. If the gate is open, close it manually. Adjust the sensor if necessary.

9.4.26 Aggregate/Cement/Water Scale Overage or Invalid Weight

CAUSE:

The indicator is sending a weight string with a status character of “O” or “I”. This is caused by the indicator reading a weight that is over range, under range, or invalid.

SOLUTION:

Check the scale calibration. Check that the hoppers aren’t completely full. Check for mechanical binding on the scale.

9.4.27 Conveyor not Running or Waiting for Aggregate Conveyor

CAUSE:

There is not 120VAC at input J2-19. The conveyor might not have been started manually. If the CB-1 is controlling the conveyor automatically, the fuse on J1-18 might be blown. If the conveyor is actually running, then there probably isn’t a signal fed back into J2-19.

SOLUTION:

Make sure the CB-1 has a 120VAC signal coming into J2-19 when the conveyor is running. If the conveyor wasn’t running check the CB-1 fuses on relay Q18 or start the conveyor manually.

9.5 CB-1 Spare Parts List

The following spare parts are recommended for this equipment and are available through authorized Rice Lake Weighing Systems distributors:

RLWS Part Number	Description
66602	Boardset, CB-1 standard, software not included
66603	Boardset, CB-1 analog, software not included
47720	CB-1 CPU board w/ SRAM installed (requires programmed EPROM)
43685	512k EPROM programmed w/ standard CB-1 program
33596	128k RAM for CB-1 CPU and Expansion board
47722	CB-1 Expansion board w/ SRAM installed
45315	Battery, 3V coin type
33201	5VDC 5A power supply (for units with S/N earlier than B82619)
67964	5VDC 7A, 15VDC 2.8A power supply (for units with S/N later than B82619)
15970	100VDC/130VAC dry contact output relay normally open, red, G40DC5
15971	12-140VAC 3A output relay, black, G40AC5
38884	Relay expander board, 120VAC
45096	Relay expander board, 220VAC
21735	Relay fuse, 4A
43285	2-position Phoenix connector
43286	3-position Phoenix connector
43263	GTC100 touchscreen without bezel
43322	GTC100 front LCD module
46193	128k EPROM programmed w/ CB-1 touchscreen program
22987	IQ plus 310A digital indicator
33615	IQ plus 310A bezel/keypad
45118	CB-1 membrane keypad
68967	Cable, Ribbon 65 inch
22827	Switch, mushroom red turn to release
67941	Switch, key lock - 2 position
22870	Contact block, 1 N.O. with latch
22871	Contact block, 1 N.O without latch
22872	Contact block, 1 N.C. with latch
22873	Contact block, 1 N.C. without latch
49384	Legend, cement
49385	Legend, aggregate
22869	Legend plate, emergency stop
67947	Legend plate holder
46195	Legend plate, power off/on
65423	Sola 2000 UPS 470VA
45045	CB-1 Installation and Operation Manual
50982	CB-1 Service Manual
64546	CB-1 "Getting Started Instructional Guide"
84501	CD, Data Exchange Software

Table 9-1. Recommended Replacement Parts List

9.6 Automatic Aeration of Cement Silo when 2-Speed Filling is not Required.

The flow characteristics of cement and flyash are notorious. Irregular flow rates during the cement and flyash weighing cycles make batching accurately very difficult. As cement sits in the silo (or weigh hopper), it loses entrained air and packs tightly. Tightly packed cement will bridge and cause no-flow alarms, inaccurate learned preacts, and inconsistent job weights. Over-batching and under-batching will result. Bubbling air into the silo has been an effective way to keep the cement aerated or fluffed up; however, over-aeration can cause very high flow rates and large over runs on the weigh up. With the advent of computer controlled automated batch plants with preact (free fall), compensation algorithms, more aeration is better than not enough. The key is consistency. If the cement or flyash is always aerated the same amount at similar times, the flow rate is likely to be similar.

Often it is desirable to have the computer automatically aerate the cement and flyash silos. This is done during the weighing. Since the CB-1 does not have output relays to specifically turn on aerators, this procedure is provided to show a way that auto-aeration can be accomplished.

Use the following procedure to set up aeration with a single speed feed gate or auger.

The CB-1 has two output relays for each of three cements (cement, flyash, or slag); a fast fill output, and a slow fill output. If the cement you want to auto-aerate has a single speed gate or auger, follow this procedure. In this procedure we will use the output labeled slow fill for the feed and fast fill output for the aeration. And for the sake of the example, it will be assumed that we will want to perform this procedure on Cement 1 which uses outputs J1-1 (fast feed) and J1-2 (slow feed).

1. From the Main menu, select **2 Configuration Parameters**.
2. Select **2- Ingredients** and then use the arrow keys to highlight the appropriate cement (Cement 1 in this example). Press **Select-Enter**.
3. Use the **up/down** arrows to highlight the parameter, delivery mode.
4. Press **Select-Enter** button until the selection, **2-CONCUR** is displayed.
5. Use the **up/down** arrows to highlight the parameter named **Slow/Jog Fill Wt.**
6. Press the **Select-Enter** button and after the numeric keypad is displayed, enter a value of 150 and press **Enter**.
7. Press **Exit** until you are back at the main menu.
8. The wire that supplies power to Cement 1 fill/feed was probably wired into output terminal J1-1. It needs to be moved to J1-2.
9. The wire that supplies power to Cement 1 aeration can now be wired into output terminal J1-1.

After these changes are made, the aeration output (wired to J1-1), will energize during the weighing process. The aeration output de-energizes 150lbs (or KG) before the calculated cutoff weight (cutoff weight = target - preact) to prevent over aeration during a critical time in the weighing. The aeration will not energize during jogging cycles. The value of 150 in the Slow/Jog Fill Wt. may need to be adjusted for your application. For less aeration at the end of the weigh cycle, increase the Slow/Jog Fill Wt. If no-flow errors occur near the end of the batch, decrease the Slow/Jog Fill Wt.

9.7 Using Data Exchange PC Software to Save CB-1 Configuration and Mix Designs on a personal computer (optional)

Note: The following procedure requires a personal computer (486DX or later running Windows® 95 or later) equipped with an unused RS-232 serial port and data exchange software version 1.2 or later.

Installing Data Exchange Software onto the PC

1. Save all work, then close all other running programs (close, don't just minimize the window).
2. Place disk #1 (labeled 1 of 3) into the 3.5" floppy drive.
3. Run the program *setup.exe* located on disk 1.
4. The installation program prompts for information or asks to confirm certain settings. Accept all the default settings and press the **Next** button when asked.

Running Data Exchange

1. Select Data Exchange from the start/programs/data exchange group. If you prefer, you can run the program *dataex.exe* found in c:\Program Files\Rice Lake Weighing Systems\Data Exchange\.
2. Once the program is started, click on the **Controller #1** tab.
3. The default communication port is Comm 1. If you get an *Invalid Communication Port* error or a *Port Already Open* error message, you will need to select a different communication port.
4. Select a different communication port (Comm 2 for this example);
 - Select **Communications Setup** from **Tools** on the toolbar.
 - Select **Controller #** tab in the **Communications Setup** window.
 - Find the **Communications Port** window and select **2** to select Comm 2.
 - Confirm the setting for baud rate, parity, data bits and stop bits are the same as on the CB-1. The defaults for the CB-1 are 9600 baud, no parity, 8 data bits, and 1 stop bit. See Section 5.6.1 for more information.
 - Press the **OK** at the bottom left of the **Communications Setup** window.

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Connecting the CB-1 to the PC

1. This step requires RS-232 serial cable with at least three wires. One end must be suitable to plug into the communication port selected on the PC. The other end must be three loose wires.
2. Before plugging the cable into the PC, find terminals 1, 2, and 3 inside the CB-1 enclosure. The terminals are located on the right side, just in back of the 5VDC power supply.
3. Use a small screwdriver to connect the ground wire to terminal 2, the PC transmit to terminal 3, and the PC receive to terminal 1.
4. Plug the other end of the cable into the selected communication port on the PC.

Testing the RS-232 Serial Connection

1. From within the data exchange software on the PC, select **Communications Setup** from the **Tools** on the toolbar.
2. Within data exchange, select **Self Test** tab in the **Communications Setup** window.
3. On the CB-1, enter the hardware test screen from the utilities screen.
4. Press the **Test PC Link** button. The CB-1 sends a PING command to the PC and displays *SENDING PING TO PC* while waiting for a response. If a valid response is received, the CB-1 displays *PC COMMUNICATING* on the screen. If no response is received, the CB-1 displays *PC NOT RESPONDING*. See Section 4.4.4 on page 5 for further details.
5. If the PC is not responding, checking the wiring and communication parameters at both the CB-1 and on the PC.
6. After the PC is responding correctly, exit the hardware test screen.

Saving the CB-1 Configuration Parameters and Mix Designs to the PC

1. Enter the utilities menu from the main menu.
2. The CB-1 always stores the configuration file under the name *config.400* in the data 1 sub-directory

under the data exchange installation directory. The default installation directory is in c:\Program Files\Rice Lake Weighing Systems\Data Exchange. If this is not the first time you have used data exchange, a file named *config.400* may already exist. The existing version of *config.400* will be lost. So if it is from another CB-1 and you want to save it, be sure to rename it before continuing on to Step 3. For users with many CB-1's, each configuration file will need to have a unique name.

3. Press selection **3 Backup Config. to PC** to start the upload (backup) to the PC. You will be asked if you "...are sure this is what you want to do." After answering yes, the backup will start. This process takes about four minutes. If everything goes okay, the message *Configuration file successfully stored on PC* appears. Touch the screen to clear the message.

Restoring CB-1 Configuration File From the PC to the CB-1.

1. The restore feature is only useful if a backup was made. Be sure to make a backup once the plant is tuned properly and most of the mix designs have been entered. Data Exchange is used most often when setting up the CB-1 on duplicate batch plants, when the CB-1 electronics needs replacing, the data gets corrupted, or the battery on the CB-1 dies. In any case, it is always recommended to initialize the non-volatile memory on the CB-1 before doing a restore. Before initializing, enter the mix design menu and write down the number of mix designs created. Number of mix designs: _____. You will need to know this number later (Step 5). See Section 2.1 for instructions on how to initialize the CB-1.
2. After the CB-1 has been initialized, enter the utilities menu from the main menu.
3. The CB-1 always looks for a file name *config.400* in the Data1 sub-directory under c:\Program Files\Rice Lake Weighing Systems\Data Exchange. If this is not the first time you have used data exchange, the file name *config.400* may have been renamed. For the user with many CB-1's, each configuration file should have been given a unique name. Rename the file you want to restore *config.400*.
4. Press selection **3, Restore Config. to CB-1**, to start the download (restore) to the CB-1. You will be asked if you "...are sure this is what you want to do." After answering Yes the restore will start. This process takes about five minutes. If everything goes okay, the message *Configuration file successfully restored on CB-1!* appears. Touch the screen to clear this message.
5. One side effect of the restore is that all the mix design information will be in the CB-1 but will be hidden. The CB-1 doesn't know how many mix designs were created, so you must unhide each mix design by pressing the **Create Mix Design** button once for each mix design previously created.

9.8 CB-1 Default Parameters

The following tables list all of the parameters available with the CB-1 and their default parameters.

Parameter	Description	Default Setting
Options List	Prompt for truck ID	No
	Prompt for job ID	No
	Prompt for water adjust.	No
	Split batch type	Disable
	Batch type	Seek ldl
	Force zero tol. check	Yes
	Discharge by rate	Yes
	Change admix targets	Yes
	Auto-discharge (dump)	No
	Agg conveyor control	Manual
	Ingredients List Aggregate 1	Aggregate 1
Delivery mode		Sgl Spd
Slow/Jog fill wt. in lb		0.0
Small preact wt.		0.0
Preact wt. in lb		0.0
Jog mode		Jog off
Jog on time (msec)		200
Jog off time (.1 sec)		25
Jog only weight		200
Under tolerance %		2.0
Over tolerance %		2.0
Ingredients List Aggregate 2		Aggregate 2
	Delivery mode	Sgl Spd
	Slow/Jog fill wt in lb	0.0
	Small preact wt.	0.0
	Preact wt in lb	0.0
	Jog mode	Jog Off
	Jog on time (msec)	200
	Jog off time (.1 sec)	25
	Jog only weight	200
	Under tolerance %	2.0
	Over tolerance %	2.0
	Ingredients List Aggregate 3	Aggregate 3
Delivery Mode		Sgl Spd
Slow/Jog fill wt in lb.		0.0
Small preact wt.		0.0
Jog mode		Jog Off

Table 9-2. CB-1 Default Parameters

Parameter	Description	Default Setting
Ingredients List Aggregate 3	Aggregate 3	Edit Txt
	Delivery mode	Sgl Spd
	Slow/Jog fill wt in lb	0.0
	Small preact wt.	0.0
	Preact wt in lb	0.0
	Jog mode	Jog off
	Jog on time (msec)	200
	Jog off time (.1sec)	25
	Jog only weight	200
	Under tolerance %	2.0
	Over tolerance %	2.0
Ingredients List Aggregate 4	Aggregate 4	Edit Txt
	Delivery mode	Sgl Spd
	Slow/Jog fill wt in lb	0.0
	Small preact wt.	0.0
	Preact wt in lb	0.0
	Jog mode	Jog off
	Jog on time (msec)	200
	Jog off time (.1sec)	25
	Jog only weight	200
	Under tolerance %	2.0
	Over tolerance %	2.0
Ingredients List Cement 1	Cement 1	Edit Txt
	Delivery mode	Sgl Spd
	Slow/Jog fill wt in lb	0.0
	Small preact wt.	0.0
	Preact wt in lb	0.0
	Jog mode	Jog off
	Jog on time (msec)	200
	Jog off time (.1sec)	25
	Jog only weight	200
	Under tolerance %	1.0
	Over tolerance %	1.0

Table 9-2. CB-1 Default Parameters (Continued)

Parameter	Description	Default Setting
Ingredients List Cement 2	Cement 2	Edit Txt
	Delivery mode	Sgl Spd
	Slow/Jog fill wt in lb	0.0
	Small preact wt.	0.0
	Preact wt in lb	0.0
	Jog mode	Jog off
	Jog on time (msec)	200
	Jog off time (.1sec)	25
	Jog only weight	200
	Under tolerance %	1.0
	Over tolerance %	1.0
	Ingredients List Cement 3	Cement 3
Delivery mode		Sgl Spd
Slow/Jog fill wt in lb		0.0
Small preact wt.		0.0
Preact wt in lb		0.0
Jog mode		Jog off
Jog on time (msec)		200
Jog off time (.1sec)		25
Jog only weight		200
Under tolerance %		1.0
Over tolerance %		1.0
Ingredient List Water		Water
	Delivery mode	Mtr Sgl
	Meter coast pulses	0
	Under tolerance %	1.0
	Over tolerance %	1.0
	Gallons/pulse conv.	1.00
Ingredient List Admix 1	Admix 1	Edit Txt
	Delivery mode	Mtr Sgl
	Meter coast pulses	0
	Under tolerance %	3.0
	Over tolerance %	3.0
	Value/100 wt of cement	Yes
	Ounces/pulse conv.	1.00
	Add with water add#	1
	Admix delivery mode	Bottle
	Admix discharge mode	Blow out
	Admix blowout time (s)	20

Table 9-2. CB-1 Default Parameters (Continued)

Parameter	Description	Default Setting
Ingredient List Admix 2	Admix 2	Edit Txt
	Delivery mode	Mtr Sgl
	Meter coast pulses	0
	Under tolerance %	3.0
	Over tolerance %	3.0
	Value/100 wt of cement	Yes
	Ounces/pulse conv.	1.00
	Add with water add#	1
	Admix delivery mode	Bottle
	Admix discharge mode	Blow out
	Admix blowout time (s)	20
	Ingredient List Admix 3	Admix 3
Delivery mode		Mtr Sgl
Meter coast pulses		0
Under tolerance %		3.0
Over tolerance %		3.0
Value/100 wt of cement		Yes
Ounces/pulse conv.		1.00
Add with water add#		1
Admix delivery mode		Bottle
Admix discharge mode		Blow out
Admix blowout time (s)		20
Ingredient List Admix 4		Admix 4
	Delivery mode	Mtr Sgl
	Meter coast pulses	0
	Under tolerance %	3.0
	Over tolerance %	3.0
	Value/100 wt of cement	Yes
	Ounces/pulse conv.	1.00
	Add with water add#	1
	Admix delivery mode	Bottle
	Admix discharge mode	Blow out
	Admix blowout time (s)	20

Table 9-2. CB-1 Default Parameters (Continued)

Parameter	Description	Default Setting
Ingredient List Admix 5	Admix 5	Edit Txt
	Delivery mode	Mtr Sgl
	Meter coast pulses	0
	Under tolerance %	3.0
	Over tolerance %	3.0
	Value/100 wt of cement	Yes
	Ounces/pulse conv.	1.00
	Add with water add#	1
	Admix delivery mode	Bottle
	Admix discharge mode	Blow out
	Admix blowout time (s)	20
Ingredient List Admix 6	Admix 6	Edit Txt
	Delivery mode	Mtr Sgl
	Meter coast pulses	0
	Under tolerance %	3.0
	Over tolerance %	3.0
	Value/100 wt of cement	Yes
	Ounces/pulse conv.	1.00
	Add with water add#	1
	Admix delivery mode	Bottle
	Admix discharge mode	Blow out
Admix blowout time (s)	20	

Table 9-2. CB-1 Default Parameters (Continued)

Parameter	Description	Default Setting	
Global Parameters - Aggregate Scale	Discharge delay (.1 sec)	0	
	Shock wt delay (.1 sec)	0	
	Second burst wt (lb)	3000	
	Begin vibrator wt. (lb)	1000	
	Settle time (.1 sec)	50	
	Min. flow rate (lb/s)	0.0	
	Zero tol. (primary)	40.0	
	Zero tol. (secondary)	40.0	
	Post zero time (.1s)	50	
	Discharge Control List		
	Inch gates present	Yes	
	Full open time (.1 sec)	30	
	Full close time (.1 sec)	30	
	Inch open time (ms)	30	
	Inch close time (ms)	30	
	Initial burst (.1sec)	5	
	Secondary burst (.1s)	4	
	Discharge rate (lb/s)	100	
	Rate time interval (.1s)	2	
Update rate count	4		
Control rate count	3		
Upper rate tolerance %	20		
Lower rate tolerance %	20		
Preact Compensation			
Auto preact active	On		
Coarse Preact tol %	50		
Coarse preact comp. %	50		
Fine preact tol. %	20		
Fine preact comp. %	20		
# out of tol. allowed	3		

Table 9-2. CB-1 Default Parameters (Continued)

Parameter	Description	Default Setting
Global Parameters - Cement Scale	Discharge delay (.1 sec)	0
	Shock wt delay (.1 sec)	0
	Second burst wt (lb)	300
	Begin vibrator wt (lb)	100
	Settle time (.1 sec)	50
	Min. flow rate (lb/s)	0.0
	Zero tolerance (primary)	5.0
	Zero tolerance (secondary)	5.0
	Post zero time (.1s)	50
	Discharge Control List	
	Inch gates present	Yes
	Full open time (.1 sec)	30
	Full close time (.1 sec)	30
	Inch open time (ms)	30
	Inch close time (ms)	30
	Initial burst (.1sec)	5
	Secondary burst (.1s)	4
	Discharge rate (lb/s)	25
	Rate time interval (.1s)	2
	Update rate count	4
Control rate count	3	
Upper rate tolerance %	20	
Lower rate tolerance %	20	
Global Parameters - Water	Preact compensation	
	Auto preact active	On
	Coarse preact tol. %	50
	Coarse preact comp. %	50
	Fine preact tol. %	20
	Fine preact comp. %	20
	# out of tol. allowed	3
	Discharge delay (.1s)	0
	Water reservoir	No
	Water to truck first	No
F2 for water start	No	
Wash/tailwater gallons	20.0	
Pulse time/noflow (.1s)	50	
Max. resvr dis time (s)	30	
Empty resvr input state	On	
Washout H2O delay (.1s)	30	
% Delivered to discharge	60	
Global Parameters - Admixture	Admix control	Auto
	Discharge delay (.1 sec)	0
	Pulse time/no flow (.1s)	50
	Discharge timeout (s)	60
	Empty rsrv input state	On

Table 9-2. CB-1 Default Parameters (Continued)

Parameter	Description	Default Setting
Global Parameters - Reporting	Custom report header	
	US units format	Lb/G/Oz
	Metric units format	Kg/L/mL
	Prints units type	Like mix
	* out of tolerance	Yes
	Print water/cem ratio	Yes
	Print each batch weights	No
	Usage report has US/SI	No
	Min batch (cubic yards)	1.00
	Min batch (cubic meters)	1.00
	Max batch (cubic yards)	12.00
	Max batch (cubic meters)	12.00
	Min aggregate lb/yard	0.0
	Max aggregate lb/yard	5000.0
	Min cement lb/yard	0.0
	Max cement lb/yard	1200.00
Min water per yard	0.0	
Max water per yard	400.00	
Small batch cutoff	0.0	
Discharge warning time (s)	0	
Serial Communications	Computer	
	Baud rate	9600
	Data bits/parity	8/None
	Xon/Xoff enabled	Off
	Cement Scale	
	Indicator type	IQ310A
Baud rate	9600	
Data bits/parity	8/None	
Decimal places	8888888	
Printer	Baud rate	9600
	Data bits/parity	8/None
	Termination	CR/LF
Xon/Xoff enabled	On	
Aggregate Scale	Indicator type	IQ310A
	Baud rate	9600
	Data bits/parity	8/None
	Decimal places	8888888
System Passcodes List	Supervisor passcode	*****
	Operator passcode	*****

Table 9-2. CB-1 Default Parameters (Continued)

Parameter	Description	Default Setting
Advanced Variables List	Screen delay (msec)	30
	Button delay (msec)	10
	Reverse delay (msec)	70
	Text delay (msec)	5
	Message delay (msec)	2500
	Print line delay (ms)	350
	# device retries	5
	Dev resp pause (1/10s)	30
	Self test updates	20
	Set time pause (ms)	2000
	CRC checking	On
	RS-485 address	99
	Get weight retries	7
	Indicator delay (msec)	300
	Message box on 'EXIT'	Off
	Debugging info.	Off
Auto contrast ticks	24	
Truck List - Truck Number 0	Truck Number 0	0
	Discharge ratio	1.00
	Truck capacity	12.00

Table 9-2. CB-1 Default Parameters (Continued)

9.9 Available Options

The CB-1 has the following available options

- Weighed water
- 4-of-6 aggregates
- Keyboard
- Moisture probe
- MNDOT
- CALTRAN
- Spanish
- Decumulative aggregate weighing (loss in weight)
- Weighed fly ash
- Dual speed aggregates (now a standard feature in version 1.52 and later)

10.0 CB-1 Wiring

The following sections address CB-1 wiring issues.

10.1 CB-1 Important Notes

10.1.1 Two Power Sources

The CB-1 requires two separate power sources to run. The power cord that came wired to your CB-1 ONLY powers the electronics. This power should come from a quality UPS with power conditioning. This clean power must be separated as far as possible from the power source used to power the motion control on the batch plant. See Section 10.2.3 for more information about UPS wiring.

Another power source must be brought into the CB-1 to power the I/O (output relays), that control the plant. No power cord is supplied because this power must be brought directly from its own circuit or fed from a manual panel.

10.1.2 I/O Power & Manual Panel Same Phase Power

The CB-1 and a manual panel will both be wired to the same I/O points for most plant controls (exceptions are air compressors or other equipment the CB-1 doesn't control in automatic mode). Because of this, it is critical that the 120V "hot" that is used for the CB-1 I/O power, is the same "hot" used by the manual panel. If the "hot" wires for the manual panel and the CB-1 are "out of phase" then the voltage may be 230 volts or more and damage the CB-1 and/or the manual panel.

10.1.3 Unused Inputs Must be Jumpered to 120V

The CB-1 uses 120V input signals from various sensors for positive and negative feedback. At a minimum the CB-1 requires the following signals:

- OK to discharge (J2-14)
- Cement discharge gate closed (J2-16)
- Aggregate discharge gate closed (J2-17)
- Aggregate conveyor running (J2-19)
- E-Stop not pressed (J2-20) This is fed 120VAC from inside the CB-1 automatic panel.

If your plant is not equipped with any of these sensors, you must get 120VAC to these inputs to satisfy the CB-1 interlocks. The best place to get 120VAC is to jumper from J2-20 (E-Stop).

10.1.4 Manual Panel Active Input

If the CB-1 sees input J2-18 come on at any time during a batch, then the word "MANUAL" is printed on the batch ticket. This input should come from the power switch on a manual panel. This is a requirement for some states but not necessary for most.

10.2 CB-1 Wiring Recommendations

10.2.1 Quencharcs

All inductive devices (solenoids, motors, mechanical relays, contactors) being controlled by outputs from the CB-1 should have a quencharc installed on them. High energy noise spikes are generated whenever current is interrupted through an inductive load. These noise spikes may interfere with associated equipment causing erratic operation. The quencharcs must be located as close as possible to the device being powered; installing the quencharcs in the electrical panel on the plant is ideal. Placing the quencharc across the contact in many cases can work as well, but for maximum effect, it is best to place the quencharc directly across the load.

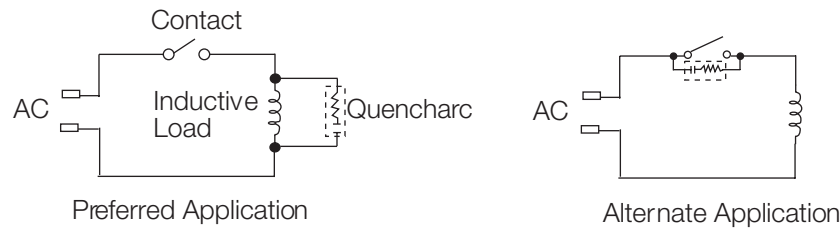


Figure 10-1. CB-1 Wiring Recommendations

10.2.2 Admix/Water Pulse Signals

If mechanical relays are used to clean up the admix pulse input signals or the water pulse signal, a quencharc should be placed across the coil of each of those relays.

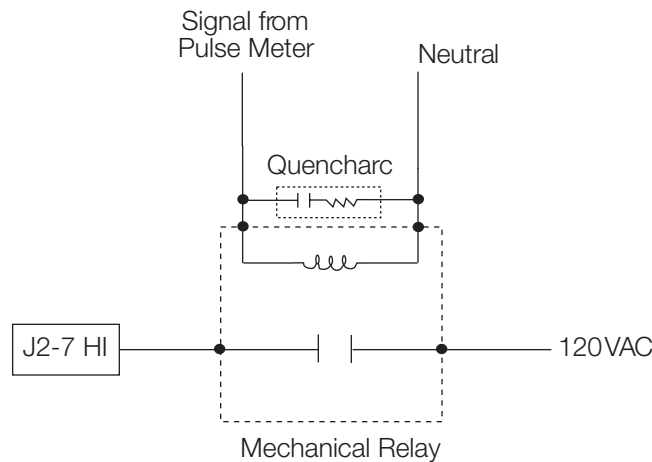
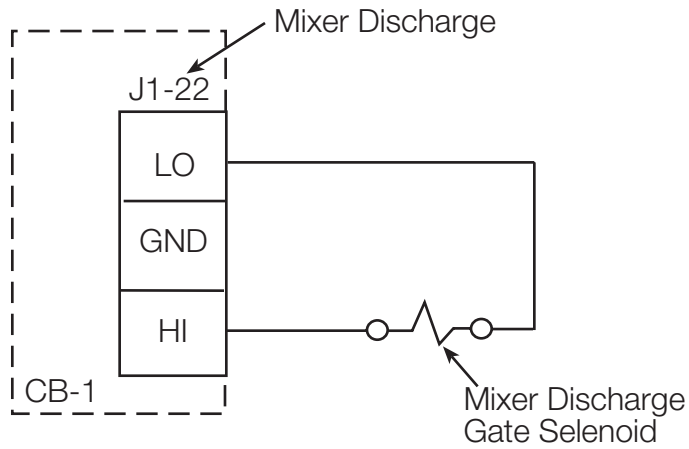


Figure 10-2. Example of Quencharc and Mechanical Relay Connections to CB-1

10.2.3 UPS Wiring

1. The AC electronics power should be on its own dedicated circuit running from the circuit breaker panel.
2. The AC electronics power should be run through an uninterruptible power supply (UPS). A suitable unit from Rice Lake Weighing Systems is our PN 65423. This is a Sola 470VA, 115VAC unit. For a plant running on 230VAC, RLWS PN 65426 is recommended which is a Sola 470VAC, 230VA unit.
3. If the CB-1 is one of the models with internal IQplus310A indicators, the indicators are connected to the clean AC electronics power internally.
If the CB-1 uses externally mounted weight indicators, the indicators must be powered from the UPS.
4. Any printer connected to the CB-1 must be powered from the UPS.

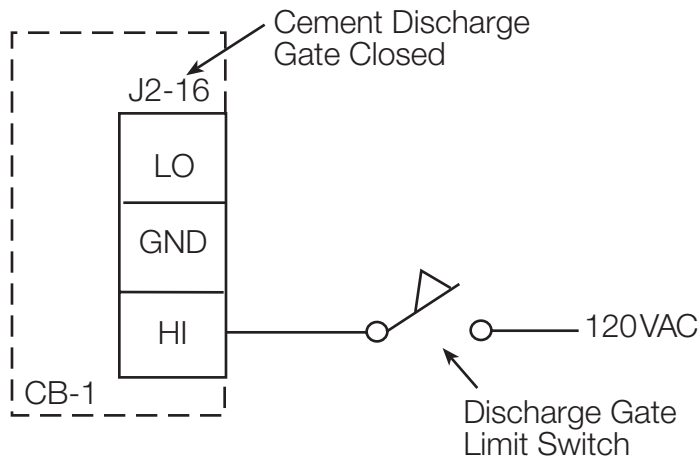
10.3 CB-1 Output Wiring Example



Note: If the OPTO22 G4OAC5 solid state relays are being used, the neutral connection on the device being controlled must be connected to the appropriate LO terminal in the CB-1.

10.4 CB-1 Input Wiring Example

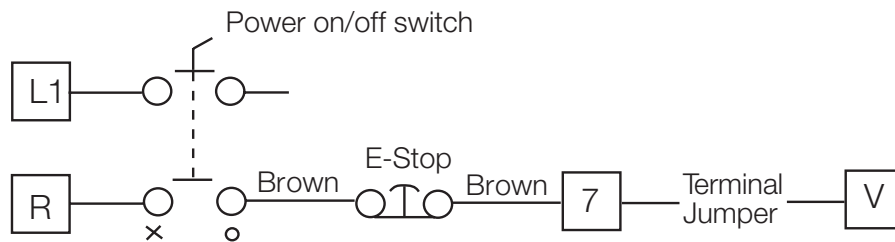
The following illustration is an example of input wiring.



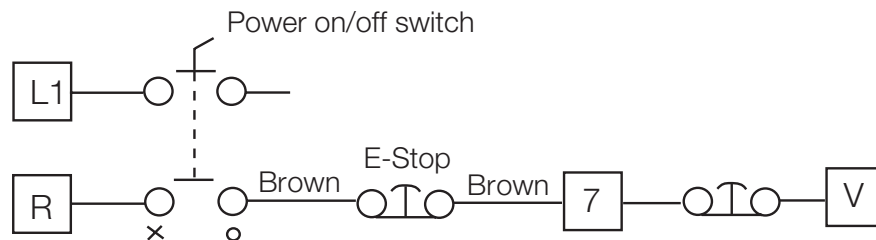
10.5 Wiring an External E-Stop into the CB-1

The following illustrations show the external E-Stop. The top illustration is the E-Stop wiring as it is shipped from the factory.

Standard E-Stop



CB-1 with 1 External E-Stop



The above graphic shows an external E-Stop wired into the CB-1. Please note that the jumper normally connecting terminal 7 to terminal V has been removed.

10.6 CPU and Expansion Board Jumper Settings

The following diagrams (Figure 10-3, 10-4, and 10-5), show the connector locations and jumper settings for the CPU and Expansion boards. Illustrated below are CPU boardset rev. D and CPU boardset rev. G.

In software version 1.40 and later a hardware watchdog is supported through the software. The watchdogs purpose is to monitor the status of the software and reset the system if the software fails to update the watchdog for more than 1.6 seconds. If this occurs all relay outputs will be shut off and the system will be reset. For the watchdog to be enabled a shorting block should be installed on jumper JP19 on the CPU board. This jumper should only be installed on systems with software version 1.40 or later.

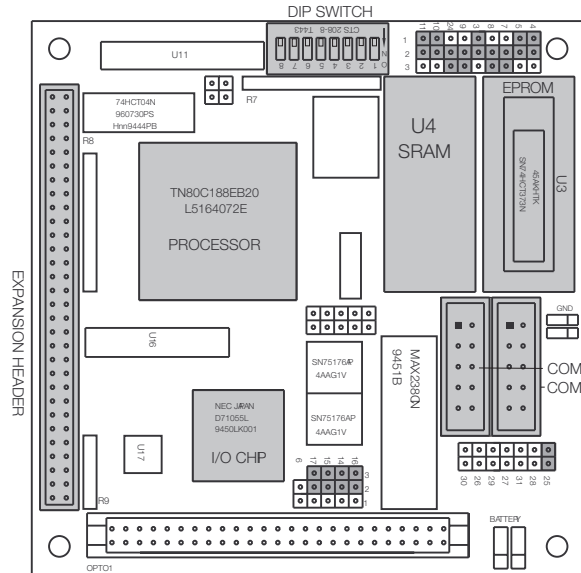


Figure 10-3. CB-1 CPU Board, Revision D

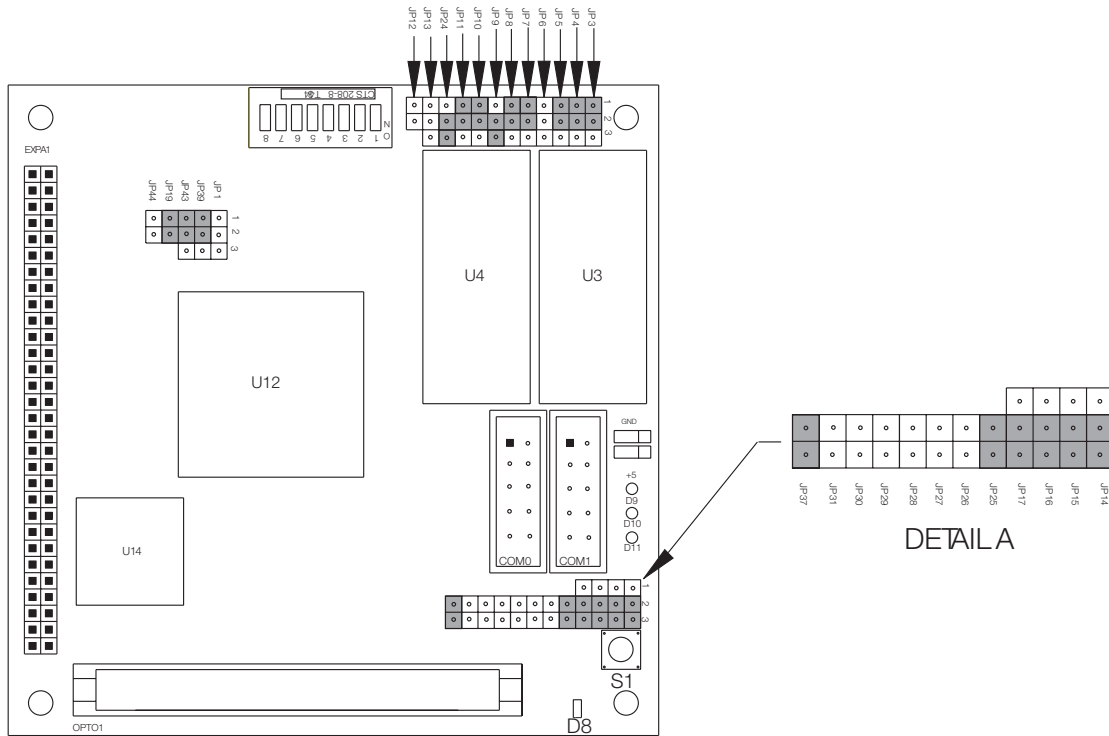


Figure 10-4. CB-1 CPU Board, Revision G

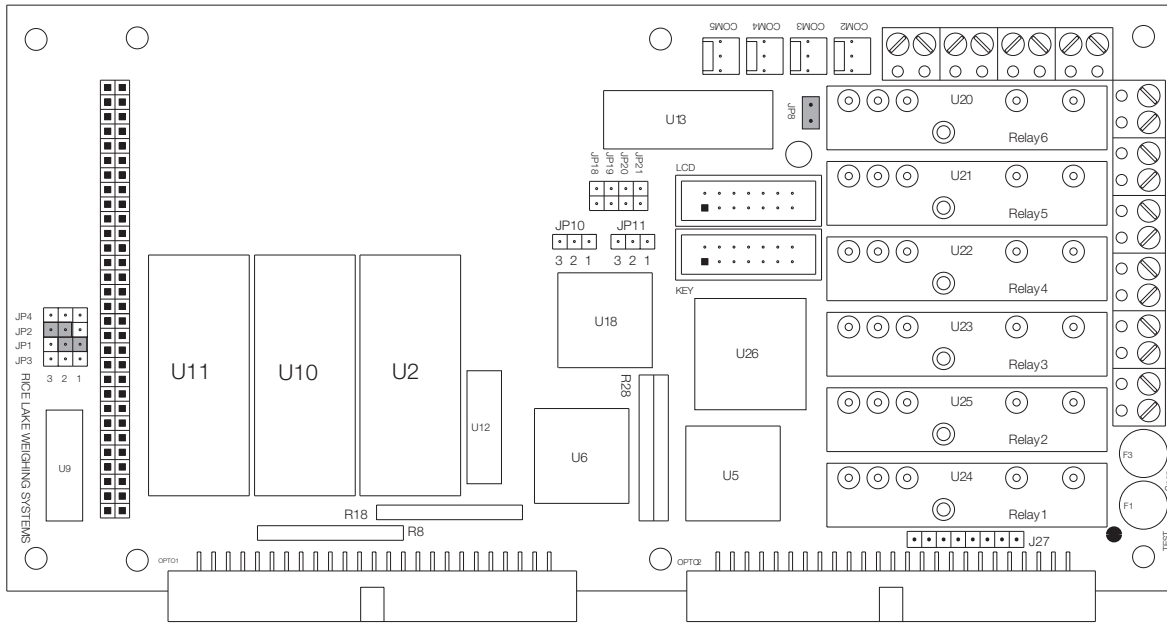


Figure 10-5. V400 Expansion Board (without analog)

10.7 CB-1 Wiring Diagrams

10.7.1 Standard CB-1 System Drawings

Refer to the following drawings for the standard CB-1. See the *CB-1 Service Manual* (RLWS PN 50982) for system drawings of all CB-1 versions.

For CB-1 Units PN 43267 and 45093

- #43267 – Sheet 1 of 4
- #43267 – Sheet 2 of 4
- #43267 – Sheet 3 of 4
- #43267 – Sheet 4 of 4

For CB-1 Units PN 45094 and 45095

- #45094 – Sheet 1 of 4
- #45094 – Sheet 2 of 4
- #45094 – Sheet 3 of 4
- #45094 – Sheet 4 of 4

10.7.2 Custom CB-1 System Drawings

If a **custom** CB-1 (manual panel, wall mount, etc) system is ordered, it will be shipped with it's own drawings.

11.0 CB-1 Limited Warranty

Rice Lake Weighing Systems (RLWS) warrants that all RLWS equipment and systems properly installed by a Distributor or Original Equipment Manufacturer (OEM) will operate per written specifications as confirmed by the Distributor/OEM and accepted by RLWS. All systems and components are warranted against defects in materials and workmanship for one year.

RLWS warrants that the equipment sold hereunder will conform to the current written specifications authorized by RLWS. RLWS warrants the equipment against faulty workmanship and defective materials. If any equipment fails to conform to these warranties, RLWS will, at its option, repair or replace such goods returned within the warranty period subject to the following conditions:

- Upon discovery by Buyer of such nonconformity, RLWS will be given prompt written notice with a detailed explanation of the alleged deficiencies.
- Individual electronic components returned to RLWS for warranty purposes must be packaged to prevent electrostatic discharge (ESD) damage in shipment. Packaging requirements are listed in a publication, "Protecting Your Components From Static Damage in Shipment," available from RLWS Equipment Return Department.
- Examination of such equipment by RLWS confirms that the nonconformity actually exists, and was not caused by accident, misuse, neglect, alteration, improper installation, improper repair or improper testing; RLWS shall be the sole judge of all alleged non-conformities.
- Such equipment has not been modified, altered, or changed by any person other than RLWS or its duly authorized repair agents.
- RLWS will have a reasonable time to repair or replace the defective equipment. Buyer is responsible for shipping charges both ways.
- In no event will RLWS be responsible for travel time or on-location repairs, including assembly or disassembly of equipment, nor will RLWS be liable for the cost of any repairs made by others.

THESE WARRANTIES EXCLUDE ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NEITHER RLWS NOR DISTRIBUTOR WILL, IN ANY EVENT, BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

RLWS AND BUYER AGREE THAT RLWS'S SOLE AND EXCLUSIVE LIABILITY HEREUNDER IS LIMITED TO REPAIR OR REPLACEMENT OF SUCH GOODS. IN ACCEPTING THIS WARRANTY, THE BUYER WAIVES ANY AND ALL OTHER CLAIMS TO WARRANTY.

SHOULD THE SELLER BE OTHER THAN RLWS, THE BUYER AGREES TO LOOK ONLY TO THE SELLER FOR WARRANTY CLAIMS.

No terms, conditions, understanding, or agreements purporting to modify the terms of this warranty shall have any legal effect unless made in writing and signed by a corporate officer of RLWS and the Buyer.

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