AutoWeigh

SELF-LOADING

GRAVIMETRIC BLENDER

SELF-LOADING AUTOWEIGH BLENDER
with
FOUR COMPONENT SOFTWARE

OPERATION AND MAINTENANCE MANUAL

CONAIR
FRANKLIN
Part of the Conair Group

Manual Number **UGB003/0296**

GETTING STARTED. READ THIS PAGE.

THE NEXT 20 PAGES OF THIS MANUAL WILL GUIDE YOU, STEP BY STEP, TO A SUCCESSFUL STARTUP.

IT WON'T TAKE LONG; SO.... PLEASE, DON'T SKIP AHEAD.

HERE ARE THE STEPS YOU WILL FOLLOW.

ASSEMBLY INSTRUCTIONS: Pages 6 - 11	Very little assembly is required. But you might as well get it right the first time. ALSO: pay attention to the section on wiring.
CHECK OUT PROCEDURE: Pages 12 - 14	This is to see if you did it right. It also will tell if anything was damaged in shipping.
LOADING SYSTEM TIMER SETTINGS: Page 16	We already did this. But you should verify the settings are correct.
LOAD CELL CALIBRATION: Pages 17 - 18	We already did this. But shipping or rough handling during assembly sometimes creates load cell problems. If weight readings are not correct, you MUST recalibrate the load cells.
RATE CALIBRATION: Pages 18 - 19	This is NOT really necessary. But if your system uses non-standard equipment, then you MAY want to do this.
NORMAL OPERATION: Pages 20 - 22	From this point forward, operating your system is a snap. This section tells you just how simple it is and exactly what to expect under normal operating conditions.
SPECIAL FEATURES: Pages 23 - 24	Your system can do much more than you may realize. This page reviews briefly some of the added features that are available to you and where in this manual you can find them.

NOTE: Pages that are color coded in **PINK** permit quick and easy access.

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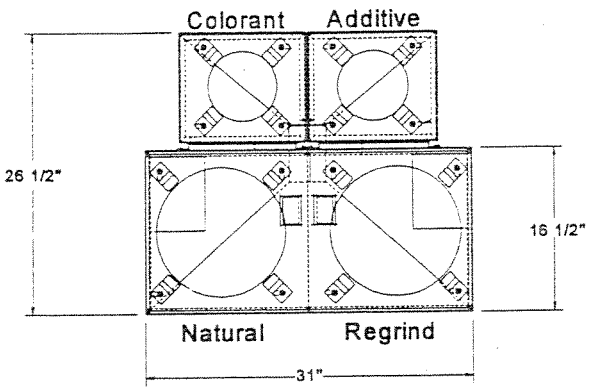
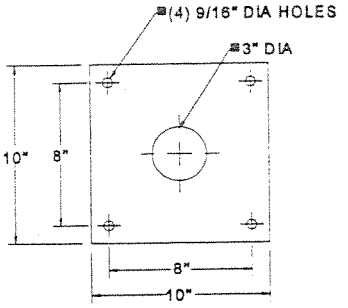
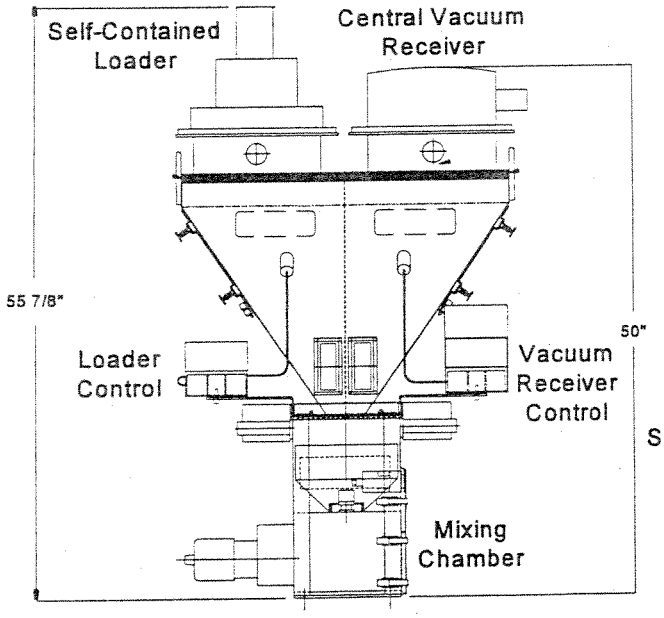
ASSEMBLY

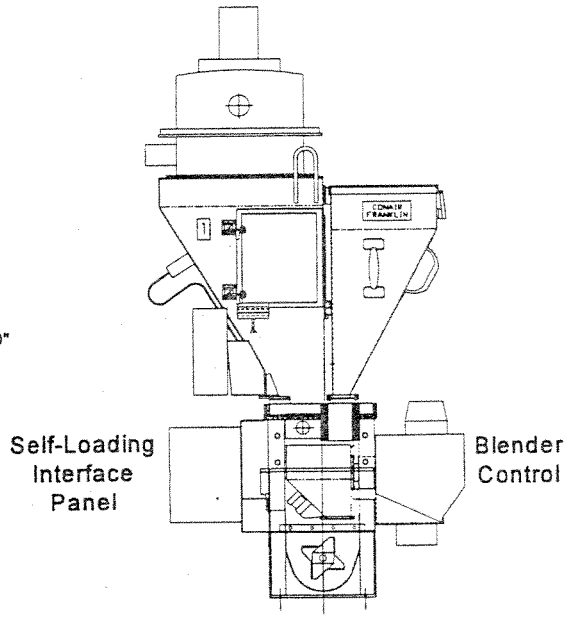
Blender Specifications
Assembly/Installation Instructions
Wiring Considerations
Check Out Procedure
Diagnostics



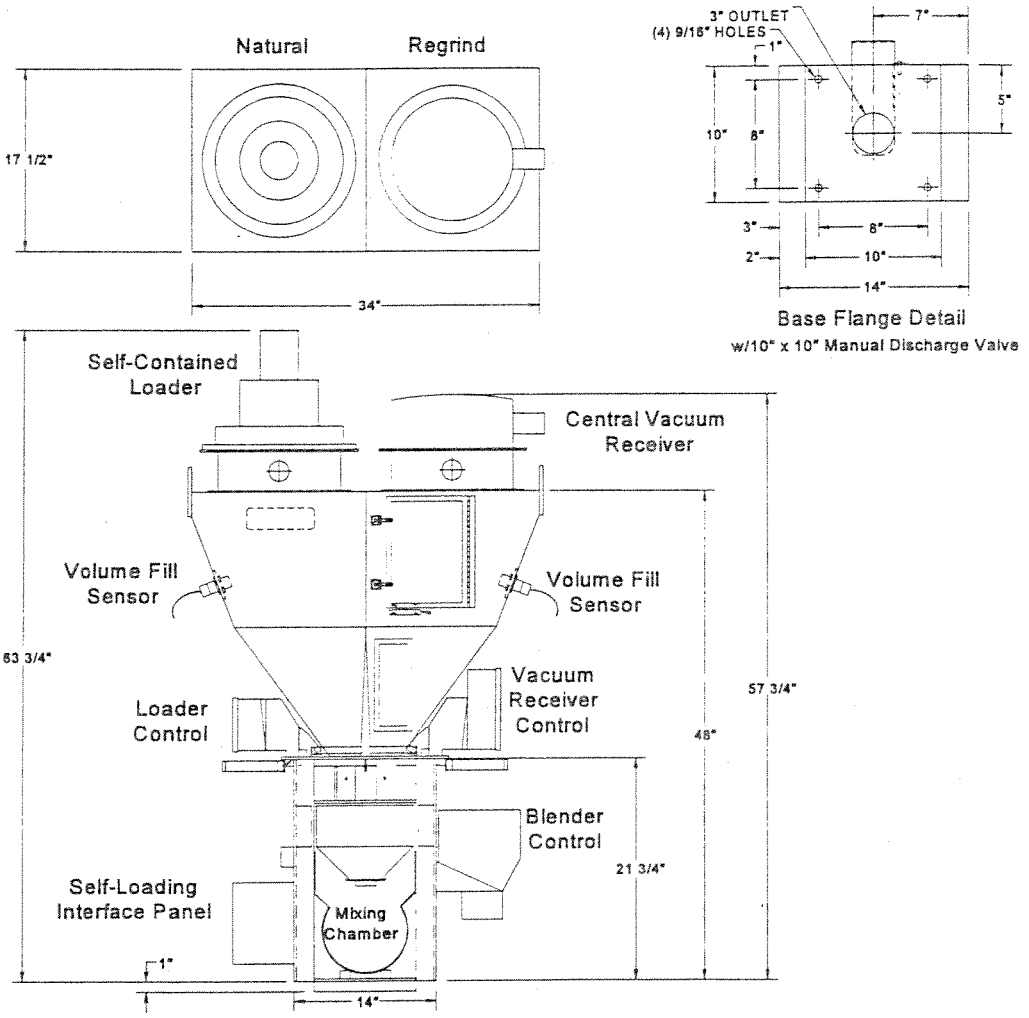


Base Flange Detail
w/10" x 10" Manual Discharge Valve





Model	Batch Size (grams)	Number of Discharge Valves	Number of Additive Feeders	Maximum Throughput (lbs/hr)	Dimensions H x W x D (inches)
GBSL-122	1000	2	2	100 to 200	56 x 31 x 26.5 Self-contained Loader
GBSL-131	1000	3	1		50 x 31 x 26.5 Central Vacuum Receiver
GBSL-140	1000	4	0		



Model	Batch Size (grams)	Number of Discharge Valves	Number of Additive Feeders	Maximum Throughput (lbs/hr)	Dimensions H x W x D (inches)
GBSL-220	2000	2	0	300 to 400	64 x 34 x 18 Self-contained Loader
GBSL-221	2000	2	1		
GBSL-222	2000	2	2		58 x 34 x 18 Central Vacuum Receiver
GBSL-420	4000	2	0	700 to 800	70 x 34 x 18 Self-contained Loader
GBSL-421	4000	2	1		
GBSL-422	4000	2	2		64 x 34 x 18 Central Vacuum Receiver

ASSEMBLY AND INSTALLATION INSTRUCTIONS

CAUTION: LOAD CELLS ARE EASILY DAMAGED.
If the frame is dropped from two feet or more, the load cells will be damaged. The warranty does not cover damaged load cells.

The following items have been shipped to you:

1. FRAME: fully assembled and strapped to a skid.
2. CONTROLLER: the controller and instruction manual.
3. FEEDER: contains a color or additive feeder as ordered.
4. FLOW CONTROL ASSEMBLY: optional
5. FLOOR STAND or VACUUM TAKEOFF ASSEMBLY: optional

RED INSTRUCTION STICKERS will assist you during assembly.

1A. Two ways to MACHINE MOUNT the GB100, 200 or 400 series model:

1) Drill the FRAME and SLIDE GATE with the proper bolt pattern for your machine and then THROUGH-BOLT them to your press.

2) Drill the 10 x 10 steel slide gate plate with the bolt pattern for your machine and bolt it to your press. Then bolt the FRAME to the slide gate and plate using the existing 8 x 8 bolt pattern holes. With this method, bolt head clearance holes are required in the poly-pro slide gate plate. This mounting works well on smaller machines.

NOTE: When choosing proper orientation, be sure you have access to the controller and weigh chamber, clearance for hinged doors, and access to removable feeder hoppers.

1B. STAND-MOUNTING the GB100, 200 or 400 series model:
Bolt the unit directly to the stand provided.

An air operated FLOW CONTROL ASSEMBLY is provided for dispensing into a container. The purpose of this unit is to allow time for mixing to occur after each dispense. This flow valve keeps the mix chamber full to just below the sensor. This assembly bolts directly to the bottom of the Weigh Scale Blender frame.

2. Slide the WEIGH BIN into position. It rests high in the frame and is inserted from the side that has the hinged access window. Install with the air cylinder toward you. If bin is already in place, remove any shipping materials, tape or string.

3. **Hang the Color and/or Additive Feeders:**
   A. Make certain that the mounting bracket is bolted to the feeder casting.

   B. On GB220/GB420 models, raise the bracket slightly to allow the mounting holes to slide over the two mounting stubs on the material bin frame.

      On GB240/440 models, tilt the bracket slightly to allow the ridge of the mounting frame to be engaged.

   C. Then center the feeder and slanted deflector plate into the feeder opening.

   D. Lower the assembly into place with the bottom edge resting on the frame and cross bar assembly. Gravity should hold the unit into place.

   E. On GB240/440 models, mounting bolts can be used to secure the feeder by bolting through the access holes in the mounting bracket and chassis flange.

4. **Place the controller on the support tray and plug in all cords:**
   A. Air solenoids into the multi-pin plug.

   B. Additive and color feeders into respective positions of the duplex receptacle on the blender controller.

   C. Mixer motor into right side of controller.

   D. Sensor cord plug into right side of controller.

   E. Load Cell plug into port on left side of controller.

   F. Self-Loading interface panel plug into the blender controller.

5. **Plug the CONTROLLER into the receptacle box located under the controller tray.**

   IMPORTANT: Do NOT plug the controller into a separate power source. The controller ground path MUST be the same as the blender frame ground path. If your system has the controller located in a remote location, MAKE CERTAIN that the power to the controller comes from the receptacle mounted on the Blender frame.

6. **Plug the power cord coming from this box into a 120 volt power source** (220 volt outside U.S.). This cord MUST provide the ONLY power source for the blending system, including the controller. See WIRING CONSIDERATIONS, next page.

7. **Connect air pressure to the unit. About 80 psi is recommended.**

8. **Remove all protective paper from the plastic windows.**

WIRING CONSIDERATIONS

The wiring of your blender is very important to its proper operation. Electronics are very susceptible to voltage spikes and static charges, both of which are very common in plastics factories.

To MINIMIZE these things, consider the following.

1. The power supply should be solid; a strong supply, not limited by a "just adequate" control transformer. A source of 120 volts that comes from a large transformer that supplies voltage to a large portion of the plant is better than a small power supply transformer that is intended to supply only this device. Power supplies, even though they may be "isolation" transformers, will still pass all voltage spikes right through. Their small size limits their ability to dampen RF (Radio Frequency) noise that is often induced into the system from outside sources. This proves worse than connection to larger central transformers.

2. Avoid running the power supply line along side any heavy power lines. An unshielded power supply in a raceway along side other heavy power lines will pick up induced RF noise and transfer it into the GB steel enclosure causing computer trouble.

3. Long extension cords should be avoided. They also reduce the ability to provide a dampening effect on spikes and static. The further the equipment is from a substantial power source, the more susceptible it is to spikes.

4. The CONTROLLER and the GB frame MUST share the same GROUND PATH. This is why you MUST plug the controller into the OUTLET that is provided ON THE FRAME.

5. REMOTE SYSTEMS. If you have your controller mounted in a remote location, you will have a number of power and signal cords running between the frame and the controller. BE SURE that the LOW VOLTAGE lines are NOT BUNDLED to the HIGH VOLTAGE lines and keep them away from other nearby electrical lines.

   LOW VOLTAGE lines are: Load Cell cable, Level Sensor cord, and Printer and Computer cables.
   HIGH VOLTAGE lines are: Air Solenoid cable, mixer motor cable, feeder motors, and MAIN POWER line.

   Keep these sets of cables SEPARATED.

6. VACUUM LOADER CONVEYING LINES. Keep them away from all electrical lines, particularly the Load Cell lines. Conveying plastic produces extreme static voltages. A Power supply line, even in conduit, that runs next to a vacuum line, can introduce extreme static pulses into the processor. Keep conveying lines SEPARATED from electrical supply lines.

7. We use many internal tooth "STAR" washers in assembling the GB to ensure good ground between painted parts. Do not remove them.

8. LOADERS. For wiring loaders to a central conveying control, please follow the instructions supplied with your loading or conveying system.

IMPORTANT: If a Self-Contained Material Loader is used, **DO NOT** plug the loader's control panel into the same power source as the blender. The resulting electrical noise could cause the blender control panel to malfunction.

CHECK OUT PROCEDURE

As you go through this procedure, if WHAT SHOULD HAPPEN, doesn't happen, see Page 14, DIAGNOSTICS, for what to check.

NOTE: 100 and 200 series models (3Kg load cells), display all weight readings in 1/10 grams (x.x). 400 series models (10Kg load cells) display weight readings in FULL grams, no decimal (XXX).

On this page we show all weight readings WITH a decimal point.

Start with NO MATERIAL in any hoppers.
Be sure an AIR SUPPLY is connected.
Place ALL switches DOWN; POWER (on front); STOP and PAUSE (on left).

PROCEDURE	WHAT SHOULD HAPPEN
Plug in controller	Nothing should happen.
Turn power on.	Display should show version date (V=20218A), followed by the check sum number (CKS xxxx), followed by (ROM OK), followed by (RAM = 8K) followed by (MOD 100) or 200 or 400. (NOTE: The MODEL number must match your unit, except for the zero. If not see below.) followed by (0.0), followed by the actual weight of material in the bin. This number should be close to 0, plus or minus several grams (20.0) to (- 20.0).
At this point:	Be sure the display is in tenths of grams, or full grams depending on your model. If the weight display is NOT correct, or the MODEL number is not correct; see Page 90, SELECTING CORRECT MODEL.
Touch weigh bin very lightly.	Display should update the weight every second reflecting the light pressure that you are exerting on the bin.
Press "*" Key	Display will say (PASSWORD).
Press "22222" (2 key five times) (entering the Program mode).	2's will be displayed as you enter them. Display will show (P x.x) when done. P = PROGRAM
Press "OPER" Key	Display will say (OPERATE).

Press "REG" Key	Regrind air solenoid will operate. LED #1 will light. The regrind dump valve will open. Press "REG" key again and the valve will close. Press "REG" repeatedly to observe operation.
Press "NAT" Key	Natural air solenoid will operate. LED #2 will light. The Natural dump valve will open. Press "NAT" Key again and the valve will close. Press "NAT" repeatedly to observe operation.
Press "COL" Key	Internal relay will close powering Color outlet. Color feeder will run. LED #3 will light. Press "COL" Key again and the feeder will stop. Press "COL" repeatedly to observe operation.
Press "ADD" Key	Relay will close powering Additive outlet. Additive feeder will run. LED #4 will light. Press "ADD" Key again and the feeder will stop. Press "ADD" repeatedly to observe operation.
Press "DUMP" Key	The dump air solenoid will operate. LED #5 will light. The weigh bin dump valve will open. Press "DUMP" key again and the valve will close. Press "DUMP" repeatedly to observe operation.
Press "ALARM" Key	The Strobe Light and Beeper will operate. LED #6 will light. Press the "ALARM" Key again and the strobe light and beeper will stop.
Press "MIX" Key	The Mixer Motor will run. LED #7 will light. (Mix blade turns counter clockwise observed through window.) Press "MIX" key again and the mixer motor will stop. (Mixer switch must be down; timed position.)
Press "HOLD" Key	The Flow Control Valve will operate. (This is an optional device). LED #8 will light. Press "HOLD" Key again and the valve will close.
Press "EXIT" Key	Press two times to return to normal mode. Verify normal mode by observing that there is NO letter P in the display (x.x).

If you have made it this far, congratulations. You have done well. The load cells and controller are functioning properly.

Proceed to **Load Cell Calibration** - Chapter 2.

DIAGNOSTICS - FOR THE CHECK OUT PROCEDURE

PROBLEM	SOLUTION
If display fails to come on at all:	check for power at outlet. (The external fuses do NOT control power to processor).
Possible model numbers are 100, 200 or 400	If model number is not correct for your unit: see page 90, SELECTING CORRECT MODEL.
If display stays at (0.0):	Insure that shipping/packing material is removed. Check for damage to load cells or load cell wires. A load cell that is distorted upward may produce a solid display of (0.0).
If unit displays randomly drifting numbers:	check to see if load cells are plugged in. check for damage to load cell wires.
If display is steady but not near zero:	An over stressed load cell will display a permanently high or low reading. Recalibration of load cells will most likely fix this. This is covered in the next section.
If there is no response from the display when the bin is touched:	check for damaged wires to load cells. check that load cell plug screws are secure.
If response is not sensitive or does not return to its start point:	check for interference around weigh bin.
If pressing * does not display (PASSWORD):	you are not in the normal power-up mode or the keypad doesn't work. Normal mode is indicated by the ABSENCE of the letter M or P at the left of the display.
If display says INVALID after entering the password number:	you pressed the wrong keys or the password number has been changed and it is no longer 22222. Call us for help.
If an air solenoid does not operate:	check the ½ amp fuse. check that solenoid cable is connected properly.
If a slide or dump valve does not open:	check that the air supply is connected. check for proper air line connections to cylinder.
If color or additive auger motor does not run:	check the 3 amp fuse. check that the motor is plugged into proper outlet. check for faulty motor by plugging it into a known source of 110 volt A.C. power.

OPERATION

Loader Time Settings
Load Cell Calibration
Rate Calibration
Normal Operation
Special Features
Controls and Outputs

CHECK LOADING SYTEM TIMER SETTINGS

The Self-Loading AutoWeigh Interface panel contains two timer relays that allow the loading system to communicate with the blender. Before starting the blender and conveying system, you need to make sure the timers have been set correctly for the loading system you are using.

To do so:

Turn off power to the loader station.
Open the Self-Loading interface control box
Find the two timer relays, one corresponding to each bin
Make sure the timer settings are correct for the type of loading system on that particular bin. Refer to the following chart for the correct settings.

Loading System	Timer Setting	How to set the timer relay
Central (Selectronic)	3/4 seconds	Using a screw driver, set the range selector at .25 to 2.5 seconds. Then turn the timer relay knob to 3.
Sentral (SLC)	3/4 seconds	
PowerFill	3/4 seconds	
Self-Contained Material Loader	6 seconds	Using a screw driver, set the range selector at 2 to 20 seconds. Then turn the timer relay knob to 3.

SET LOAD TIMES

Set material load times for each bin. Please follow the instructions provided with your loading system for this step.

LOAD CELL CALIBRATION

NOTE: Displays shown here are in 1/10 grams; 100 and 200 series models. 400 series models are full grams, no decimal.

If your load cells are displaying a weight close to (0.0), plus or minus 5 grams, you may skip this section and go directly to RATE CALIBRATION (next page).

If your unit DOES NOT display a weight of (0.0) grams, plus or minus 5 grams, you should recalibrate them, reset ZERO weight, at this time.

To do so:

BE SURE the weigh bin is EMPTY.
BE SURE the load cell plug is plugged into the side of the controller.
BE SURE the weigh bin is resting on the load cells freely.
BE SURE the air line to the dump valve is connected as it would be during normal operation. (A disconnected air line adds weight.)
BE SURE the load cells and bin are not jammed in any way. To test for this see that a light touch on the bin causes the display to change. When the pressure is removed the display must return to exactly where it was, plus or minus 0.1 gram.

If this does not happen, something is touching something and the bin is not entirely free to move. Check EVERYTHING around the bin.

LOAD CELL CALIBRATION:

The sequence of keystrokes is as follows:

Press: *	Display will say:	(PASSWORD)
Press: 22222	Display will say:	(P x.x)
Press: *99	Display will say:	(CAL OFF)
Press: *	Display will say:	(CAL ON)
Press: EXIT	Display will say:	(P x.x)
Press: ZERO WT	Display will say:	(--WAIT--)
	followed by:	(P 0.0)

The ZERO point of the load cells is now set properly. FULL weight calibration may also be done at this time, however, it probably is NOT NECESSARY. When load cell readings shift due to rough handling, the entire range of readings from ZERO to FULL shift together. The ZERO weight calibration routine resets the full range of the cells and, therefore, corrects FULL weight readings as well. For information on FULL weight calibration, see RECALIBRATION OF LOAD CELLS, Page 94.

RATE CALIBRATION

RATE CALIBRATION is not absolutely necessary. The software initially expects STANDARD hardware. However, if you are using an auger feeder on a model with four dispense valves, or a ½" auger instead of a 1" auger, the software will take 10 or 20 cycles to adjust to correct operation. This slows down the process for a short time, but does not effect accuracy.

If your hardware is STANDARD, or you prefer letting the system SELF ADJUST, you may: proceed to **NORMAL OPERATION** (next section).

To perform a **RATE CALIBRATION**:

Have all HOPPERS LOADED with enough material to run for several cycles without running out.

Have the "OFF AT END OF CYCLE" and "PAUSE" switches DOWN.

Press: *	Display will say:	(PASSWORD)
Press: 22222	Display will say:	(P x.x)

If you have auger feeders, operate them briefly to ensure they are fully primed. To do so:

Press: OPER	Display will say: (OPERATE)
Press: COL	Run until Color auger is dispensing.
Press: ADD	Run until Additive auger is dispensing.
Press: DUMP	This will empty the weigh bin

Now CALIBRATE EACH MATERIAL. To do so:

Press: CAL	Display will say: (CALIBRATE)
Press: NAT	Natural will calibrate itself.

For each material, press CAL followed by the proper component key. Each time a dispense will occur, followed by weighing, followed by a dump to empty the weigh bin.

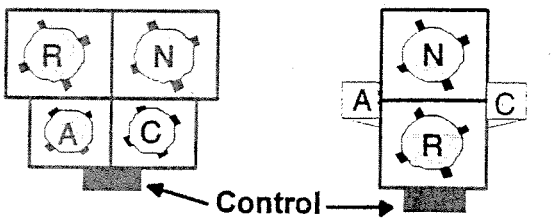
Press: EXIT	when all calibrations are done.

YOU ARE NOW READY FOR ACCURATE PRODUCTION BLENDING.

INSTRUCTIONS FOR NORMAL OPERATION

OPERATION: .....very simple.

1. Fill HOPPERS:
   R=Regrind
   N=Natural
   A=Additive
   C=Colorant



2. Set THUMBWHEEL switches for percentages desired.
   REGRIND, enter as a percent of the entire mix (xx percent).
   COLOR, as a percent of the NATURAL (xx.x percent).
   ADDITIVE, as a percent of the NATURAL (xx.x percent).

3. On Controller, turn **POWER** ON, set **STOP**, and **PAUSE** switches UP. Switch **MIXER** motor DOWN to run for a timed period each cycle.

   Unit will now operate automatically to maintain a level of material high enough to cover the sensor.

   Use the STOP or PAUSE switches to stop the dispensing of material. Turn POWER off only on final shutdown. Battery-backed RAM ensures all information is retained even with power turned off.

The **keypad** is only for:
1. MANUAL TESTING.
2. ALTERATION OF INTERNAL PARAMETERS.

AFTER SEVERAL DAYS OF PROPER OPERATION:

Save all parameter information to the EEPROM for future retrieval in case software problems develop later. To SAVE all parameter information to the EEPROM:

Press: *	Display will say:	(PASSWORD)
Press: 22222	Display will say:	(P x.x)
Press: *	Display will say:	(INSTR --)
Press: 23	Display will say:	(SAVING)
Wait: when done,	Display will say:	(P x.x)
Press: EXIT	Display will say:	(x.x)

If software related problems develop, RETRIEVE this correct copy of the parameters from the EEPROM. This clears corrupted data from RAM and corrects most software problems.

Switch:	POWER OFF.
Hold:	the "CE" key down.
Switch:	POWER ON.
Release:	the "CE" key. Display will say (CLEAR).

If you do not see (CLEAR) on the display, do it again.

NORMAL OPERATING SEQUENCE - EACH CYCLE

As the sensor in the mixing chamber is uncovered, the cycle begins. The target weight of a complete batch is 1000 grams on 100 Series, 2000 grams on 200 Series and 4000 grams on 400 Series.

REGRIND, if requested, will dispense first. After the Regrind dispenses, the space remaining in the weigh bin is calculated.

NATURAL will dispense second. This dispense is calculated to fill the bin leaving just enough space for the Color and Additive dispenses. After the Natural dispense is complete the exact weight of this dispense is calculated and, based on this actual dispense weight, the Color and Additive dispenses are now calculated.
COLOR and ADDITIVE are now dispensed one at a time as requested. These dispenses are a percentage of the Natural component only.

If the Natural, Color, or Additive components fail to reach the requested weight, the process does NOT CONTINUE. The ALARM strobe light flashes and the system holds until the problem is remedied.

As each component is being dispensed and weighed, the corresponding letter (R, N, C or A) is displayed. The total updated bin weight is displayed about 3 seconds AFTER each dispense.

Each dispense weight is checked and recorded. Rate recalibration takes place every cycle to ensure continuous process accuracy. The total batch is then blended in the mixing chamber before entering the throat of the process machine.

NOTE: During operation, you might notice that the loading system turns on and stops the blender in the middle of a batch. This is normal. The dispense valves in the bottom of the material bin have a dual role in the Self-Loading AutoWeigh. The valves close to provide a vacuum seal in the bin during loading and open to dispense material into the weigh chamber when the loading cycle ends. Continuous process accuracy will not be affected, even when a loading cycle halts dispensing in the middle of a batch. The controller "remembers" exactly where it was in the batch, and will restart from that point to dispense the correct amount of material.

SPECIAL FEATURES

To use one of these SPECIAL FEATURES, read about it first, then follow the directions on next page to make the proper changes.

To store RECIPES using the RECIPE storage feature, read:
Page 34, RECIPE key, and set 3rd digit in the FLG parameter to 1.

To blend a preset BATCH amount of material and then stop, read:
Page 36, BATCH key, and set 5th digit in the FLG parameter to 1.

To increase throughput, using the FAST key, read:
Page 37, FAST key, and set 4th digit in the FLG parameter to 1.

To TAG all material usage data with Work Order or Employee numbers for better tracking of material used, read:
Page 38, TAG key, and set 2nd digit in the FLG parameter to 1.

BATCH, RECIPE, FAST, and, TAG keys REQUIRE that you read:
Page 74, FLG parameters.

To change the MIXER RUN TIME, read:
Page 75, MIX Parameter.

To run a LOWER PERCENTAGE than 00.1 percent, read:
Page 77, _XT parameter.

To place UPPER LIMITS on the thumbwheel settings, read:
Page 81_SE Parameter.

To LOCK OUT others from changing the settings, read:
Page 48, (*78) - Changing the Password

To blend TWO NATURAL materials instead of Natural and Regrind, read:
Page 49, (*69) - the TWO NATURALS flag.

To TRACK MATERIAL usage, read:
Page 34, VIEW DATA, and Page 81, PRT Parameter.

To VERIFY ACCURACY of the entire system, read:
PRINTER OUTPUT and TROUBLESHOOTING sections.

READ the rest of the manual at your leisure to learn more about how your AUTOWEIGH BLENDER works and what else it can do.

KEYSTROKE SEQUENCE FOR THESE OR OTHER SPECIAL FEATURES

With STOP END OF CYCLE switch DOWN,

Turn POWER ON. Wait 5 seconds, until display says (x.x).
Press: * Display will say (PASSWORD)
Press: 22222 Display will say (P x.x)
This is the **PROGRAM MODE.**

To alter a PARAMETER: Press: PARA Key

Press repeatedly until the parameter you want is displayed.
If you pass it, use the * key to back up.
With the proper one displayed, enter the NEW parameter number.
Enter 5 digits; use leading zeros if necessary.
For correct entries, follow specific directions given in the PARAMETER section, starting on Page 71.
Press: EXIT when correct parameter has been entered.

To make a (*XX) entry:

Be in the PROGRAM mode, the same as above.
Display will say (P x.x)
Press: * Display will say (INSTR --)
Enter the 2 digit code.
For correct entries, follow specific directions given in the KEYPAD section, STAR FUNCTIONS, starting on Page 43.

Press: EXIT when correct information has been entered.
When finished, press EXIT again to exit the PROGRAM MODE.

CONTROLS AND OUTPUTS

1. POWER ON switch.

   Controls all power to the controller and all outputs. When power is switched off, battery backed-up RAM preserves all internal totals and parameters. All other functions are reset for normal start-up when power is restored.

2. STOP END OF CYCLE / CONTINUE switch.

   This is the PREFERRED STOP switch. This switch is wired in series with the level sensor. Turning it off breaks the signal to the computer the same as covering the level sensor with material. This stops the process at the end of a full cycle.

3. IMMEDIATE PAUSE / CONTINUE switch.

   Causes a computer-controlled immediate pause in the cycle. Dispenses will stop in mid dispense if necessary. When switched back to CONTINUE, the process continues without any error in amounts dispensed.

4. REGRIND thumbwheel switch (00 to 99.9).

   This setting represents the PERCENT of the ENTIRE MIX that is to be REGRIND.

   A lower limit of 5% (050) has been entered into the software. This limit may be altered using the keypad (see parameters).

   A setting of "99.9" causes the system to run 100 percent regrind. With this setting, no attempt is made to meter natural, color, or additive unless the regrind dispense fills less than ½ of the weigh bin.

5. COLOR thumbwheel switch (00.0 to 99.9)

   This setting represents the PERCENT of the NATURAL PORTION that is to be COLOR. For example, if your COLOR to NATURAL mix ratio is 1:25, then "04.0" is the proper setting. (1 pound of color to 25 pounds of natural is 1/25 = 4%).

6. ADDITIVE thumbwheel switch (00.0 to 99.9)

This setting represents the PERCENT of the NATURAL PORTION that is to be ADDITIVE. For example, if your ADDITIVE to NATURAL mix ratio is 1:100 then "01.0" is the proper setting (1/100 = 1%).

7. ALL AIR SOLENOID outputs.

This is a single 8 pin Amphenol plug located on the front of the control panel. This provides 110 volt power for the NATURAL, REGRIND, WEIGH BIN DUMP, and FLOW CONTROL (optional) air solenoids. On Models 140, 240, 440, 940 and 1840, (FOUR valve units), COLOR and ADDITIVE dispense valves are also powered. This power source is transistor driven and is protected by the ½ amp panel fuse.

Pin "A" = WEIGH BIN DUMP solenoid
Pin "B" = REGRIND solenoid
Pin "C" = NATURAL solenoid
Pin "D" = COLOR solenoid
Pin "E" = ADDITIVE solenoid
Pin "F" = FLOW CONTROL solenoid
Pin "H" = neutral line, all solenoids.

8. COLOR and ADDITIVE outlets.

Each outlet puts out 120 volts (220 volts outside U.S.A.) through internal plug-in solid state relays rated at 5 amps and fused at 3 amps. These relay outputs are designed to drive motors or other devices requiring power up to 3 amps each.

The COLOR outlet is driven based on the COLOR setting. The ADDITIVE outlet follows the ADDITIVE setting. COLOR dispense occurs first but has no effect on the ADDITIVE dispense. The amount of each dispense is calculated based on the NATURAL dispense that precedes them.

9. EIGHT CHARACTER DISPLAY

Displays the accumulated total bin weight, in grams, after each dispense. The display flashes when an inadequate dispense has occurred and the dispense is going to be retried. Other information displayed here includes material usage totals, internal parameters, current thumbwheel settings or keypad entered settings, and various information prompts to assist the operator.

####.# Numbers displayed are the total weight of material, in grams, in the bin at any time. The weight in the bin is updated only after an individual dispense is complete. During the dispense the displayed weight does not change.

P in the left most position indicates unit is in PROGRAM mode.

M indicates unit is in MANUAL mode.

R, N, C, A indicates the component being dispensed.

INVALID indicates:
1. you pressed an incorrect key,
2. you pressed a key for a function that is not active
3. you are not in the right mode for this key to operate.

PASSWORD is displayed when you press the "*" key from the normal mode. Enter "11111" for MANUAL mode or "22222" for PROGRAM mode or enter your own password number if you have established one.

SETTING, OPERATE, TIMED, VERIFY, and CALIBRATE are displayed when the respective keys are pressed from the manual or program modes. These displays are followed by pressing a device key; REG, NAT, COL, ADD, DUMP, ALARM, MIX, or HOLD.

FLASHING means that retries are occurring because the first dispense was not enough. Other error conditions also cause flashing.

ROM OK or ROM BAD indicates condition of ROM chip. See KEYPAD, *25 for explanation.

10. LED LIGHTS

The LED lights in two vertical columns (or horizontal rows) of eight located above the 8 character display indicate the following:

LEFT COLUMN (or top row):

1. REG Regrind dump solenoid operating.
2. NAT Natural dump solenoid operating.
3. COL Color drive relay operating.
4. ADD Additive drive relay operating.
5. DMP Dump valve solenoid operating.
6. ALM Alarm output operating.
7. MIX Mixer motor drive relay operating.
8. HLD Mixer flow valve is open (Optional).

RIGHT COLUMN ALARMS (or bottom row):

1. Alarm is on because Regrind ran out.
2. Alarm is on because Natural ran out.
3. Alarm is on because Color ran out.
4. Alarm is on because Additive ran out.
5. Alarm is on because Weigh Bin is not within limits.
6. C Color thumbwheel switches are locked out and the setting being used does not match the thumbwheel setting.
7. A Additive thumbwheel switches are locked out and the setting being used does not match the thumbwheel setting.
8. R Regrind thumbwheel switches are locked out and the setting being used does not match the thumbwheel setting.

(NOTE: Earlier panel fronts are silk screened incorrectly. C, A, and R are mislabeled R, C, and A.)

11. STROBE LIGHT AND BEEPER ALARMS

The Strobe light flashes and the Beeper sounds when NATURAL, COLOR or ADDITIVE fail to meter properly. Alarms begin after a preset number of retries have occurred. The number of retries before Alarm is determined by settings in the parameter table (see parameters). Regrind can also be alarmed.

12. ALARM SILENCE

This button stops the STROBE and BEEPER ALARMS. The continuation of the cycle to its proper completion will also stop the alarm. If the BATCH mode is in operation, this button starts the next batch.

13. LEVEL SENSOR INPUT

The high level sensor in the mixing chamber plugs into this outlet and signals the controller to start a dispense cycle when it is uncovered. The sensor must be uncovered for at least 2 seconds before a cycle will start (see DLY 00244 parameter). Once a dispense cycle is started, covering the sensor does not stop it. Operation continues until the cycle is complete.

14. MIXER MOTOR OUTPUT

This outlet is energized continuously when the MIXER SWITCH is ON (up). In the TIMED position, it stays energized for a time period following the dump of the weigh bin. You may adjust this time in the parameter table (MIX 03010). This time should be just long enough to provide adequate mixing. Mixing for a longer period may contribute to a static problem. Also, excessive mixing sometimes causes separation of pellets of different size and weight.

15. MIXER MOTOR ON/OFF SWITCH

The ON/OFF switch is provided as a safety so that you may switch the mixer off when you wish to clean out the mix chamber. In the UP position (ON), the mixer runs continuously. In the middle position (OFF) the mixer is off. In the down position, the mixer will run for a timed period following the dump of the weigh bin.

16. MIXER MOTOR FUSE

The fuse is rated at 3 amps and protects the mixer motor separately from all other fuses. On 200 and 400 series models, this fuse protects the mix motor directly.

17. LOAD CELL INPUT PORT

The system's two load cells are joined by a common connector that is plugged into this port.

18. PRINTER OUTPUT

This is a parallel printer port. A printer plugged in here allows four types of information to be ported directly to a printer giving the benefit of a permanent printed record. They are:

1. The totals of the material usage data.
   (Press VIEW and "*" keys or use the PRT parameter to AUTOMATICALLY and periodically print these totals).
2. A list of the internal parameter table.
   (Press *77 in the PROGRAM mode.)
3. A printout of information after each cycle including actual dispensed weights and percentages for every cycle.
   (Press *54 in the PROGRAM mode, use "*" to set printer flag ON.)
4. A printout of information after the TIME, CALIBRATE or VERIFY routines.

Any common parallel printer that you would use with a small PC computer may be used. Connect using a standard parallel printer connecting cable, (34 pin parallel centronix connector to a DB25 IBM compatible connector), available from us or at any computer store. There is a detailed explanation of this printout in the PRINTED OUTPUTS section of this manual.

19. COMPUTER INPUT / OUTPUT

If you choose to gather material usage data automatically and continuously by computer, then this connector allows for connection to any IBM PC type computer operating under the MS-DOS operating system.

The COMPUTER port is a DB9 (9 pin) male port. You will need a specially wired cable from us to connect to the serial output on your standard PC computer. You will also need software from us for communicating with your Weigh Scale Blender. Your computer operating system must be MS-DOS. This software allows downloading settings and retrieval of information and will produce extensive reports for those customers who wish to take advantage of this feature.

Either one or many Weigh Scale Blenders can be connected to one computer. Customers that wish to do their own programming may easily interact with the Weigh Scale Blender by way of a single program that we will provide. This program, when executed, gathers all current totals from all controllers and moves them into an ASCII text file for access by other software.

For multiple Weigh Scale Blender systems, or communication over long distances, an additional piece of hardware is required. All GB controllers are fully programmed to communicate with your computer now or at a later date.

20. PANEL FUSE FOR DUPLEX RECEPTACLE - 3 AMP

Fuses the common power wire of the duplex receptacle (the color and additive outputs). Since these outlets are only turned on one at a time, each is protected to the full 5 amp rating of the fuse.

21. PANEL FUSE FOR SOLENOID OUTPUTS - ½ AMP

Fuses the common power wire of the air solenoids and the relay coils. Since these outlets are only turned on one at a time, each is protected to the full ½ amp rating of the fuse.

22. INTERNAL FUSES

In-line fuses are provided internally to protect the power supply (½ amp) and the main 120 volt power cord supply (10 amps). If either of these fuses blow, an internal short circuit is indicated and we don't recommend that you try to fix it. Remember, this unit carries a three year warranty; just send it back.

The MIX MOTOR timed power source and the AUGER FEEDER OUTLETS are driven by internal solid state plug-in relays. A small 5 amp glass fuse is located to the right of each relay. A spare fuse is also located on the board if replacement is necessary.

23. KEYPAD - The KEYPAD is explained extensively in the next section.

KEYPAD

Keypad
- Summary Description
- Automatic Mode
- Manual Mode
- Program Mode

Explanation of Parameters

Parameters of Interest

KEYPAD - SUMMARY DESCRIPTION

Detailed explanations are given on the pages that follows:

AUTOMATIC OPERATION MODE: (normal operation on power up)
These keys are operational in this mode.

VIEW:	View Data: date, time, cycles, and lbs of Reg, Nat, Col, Add. Repeat pressing VIEW key to view all data. Press VIEW, * to print all data. At end press 00 to clear data.
RCP:	Enter and retrieve stored RECIPES.
BTCH:	Blend a BATCH. Set or view: Target Weight, Current Portion, Accumulated data. CE key will clear displayed field.
FAST:	Increase Output. Run rapid FAST cycles after a normal weighed cycle. Press * to toggle this function on or off.
TAG:	Tag a Work Order and Operator number to all reports.
EXIT:	This key is operational in ALL MODES. Press to EXIT any and all sequences.
CE:	Press to display the "raw signal" weight readout for 3 seconds.

MANUAL MODE: to enter, press: "*"; then enter (11111) or your own five digit password. These additional keys now are operational.

SET:	Observe current settings, set by thumbwheel or keypad.
OPER:	Operate all devices manually; open and close valves.
TIME:	Operate devices for a timed period.
VER:	Verify formula accuracy by dispensing only one component.
CAL:	Operate devices for a preset time period to learn the rate. **NOTE**: With above five keys, you must also press one DEVICE key: NAT, REG, COL, ADD, DUMP, ALARM, MIX or HOLD.
ZERO:	Zero the tare weight with the bin empty.
FULL:	With bin loaded, enter gram weight to calibrate load cells.
*00	Clear DATA fields.
*99	Set flag to enable weight calibration of load cells.

PROGRAM MODE: to enter, press: "*"; then enter (22222) or your own five digit password. All MANUAL operations plus these additional keys now are operational.

SET: Enter settings using keypad; locks out thumbwheel use.
PARA: View or change system constants and parameters.
STAR FUNCTIONS: Press * and two numbers for the following functions:

*12	Move parameter table from ROM to RAM.
*23	Move parameter table from RAM to EEPROM.
*32	Move parameter table from EEPROM to RAM.
*66	Enter an I.D. number for this GB (1-255).
*11	Enter current DATE and TIME into the real-time clock.
*89	Select readout of data: grams, kilograms, ounces, or pounds.
*77	Obtain printed copy of all internal parameters.
*45	Change PASSWORD for MANUAL mode.
*78	Change PASSWORD for PROGRAM mode.
*25	Check ROM OK flag. "CE" to clear error flag.
*98	Set flag for continuous raw signal readout.
*87	Set flag for VOLUMETRIC operation.
*54	Set flag to send each cycle information to printer.
*69	Set flag to treat regrind as a second material
	Use "*" key to select readout or toggle flags ON or OFF.

KEYPAD - DESCRIPTION OF FUNCTIONS

Three (3) operation Modes are available: AUTOMATIC, MANUAL, PROGRAM.

KEYPAD - AUTOMATIC OPERATION MODE

This is the NORMAL operating mode. When power is turned on, the unit is in this mode. Automatic dispensing occurs ONLY in this mode. The AUTOMATIC mode is indicated by the ABSENCE of the letter "P" or "M" at the left end of the display.

Only the VIEW, RECIPE, BATCH, FAST, INFO, CE AND EXIT keys are available in this mode. These keys operate only BETWEEN cycles or when the PAUSE switch is on. To stop between cycles, use the "OFF AT END OF CYCLE" switch.

VIEW DATA: (VIEW)

Press to display the CURRENT Date and Time, LAST CLEARED date and time, and stored material usage data. Six totals are available: (in Pounds, Kilos, Grams, or Ounces).

Number of CYCLES that have occurred:	(CY = #####)
Weight of REGRIND that has been dispensed:	(R = #####)
Weight of NATURAL:	(N = #####)
Weight of COLOR:	(C = #####)
Weight of ADDITIVE:	(A = #####)
Total weight of ALL materials:	(T = #####)

Each successive press of the VIEW key displays the next total. The last displayed line will say (00=CLEAR) for 5 seconds. During this time, you may press 0,0 to clear the data. Waiting 5 seconds or pressing any other key will exit the sequence. When the sequence is exited, normal automatic operation resumes. These totals may be displayed as pounds, grams, kilograms, or ounces by a selection procedure explained later (*89).

Press the VIEW key once followed by the "*" key to cause all information to be sent to the printer (if available). To then clear the data, press 00 within 5 seconds. Press any other key or, wait 5 seconds, to continue the process without clearing the totals.

RECIPE (RCP):

This key allows you to LOOK at, RUN, and SAVE RECIPES. To SAVE a recipe you must be in the PROGRAM mode. Recipes are thumbwheel switch settings. 100 recipes may be stored, numbered 00 to 99.

This key is NOT FUNCTIONAL unless the 3rd digit of the "FLG" parameter is set to 1 (xx1xx). To do this, see the SOFTWARE MAINTENANCE section, PARAMETER TABLE, "FLG".

In normal Automatic mode: Press RCP key. If no RECIPE is currently in use, display says (GET ____). If a RECIPE is currently in use, then display will flash through the current stored data:
(RCP ___), (R = XX), (C = xx.x), (A = xx.x)

Press CE to CLEAR CURRENT RECIPE and return to thumbwheels.

Press RCP to look at another recipe. Display = (GET ___). Enter 2 digits to retrieve one of 99 recipes. Display will flash through the current stored data:

(RCP ___), (R = xx), (C = xx.x), (A = xx.x), (*TO LOAD)

Press * to LOAD this recipe into memory. Routine will exit automatically.
Press RCP or EXIT to return to the display (GET ___).
Press RCP or EXIT again to exit.

To SAVE a RECIPE you must be in the PROGRAM mode. If you press RCP key again after display of (GET ___), display says (SAVE ___). Enter 2 digits, display will say (SAVING). The current settings are saved into memory under the recipe number you have entered. These are normally the THUMBWHEEL switch settings.

CAUTION: If settings have been entered by KEYPAD or RECIPE, then these are the ones that will be saved. Therefore, when saving a recipe, be certain that no other recipe is currently loaded, and that no keypad-entered settings are currently loaded. The lower right corner of 3 LEDs should be off indicating thumbwheels are being read.

Routine will EXIT automatically. EXIT will exit at any time.

When a RECIPE is loaded, three LEDs, bottom row, last three, will light indicating that the thumbwheel settings do not represent the settings that are being run by the controller. Whenever internally stored settings are not the same as the thumbwheel settings, these three LEDs will light to indicate this condition. These LEDs correspond to REG, COLOR, and ADDITIVE settings respectively.

NOTE: To allow the operator the ability to stop running any single component, a thumbwheel setting of all ZEROS (00.0) is still accepted as valid and will override any setting that has been entered by a Recipe. If you do not want this override option, enter a 1 as the first digit in the SE parameter (__SE 1xxxx). See PARAMETERS; SE.

BATCH (BTCH): This key allows you to blend a PRE-SELECTED WEIGHT of material, and then STOP running and sound the ALARM. The process may also be programmed to sound the alarm but continue running. Since each cycle will always blend a full weigh bin amount, the total amount blended may exceed the target batch weight by up to one cycle's blend weight.

This key is NOT FUNCTIONAL unless the last digit of the "FLG" parameter is set to 1 or 2 (xxxx1). To do this, see the SOFTWARE MAINTENANCE section, PARAMETER TABLE, "FLG".

The ALARM SILENCE button on the side of the controller, is the ONLY way to CONTINUE OPERATION after a BATCH amount has been run

Assuming a proper "FLG" parameter is set:
Press the BTCH key once to view the desired BATCH WEIGHT.
Display will say (BW #####).
BATCH WEIGHT is the amount you wish to dispense before stopping and/or sounding the alarm.

Press again to view the CURRENT PORTION, of the batch, that has been dispensed.
Display will say (CP #####).
CURRENT PORTION shows how much has been blended so far.

Press again to view the ACCUMULATED TOTAL weight of all batches dispensed.
Display will say (AT #####).
ACCUMULATED TOTAL is the sum weight of all batches that have been blended. This number will continue to grow until it is manually cleared to zero, or it exceeds its maximum possible value.

Press again to view the total BATCH COUNT.
Display will say (BC #####).
BATCH COUNT is the total number of batches that have run. This number will continue to grow until it is manually cleared to zero, or it exceeds its maximum possible value.

Press again to return to normal operation.

When any of the above totals are being displayed. you may press the CE key to RESET that number to zero. While all four totals can be cleared to zero manually, only a BATCH WEIGHT number can be entered manually.

When the BATCH WEIGHT is being displayed, you may enter a NEW batch weight using the keypad. You must enter a 5 digit number with leading zeros, if necessary. Maximum number that can be entered is "59999".

The unit of weight that will be used is either POUNDS or KILOGRAMS as determined by the *89 option, explained later.

While in operation, when the total is reached, the system will alarm and stop blending if the FLG parameter is set to 00001. The system will alarm but CONTINUE running if the FLG parameter is set to 00002.

Use the ALARM SILENCE button (on the side of the controller) to silence the alarm. Pressing the BTCH KEY to view the information will also silence the alarm.

If the system is programmed to STOP at the end of a batch, the ALARM SILENCE button MUST be pressed to start blending the next batch.

The EXIT key will exit the BTCH sequences at any point but will NOT cause the system to start a new batch.

FAST (FAST): (Formerly REPT)

This key will allow you to exceed the normal blending rate of your unit. Once your system has learned proper flow rates of each material, the timing of each component dispense is very consistent cycle to cycle. The FAST key allows one or more FAST REPEAT cycles to follow a normal calibrated cycle. In a FAST REPEAT cycle all components are dispensed simultaneously, without any weights being taken. Errors in dispense amounts will not be detected. These are, in fact, volumetric dispenses, not gravimetric. These dispenses take much less time. Throughput is easily doubled in this manner.

This key is NOT FUNCTIONAL unless the 4th digit of the "FLG" parameter is set to 1 (xxx1x). To do this, see the SOFTWARE MAINTENANCE section, PARAMETER TABLE, "FLG".

The shorter mixing time may be a problem. So the number of FAST REPEAT cycles is kept as low as possible. Up to 4 repeats may occur.

Press the FAST key to toggle the FAST flag ON or OFF. When set to (FAST OFF) the FAST mode will not operate. When set (FAST ON) every normal calibrated dispense will be followed by up to 4 FAST repeat dispenses.

Press * to toggle between (FAST ON) and (FAST OFF). Press EXIT, to exit.

When the REPEAT mode is in operation, the display (FAST) will flash intermittently.

TAG: This key (third row, third key) allows three pieces of information to be "tagged" onto all data that is either printed or retrieved through the computer port. The items are WORK ORDER, OPERATOR and RECIPE number.

This key is NOT FUNCTIONAL unless the 2nd digit of the "FLG" parameter is set to 1 (x1xxx). To do this, see the SOFTWARE MAINTENANCE section, PARAMETER TABLE, "FLG".

Press once to display the current Work Order number (WO-----). Press again to display the current Operator number (OPRTR---). Press again for the Recipe (RECP ---). You may enter or change any of these numbers when each is displayed.

These numbers are for your TRACKING of information ONLY. They have NO EFFECT on the operation of the Weigh Scale Blender.

WORK ORDER number (6 digits) allows you to tag all information with an internal accounting number such as a job or purchase order number.

OPERATOR number (3 digits) allows you to track who is operating the equipment.

RECIPE number (3 digits) allows you to track what recipe you are using. The number will be a 2 digit number if a recipe is being run that resides in the controller RAM; one that was entered using the RECIPE key. If a recipe has been entered using our MLAN software, through the computer port, then a 3 digit number will be displayed. In any case, the number in this field will be displayed and "tagged" to all printouts and retrievals.

EXIT will exit the sequence at any point.

EXIT: Operational in ALL MODES to exit ALL keypad sequences.

CE: Press "CE" at any time to display raw data readout of the load cells for five seconds. This is helpful in diagnosing possible load cell problems and is explained in detail in the MAINTENANCE section.

Holding the "CE" key down while turning POWER ON will perform a "CLEAR". See page 89.

KEYPAD - MANUAL MODE

In this mode, you may operate individual functions manually for test purposes. Calibration of Load Cells is also possible. No totals are saved and automatic operation does not take place. The low level sensor has no control or effect over manual operation repeats.

The Row of keys marked SET, OPER, TIME, VER, and CAL operate in this mode coupled with the Column of keys marked REG, NAT, COL, ADD, DMP, ALRM, MIX, and HOLD. The ZERO and FULL keys allow Load Cell calibration.

You can enter this mode only when the controller is between cycles. The sensor must be covered or the sensor control switch must be in the "OFF AT END OF CYCLE" position. When in this mode, no automatic dispensing occurs.

TO ENTER THIS MODE: press "*", then enter the correct password number. The correct password supplied with the unit is "11111". You may change this to any other 5 digit number if you wish as explained later (*45). When in the MANUAL MODE, the letter "M" shows at the left end of the display.

The following manual functions are available in the MANUAL mode.

SETTING (SET): Press once followed by one of 3 keys: REG, COL, or ADD. The current thumbwheel setting is displayed. If, while in the program mode, the keypad was used to enter this setting then it will not match the thumbwheel setting. EXIT will exit the sequence.

OPERATE (OPER): Press once followed by one of 8 keys: REG, NAT, COL, ADD, DUP, ALM, MIX or HOLD. The selected output operates until the key is pressed again or another output is selected. Only 1 output will be active at a time. EXIT will exit the sequence and close all outputs.

TIMED (TIME): Press once followed by one of 4 keys: REG, NAT, COL, or ADD. A time in interrupts is requested; (TIME ---). Three digits must be entered specifying a dispense time up to 999 interrupts (about 4 seconds max.). CE will cancel entry before last digit is entered. Following a full 3 digit time entry, the specified output is activated for the time requested. After the dispense is weighed, the dump valve automatically operates to empty the weigh bin. If a printer is on line and the Print flag is ON, then output information will be printed. EXIT will exit the sequence.

CALIBRATE: (CAL) (RATE) Press once and then press one of 4 keys: REG, NAT, COL, or ADD. A dispense will occur for 2 seconds. If the amount dispensed is less than 50 grams, a second dispense will occur for 20 seconds. Using the resulting weight and time, the processor calculates a proper beginning point dump rate for the start of production blending. After each dispense is weighed, the weigh bin dump valve automatically operates to empty the weigh bin. If a printer is on line and the Print flag is ON (see KEYPAD *54), then output information will be printed. EXIT will exit the sequence.

If the display say (DO AGAIN), press any key to cause the process to repeat itself. If the display then says (NO GOOD), the weight dispensed was below 5 grams, not enough for a valid calibration.

During initial operation, after each power up, the blender calibrates itself completely automatically, regardless of how far off the initial flow rate may be. This may take several cycles. During normal operation, calibration correction occurs continuously.

Since this unit adjusts flow rates automatically, manual Rate Calibration is not necessary for proper operation.

ZERO WT (ZERO): THIS HAS BEEN DONE AT THE FACTORY. IT SHOULD NOT BE NECESSARY FOR YOU TO DO THIS AGAIN.

Press the ZERO key once to set the displayed gram weight of the empty bin to zero. BE SURE the load cells are plugged into the controller. Be sure the bin is properly in place and EMPTY when this key is pressed.

For this key to function, you must first set the weight calibration flag ON. Press *99 to observe flag status. Press * to toggle flag ON or OFF. With flag set ON, press EXIT. Power off always resets this flag to OFF.

Since the bin, even when empty, weighs about 1300 grams, it is necessary on initial setup of equipment to instruct the controller of the exact tare weight of the empty bin.

Slight drift in the tare or zero weight during day to day operation is normal. All weight calculations automatically compensate for this drift. However, when the bin is empty, if the weight displayed is more than 50 grams above or below zero, then you may wish to reset the electronics to display zero when the bin is empty.

If, when the bin is empty, the weight displayed is greater than 100, or less than -50, (Parameters TH and TL), the dispense cycle will not begin. Instead, the dump valve will repeatedly try to dump any material it thinks is in the bin or will sound the alarm if weight is below -50. If the load cell calibrations have drifted this far, it is absolutely necessary to reset empty bin weight to zero.

If weight readings drift steadily in one direction, allow system to warm up before setting ZERO or FULL weights.

Generally, when zero weight shifts, the full weight reading shifts the same amount. For this reason, resetting the ZERO WT will automatically shift the FULL WT readout by the same amount. Resetting the ZERO weight usually is all that is necessary.

FULL WT (FULL): THIS HAS BEEN DONE AT THE FACTORY. IT SHOULD NOT BE NECESSARY FOR YOU TO DO THIS AGAIN.

ZERO WT. must be entered before FULL WT to achieve proper calibration. The FULL WT key will not function until you have set ZERO WT as described above.

If you wish to reset the controller for proper full-weight scale display, use any known weight as close to design full weight as possible (1000, 2000, 4000 or grams). Place this weight in the bin and press the FULL WT key. The display will show four dashes (FULL ____). Now enter the actual weight in grams of the item you are weighing.

AGAIN, both FULL WT and ZERO WT have been set at the factory. A drift of several grams from these settings is normal and should not be of any concern. Recalibration should be considered only if ZERO is more than 20 grams off or FULL WT is more than 50 grams off. These errors do not prevent proper proportions from being dispensed. ZERO error is always "tared" for proper weighing of each component. FULL scale error will only cause accumulated totals to be off by the degree of this error. The primary function of the WEIGH SCALE BLENDER is to dispense materials in the proper ratios. Because all components are weighed by the same load cells, the accuracy of these ratios is not affected by zero or full scale errors.

STAR FUNCTIONS available in this mode.

*00	Press (*,0,0) to CLEAR ALL DATA fields. These are the material usage totals that are viewed with the VIEW key. If you are tracking material usage, you should record these numbers and reset them to zero at least once a week. After VIEWING the data or printing of data using the VIEW, * key sequence, a display of (00=CLEAR) will appear for 5 seconds. At this point you may reset all data fields to zero by pressing 00. Pressing any other key will exit this sequence without clearing data.
*99	Press (*,9,9) to set flag to enable Weight Calibration of the Load Cells. This flag must be ON before the load cell weight calibration keys, ZERO and FULL WT, will function. Use the * key to toggle flag ON or OFF. Power On will always set this flag to OFF. Press EXIT when desired flag status is displayed.

KEYPAD - PROGRAM MODE

In this mode, you may perform ALL of the functions available in MANUAL mode, plus additional functions that alter the logic with which the controller operates.

The PARA (PARAMETER) key operates in this mode. The SET key has additional functions. STAR FUNCTIONS are available by pressing the * key and two numbers.

Just as with the MANUAL mode, you can enter this mode only when the controller is between cycles. The sensor must be covered or the sensor control switch must be in the "OFF AT END OF CYCLE" position. When in this mode, no automatic dispensing will occur.

TO ENTER THIS MODE: press "*", then enter the correct password number. The correct password supplied with the unit is "22222". To change this to another 5 digit number of your choice, see (*78). When in the PROGRAM mode, the letter "P" shows at the left end of the display.

The following PROGRAM functions are available in the PROGRAM mode.

SETTING (SET): Press the SET key once followed by one of 3 keys; REG, COL, or ADD. The current thumbwheel setting will be displayed. If the keypad, or a computer, was used to enter this setting then it may not match the thumbwheel setting.

A new setting may be entered at this time by keypad if so desired. (CE will cancel entry before last digit is entered.) Settings entered by keypad CANNOT BE ALTERED by the thumbwheel switches. After entering a setting by keypad, verify this by rotating the appropriate thumbwheel switches. An LED will light indicating that the internal setting being used by the computer does not match the thumbwheel switches.

The display of a setting followed by pressing the "CE" key, will revert that setting back to the thumbwheel control and will also exit the sequence. EXIT will exit the sequence.

This function will positively fix the settings so that the thumbwheel switches have no control and no one can change them without authorization. An LED will light indicating this override condition. The LED will be lit ONLY when the thumbwheel setting does not match the internal setting.

To allow the operator the ability to stop running this component, a setting of all ZEROS (00.0) is still accepted as valid and will override any setting that has been entered by keypad. If you do not want this override option, enter a 1 as the first digit in the SE parameter. See PARAMETERS, __SE.

To later return to thumbwheel control, use the same procedure as above except instead of entering a setting, press the "CE" key when you see the setting displayed.

PARAMETERS: (PARA)

Press the PARA key to display the table of operating parameters that reside in memory. There are more than 60 parameters, and each successive press of the key displays the next parameter in the table. Pressing the "*" key allows you to back-up in the table. You may change a parameter by entering a new number over the old one. CE will cancel a number entry before the last digit is entered. Parameters are explained elsewhere in this manual. EXIT will exit the sequence.

STAR FUNCTIONS

*12

Press (*,1,2) to move the PARAMETER table from ROM to RAM. This allows system to operate with the parameters that were originally supplied as default numbers with the system.

EXPLANATION: All PARAMETERS are stored in a table that resides in three places: ROM, RAM, and EEPROM.

ROM stands for "Read Only Memory." This memory portion of the circuit board cannot be altered in any way except by physically replacing this chip on the board. It contains the program and the copy of the parameter table that we supply as standard with all controllers.

EEPROM stands for "Electrically Erasable Programmable Read Only Memory." This memory portion of the circuit board can be altered by the computer by special request only, and data stored here is not lost even if the battery backed up RAM should lose power. It contains all parameters and control numbers that are unique to your system. At the factory we have set what we believe to be the proper parameters for your application into the EEPROM.

RAM stands for "Random Access Memory." It is the memory portion of the circuit board that would go blank if power were removed from it. We have provided a battery back-up for the RAM so this should never be a problem. On normal power off and power on, the data and parameters that reside in RAM are not lost. However, RAM is the portion of memory most easily corrupted due to unforeseen circumstances in the poor electrical environment of a factory. Should some unforeseen circumstances cause the data in RAM to be corrupted or lost, a CLEAR-RESTART procedure is provided that will retrieve the parameter table stored in the EEPROM and copy it into RAM memory for use. If you make changes to the PARAMETER table, these changes reside only in RAM and may be lost in the event of an unforeseen computer malfunction. To insure that your changes are saved for future runs, it is necessary to move this information from RAM to the EEPROM.

NOTE: The battery used for backup is a lithium battery that is part of an I.C. chip on the board. It has an expected 10 year life and is not easily accessible for replacement. Should it fail, we suggest that it be replaced at our factory.

23 Press (,2,3) to move the PARAMETERS table from RAM to EEPROM. This information is then available for retrieval using the CLEAR routine (press CE key on Power Up) or by using the *32 function described next.

32 Press (,3,2) to move EEPROM information to RAM. This is useful for retrieving correct information that you may have stored earlier in the EEPROM. Also, if you have been making changes to RAM tables and now wish to restore all parameters to what they were at power up, this is the function to use.

66 Press (,6,6) to enter an identification number for this particular weigh scale blender. This I.D. number will appear on all printed reports. If you have more than one unit, this helps to identify reports. If you are using a computer to automatically gather data, then each controller must have a unique address. Valid numbers are 000 to 255. They need not be consecutive. When units are connected to a computer, do not use the number 000 for identification.

*11

Press (*,1,1) to enter the correct date and time into the real-time clock. Correct date and time is helpful if you are retrieving information using a printer or are collecting data by computer. Six entries will be requested.

The first display will indicate USA or EUROPE date format. USA will cause all dates to be displayed MONTH/DAY/YEAR. EUROPE will cause all dates to display DAY/MONTH/YEAR. Use the CE key to toggle from one to the other.

The remaining five entries are two digits each; MONTH ___, DAY ___, YEAR ___, HOUR ___, and MIN ___.

Use the * key to step through all displays without change, enter new settings where required. The correct date and time have been entered at the factory and should never have to be reset. Of course you may be in a different time zone.

*89

Press (*,8,9) to select the desired weight unit (GRAMS, KILOGRAMS, OUNCES, POUNDS) for readout of data. Systems in the U.S.A. are supplied with POUND readout selected. KILOGRAMS is preferred for nearly all countries outside the U.S.A. GRAM or OUNCE readout is appropriate only for very short runs or short demonstrations. Use the * key to walk through the four possible selections. Press EXIT when the weight unit you want is displayed.

*77

Press (*,7,7) to print a copy of all internal parameters. A printer must be connected and ready. Four columns will print since parameters reside in four different locations in memory: RAM; ROM, both GB-2 and GB-9 tables; and EEPROM. Identifying headings print above each column.

*45

Press (*,4,5, followed by a 5 digit number) to change the PASSWORD number for entering the MANUAL mode. The system is supplied with the number "11111" as the password number. If you wish to restrict use of this mode to only yourself, you may make up your own number and enter it here.

*78

Press (*,7,8, followed by a 5 digit number) to change the PASSWORD number for entering the PROGRAM mode. The system is supplied with the number "22222" as the password number. If you wish to restrict use of this mode to only yourself, you may make up your own number and enter it here.

If you forget your password number, call us for help.

*25

Press (*,2,5) to check the ROM CHECK flag. Whenever your controller is on, the processor is continuously performing an integrity check of the ROM program chip supplied with the unit. Each complete scan of the program takes about one minute. If any single check reveals an incorrectly set bit, the ROM CHECK flag is turned on. This flag is checked every time you power up. If the flag has been set the display will say (ROM BAD), followed by the date and time of the last check that was found bad. If the flag has not been set, (ROM OK) will be displayed. To turn the flag off, you must select this option, (*25), and, with (ROM BAD) displayed, press the "CE" key. This will clear the flag and it will remain off until another error is detected. The seriousness of the problem will be somewhat indicated by the date and time of the last bad check and how frequently you find it necessary to turn this flag off. Even with an error, your controller may still work perfectly. However, we suggest you request a new program chip from us as soon as possible.

*98

Press (*,9,8) to set flag for raw signal readout in place of gram readout of scale weight. A raw signal readout is useful to demonstrate the extreme sensitivity of the load cells. The raw signal readout bypasses calibration math. Load cell function can be monitored without concern for any improper weight calibration that may have been done.

Use the * key to toggle flag ON or OFF. Power On will always set this flag to OFF. Press EXIT when desired flag status is displayed.

During normal operation, pressing the "CE" key will cause raw signal readout to be displayed for 5 seconds.

*87

Press (*,8,7) to set flag for operation in a VOLUMETRIC mode. With this flag ON (VOLUMETRIC mode), the load cells are completely ignored. Error correction and rate recalibration does not take place. The unit functions like a volumetric feeder without checking or correcting for errors. Since load cell readings are ignored, this flag allows operation even if the load cells become damaged. Dispense times will be based entirely on the WT and TI parameters.

Use the * key to toggle flag ON or OFF. Power On will always set this flag to OFF. Press EXIT when desired flag status is displayed.

*54

Press (*,5,4) to set flag for a printout of data after each full dispense cycle. With this flag ON and with a printer on line, four lines of information about the dispense cycle that just occurred will be sent to the printer. This information includes dispense weight and percentage of each component, the internal rate numbers used by the computer to determine dispense time, and the actual dispense time of each component. This is excellent information to track the accuracy of each dispense cycle and the accuracy of the entire system over an extended period of time. A more detailed explanation of this information is in the PRINTER OUTPUT section of this manual.

Use the * key to toggle flag ON or OFF. Press EXIT when done.

*69

Press (*,6,9) to set flag to treat the "REGRIND" dispense as a SECOND NATURAL material.

With the flag OFF, Natural is calculated to fill the space remaining in the weigh bin after a Regrind dispense has occurred. In other words, when a reduced amount of Regrind is dispensed, additional Natural is dispensed. Color and Additive dispenses are calculated as a percentage of this Natural dispense ONLY.

With the flag ON, Natural is calculated to maintain the proper RATIO between the two components (Natural and Regrind). Color and Additive dispenses are calculated to add to BOTH components at the requested ratios.

"Regrind", in the normal sense, is not added. Instead, this component is treated as another "Natural" material. If the ratio of the two naturals is not 50/50, place the HIGHER volume component in the "regrind" side. Set the "regrind" thumbwheel for the percentage that the "regrind" side is of the combined mix. For example; Natural A and B are to be used at a 20/80 mix ratio; B is the greater at 80 percent. Put component B in the regrind side and set the regrind switch for 80 percent.

NOTE: The Regrind alarm parameter (RAL) is automatically set to a number that forces retries and stops the system when this component runs out. See PARAMETERS, RAL-00004.

Use the * key to toggle flag ON or OFF. Press EXIT whe desired flag status is displayed.

*44 This flag for SPECIAL APPLICATIONS ONLY.

Press (*,4,4) to tell the controller to end a cycle when the weigh bin is FULL. Use the * key to toggle between (END EMTY) or (END FULL).

Normal operation is to end the cycle EMPTY. The (END FULL) option is ONLY for SPECIAL installations where the sensor has been relocated BELOW the mix chamber and the purpose of the unit is to calculate exact material usage rates in order to control an extruder.

Leave this flag set to (END EMTY), unless you have specific instructions to do otherwise.

*72 This flag for SPECIAL APPLICATIONS ONLY.

Press (*,7,2) to change the Color and Additive settings to be interpreted as percent of the entire MIX instead of percent of the Natural. The display will say (APM -OFF). Press "*" to toggle flag to (APM -ON). (APM stands for Additives Percent of Mix). This option has been added for a customer with a unique requirement.

Leave this flag OFF, set to (APM -OFF), unless you have specific instructions to do otherwise.

CAUTION: With this flag set, Color and Additive settings combined must NOT exceed 100 percent. From a practical stand point, they should not exceed 20 percent combined.

BRIEF EXPLANATION OF PARAMETERS

All WEIGH SCALE BLENDER controllers operate according to certain internal parameters. Because customer requirements vary widely, we have made over 60 parameters accessible for change through the keypad.

BRIEF explanations are given here. See the SOFTWARE MAINTENANCE section for complete information.

FLG	**This parameter turns on the RECIPE, BATCH, REPEAT, and TAG keys.** These keys will NOT WORK unless you set this parameter. The RECIPE key is for storing up to 99 recipes. The BATCH key allows for filling a barrel or gaylord. The REPEAT key allows a higher output mode. The TAG key adds certain information to all printouts. See KEYPAD section, for full explanations of these 4 keys.
RAL NAL CAL AAL	**These parameters set ALARM functions.** When material runs out, or does not dispense fully, these flags instruct the controller what to do. Default settings are for Natural, Color, and Additive to alarm but not Regrind.
MIX	This parameter times how long the MIX motor runs and the INTERVAL between jogs of the mix blade. The default is set to 03010; 10 seconds of mix followed by a short jog every 30 seconds.
FCV	This parameter is the TIME the flow control valve delays before opening. This is only for units equipped with the optional flow control valve under the mix chamber.
DTI	This parameter times how long the weigh bin dump valve opens to empty. No change is required.
KDF	This parameter controls sensitivity of weight readings during calibration of load cells. No change is required.
WDF	This parameter controls sensitivity of weight readings during normal operation. **If excessive vibration interferes with weight readings you may want to increase this number.**
BER	This parameter controls sensitivity of the emergency "bailout" routine that prevents overfilling of the weigh bin. No change is required.
CXT AXT	**These parameters allow entry of less than (00.1) percent for COLOR or ADDITIVE.** When set to "00010" settings are read as x.xx percent. When set to "00100" settings are read as .xxx percent.
ROC	This parameter indicates the PERCENT of REGRIND that will be treated as natural when the COLOR and ADDITIVE dispenses are calculated. This adds some color or additive to your regrind.
ROV	For closed loop fully automatic reprocessing of regrind scrap, this parameter will detect when more regrind is being produced than consumed, and automatically override the current setting to use a higher amount. This prevents the problem of material backing up in your grinder.

RHL	This parameter has effect only if additional sensors are added to your unit to detect material level in the regrind hopper. These sensors can alter regrind usage.
FUL	This is the FULL target weight that is blended each cycle. Change only for extremely fluffy or very heavy material.
MAX	This parameter prevents overflowing of the weigh bin. It is reset automatically if the FUL parameter is changed.
TL, TH	These are the lowest and highest TARE weights that are accepted for processing to begin. TL prevents starting with the weigh bin out of place. No change is required. Change TH only if clumps of material hang up in the weigh bin.
PRT	**This parameter will cause your system to PRINT MATERIAL TOTALS automatically.** A printer must be connected.
RSE, NSE, ASE	**These parameters allow you to SET UPPER LIMITS to the thumbwheels.** For color and additive, this may help ensure that expensive material is not wasted.
RLO	This parameter sets a LOW limit to 5 percent to the REGRIND setting. No change is required.
DLY	This parameter is the time that the sensor must be uncovered before a cycle will begin. No change is required.
LT1, LT2	These are timers for loaders. Since loader outputs are not yet available, leave them set to zero.
RPT, NPT, CPT, APT	These parameters reduce the first try dispense for special applications. Leave them set to zero.
	The following six parameters are set when RATE CALIBRATIONS are done and change AUTOMATICALLY during normal operation. __WT Weight portion of the flow rate calibration. __TI Time portion of the flow rate to the calibration routine. __MI Minimum acceptable flow rate to the calibration routine. __NC Acceptable error range, prevents hunting. __RP Percent error that forces a retry. __RD Weight error that forces a retry.
RLA, NLA, CLA, ALA	These parameters state the lag time between when a device is signaled and when it actually begins to operate. Change ONLY if you change to non-standard equipment.
PRC	Maximum Percent Rate change that can be forced by the error correction routine. No change is required.
STL	The time allowed for material to SETTLE in the weigh bin before a weight is taken. No change is required.

LCL, LCH, LCF, LCZ	These parameters relate to the characteristics of the LOAD CELLS mounted on your blender. **DO NOT CHANGE THEM.**

PRINTER OUTPUTS

Monitoring System Accuracy
Special Tests
Material Usage Information

MONITORING SYSTEM ACCURACY

The best way to monitor system accuracy is to connect a printer to the printer port and turn the printer flag ON (KEYPAD section, *54). The printer will then automatically print full output information after every cycle.

When the printer flag is ON, the controller will output a single heading line at the top of each page and 4 information lines to the printer at the end of each cycle. This adds several seconds to each cycle time. To turn the printer flag on:

Press:	*	Display will say:	(PASSWORD)
Press:	22222	Display will say:	(P x)
Press:	*54	Display will say:	(PRNT OFF)
Press:	*	Display will say:	(PRNT ON)
Press:	EXIT	Display will say:	(P x)
	EXIT	Display will say:	(x)

Any common parallel printer that you would use with a small PC computer may be used. Connect using a standard parallel printer connecting cable, (34 pin parallel centronix connector to a DB25 IBM compatible connector), available from us or at any computer store.

The printout after a normal cycle looks like this:

```
                **REG  20** **NATURAL** **COL 04.0** **ADD 01.0** TOTAL

                * 03/27/90 * * 16:34:40 * * ID# 003 *  ********** *******
FINAL: DISP, %  400.0  20.0  1523.8        60.9   4.0   15.2   1.0   2000.0
RATE: GR/TIME   29823  976   33000   976  10240  31232  10240  31232
1ST DISP. TIME   302.1  130  1488.3   440   60.9   1857   15.2   463
```

Heading Line: Designates columns for each component information and includes the current thumbwheel settings. This line prints at the top of each page, and prints when a setting is changed.

Date Line: Current DATE, Current TIME and ID# for this controller.

Final: Actual final dispense weight and percent, each component. Example: For Regrind as shown above; 400 grams was the final weight dispensed. This is 20.0 percent of the final mix weight of 2000 shown in the TOTAL column.

Rate: Dispense Rate: 1/10th grams / interrupts.
Example: For Regrind as shown above; 29823 976
29823 = 2982.3 grams
976 interrupts = 4 seconds; (244 interrupts = 1 second)
The computer will use this dispense rate to calculate the time for the next dispense. For example, if 400 grams are required to be dispensed next cycle, then a dispense time of 130 interrupts will be computed:
400 x 976 / 2982.3 = 130.9 (130 interrupts)

1st Disp, Time: Actual dispense WEIGHT and TIME for last cycle on the FIRST try only. If retries occur, they are not added in.
Example: Regrind shown above; 302.1 130
The actual weight dispensed on the first try = 302.1.
The actual dispense time that was used = 130 interrupts.
If additional retries had occurred, these numbers would not equal the final dispense weight shown in the FINAL line. This does, however, represent the dispense weight, and time, that recalibrations are based on.

SPECIAL TESTS

If you are running special tests in the MANUAL or PROGRAM mode, a printout will automatically occur after each test provided the PRINT flag (*54) is turned on.

Special tests that produce printouts are TIME, CALIBRATE, or VERIFY.

TIME (See KEYPAD, MANUAL MODE, TIME for more information)

The TIME function is to determine lag times of different metering devices. It also allows testing of device repeatability. The printout looks like this:

```
TIME   NATURAL  123          274.9
                 ^Dispense time (in interrupts; 244 = 1 sec.)
                              ^weight dispensed
```

CALIBRATE (See KEYPAD, MANUAL MODE, CALIBRATE for more information)

The CALIBRATE function allows the controller to rapidly learn the flow rate of the device. It automatically sets the WEIGHT and TIME parameters that determine metering rate, and the MINIMUM RATE parameter. For more information see PARAMETERS, __RA, __TI, and __MI.

```
CALIBRATE NATURAL   732    2079.5 15     346.5
                    ^Dispense time
                           ^weight dispensed
                                  ^lag time used
                                         ^min rate
```

MATERIAL USAGE INFORMATION

Pressing the VIEW key followed by the * key will cause all material usage totals to be printed. The (*54) flag need not be on. These totals are since the last time printed, and since the last time cleared. This same information may be periodically, and automatically, printed by setting the PRT parameter to a time internal number. (See PARAMETER, PRT).

The printout looks like this:

```
                     DATE       TIME        TOTALS:  GRAND PCT CURRENT PCT
CURRENT              11/01/90   18:26:45    CYCLES     83          1
LAST PRINTED         11/01/90   18:19:59    REGRIND    6.2   .4    0.0     0
LAST CLEARED         10/30/90   20:02:36    NATURAL 1485.4        19.0
                                            COLOR     15.3 1.01    0.2     1.00
WEIGHT SCALE ID#: 120                       ADDITIVE   0.0  .00    0.0      .00
TOTALS ARE IN POUNDS                        TOTAL    1506          19
POUNDS PER HOUR 286.2
```

The Totals may be in POUNDS or KILOS depending on your selection of weight unit using the *89 function in the PROGRAM mode.

The POUNDS PER HOUR is based on the total material throughput since the last time totals were printed.

GRAND totals are totals since the last time the data was cleared using the *00 routine, or by pressing 00 immediately after executing this print routine.

CURRENT totals are totals since the last time a printout was obtained.

TROUBLESHOOTING

Typical Problems
Normal Operating Sequence
Verifying Load Cell Function
Load Cell Raw Signal Readout

If you are reading this section, you are having problems. To locate and correct the problem we suggest that you take the following steps:

1. Start by reading the WIRING CONSIDERATIONS section. Even if the system worked well for a time, new wiring or increased plant electrical noise can cause new problems.

2. Then follow the CHECKOUT procedure in the front of this manual. If anything does not work right, read the diagnostics section that follows it.

3. Read the section on NORMAL OPERATING SEQUENCE to be sure you understand what it is supposed to be doing. If you are still unsure as to how the software logic works, call us.

4. Read the list of TYPICAL PROBLEMS that follows this list.

5. For difficult problems we can provide the most help if we have a printout of the PARAMETER table (KEYPAD, *77) and a cycle by cycle printout (KEYPAD, *54). (See PRINTED OUTPUTS section).

   To print the PARAMETER table:

Press: *	Display will say:	(PASSWORD)
Press: 22222	Display will say:	(P x)
Press: *77	Display will say:	(INSTR 77)
	Parameter table will print.	

   To print cycle information while the unit is running:

Press: *	Display will say:	(PASSWORD)
Press: 22222	Display will say:	(P x)
Press: *54	Display will say:	(PRNT OFF)
Press: *	Display will say:	(PRNT ON)
Press: EXIT	2 times.	

6. If you have previously saved a correct copy of the parameter table using the *23 function, then do a "CLEAR" by pressing the "CE" key while turning POWER ON.

7. As a last resort, do a CLEARALL, (see CLEAR ALL section).

TYPICAL PROBLEMS

These problems are based on phone calls that we have received from Weigh Scale Blender users.

The display does not read close to zero when power is turned on, bin empty (plus or minus 10 grams).

* The load cells are not plugged in.
* The weigh bin is not resting properly and freely in its platform or the platform is not resting properly on the bolts that protrude from the load cell enclosures.
* The controller was never calibrated for these load cells, or you just did a CLEAR ALL. In this case, the controller will most likely read about 400 grams. See LOAD CELL CALIBRATION.
* The load cells are damaged. See CHECKING THE LOAD CELLS.

The Controller "RESETS" itself for no reason. This indicates electrical noise or voltage spikes disrupting the processor.

* See WIRING CONSIDERATIONS, ASSEMBLY section.

The ALARM is flashing and the display shows a weight above 100 or below -50 grams. If above 100, the Weigh bin dump valve keeps opening and closing every 6 or 7 seconds.

* There is material in the weigh bin that will not dump out.
* The dump flap may be stuck.
* The load cells are hung up or obstructed.
* The load cells are out of calibration.
* Incorrect grounding is causing wide load cell readouts.

The VERY FIRST DISPENSE does NOT take place. After a few seconds the ALARM begins to flash. The display says (N x.x) and is flashing.

* The air supply is not connected or the pressure is set too low.
* The Natural solenoids are not connected properly.
* The ½ amp panel front fuse is blown.
* The NATURAL air cylinder is jammed. Maybe the mount is bent.

The NATURAL dispense valve continues to dump repeatedly even though the weigh bin has filled to overflowing. The weight reading is still below batch weight.

* The weigh bin is not free to move.
* The load cells are jammed.
* The load cells are damaged. See CHECKING THE LOAD CELLS.

The system operates but always needs MANY RETRIES to complete a dispense and never seems to "learn" the proper dispense rate.

* The Minimum rate parameter is set too high. To correct, turn power off and then on again. the software will recalculate this parameter within the first 10 or 20 cycles.

The THUMBWHEEL SWITCHES do not seem to be controlling output. One or more LEDs (bottom row) are on all the time.

* Someone has LOCKED IN a setting using the keypad. See KEYPAD, PROGRAM MODE, SETTING.
* The __SE parameter is LIMITING the thumbwheel switch setting. See KEYPAD, PROGRAM MODE, and PARAMETERS, __SE.

Occasionally, the system gets STUCK doing retries of a component but the retry time is so short that nothing gets dispensed.

* The LAG TIME parameter is set for too short a time. See KEYPAD, TIME and PARAMETER, __LA.
* The dispense valve is sticking, slightly delaying it's opening. The time period is too short for the valve to begin moving.

The system USED TO WORK but now it does unexplainable things.

* Static or a voltage surge has altered RAM memory. Do a CLEAR or CLEAR ALL. See "CLEAR" RESTART or "CLEAR ALL" RESTART. Then do a LOAD CELL CALIBRATION.

The Display reads 3100.0 even with the bin empty. This is the upper limit load cell readout.

* The Load Cells are not plugged in and the circuitry has drifted to the top limit.
* The load cells have been overloaded way beyond their limit and are now permanently deflected.

Dispenses from a slide gate are not as consistent as they should be.

* The slide gate is sticking slightly. With the hopper empty, move the slide manually to see that it moves freely. Press up or down on the air cylinder to adjust for proper alignment.
* The material does not flow very well. A bridge breaker adaptor may be required.

Load Cell weight readings are not holding steady. They vary as much as 100 grams from second to second.

* This is static and improper grounding. See WIRING CONSIDERATIONS.
* If readings drift slowly in one direction, requiring frequent recalibration, a component on the circuit board is most likely faulty. Call us.
* If TARE weights are not steady, something may be physically interfering with free movement of the cells.

The Weigh Bin dump valve does not stay open long enough for the bin to empty fully.

* The air flow control valve is adjusted too far in and the valve opens too slowly. This should be adjusted to slow the closing just enough to prevent excessive banging.
* The DTI parameter is not set for enough dump time. this parameter controls Dump Time (DTI). Recommended times are 2000 grams = 6 sec.; 4000 grams = 10 sec. Entries are in seconds. See PARAMETERS for more information.

The MIX MOTOR runs when set to ON but not when set to TIMED.

* The fuse on the RELAY circuit board is blown. See hardware maintenance for replacement instructions.

The DISPENSE VALVES OPEN WHILE the LOADING system is trying to convey material to the blender.

* The Self-Loading interface panel is not plugged into the blender controller.
* The timer relay inside the interface panel is not plugged in completely.
* The timer relay inside the interface panel is not working. The red light on the face of the relay should be on during a loading cycle. If the light is off during a loading cycle, replace the timer relay.

The BLENDER DOES NOT RESUME operation AFTER a LOADING cycle.

* The timer relay inside the Self-Loading interface panel is stuck in the closed position. Unplug the interface panel from the blender controller. If the blender starts, replace the timer relay in the interface panel.

NORMAL OPERATING SEQUENCE

This section tells you how the system is supposed to work. If your system is not operating correctly, this description may help you spot exactly where the system is failing, providing a clue to the problem.

Turn Power On:	The following displays occur for 1 second each: Program version date (V=21031A), the check sum number (CKS XXXX), ROM check (ROM OK), RAM size (RAM = 8K), Model number (MODEL220), display of (0.0), actual weight in the bin is displayed last. It should be close to 0.0, plus or minus several grams.
BEGIN Operation:	The unit will begin to operate if both switches on the left side are UP in the CONTINUE position and the SENSOR in the mix chamber is UNCOVERED. The sensor must be plugged into the right side of the controller. If it is not, this has the same effect as the sensor being covered; the unit will not run. If the sensor LED (on the sensor) is on, the sensor thinks it is covered. If it is sensing incorrectly, adjust the sensitivity. See ADJUSTMENTS.
If the WEIGH BIN DUMP Flap opens and closes repeatedly:	If initial empty bin TARE weight is 100 grams or more, the weigh bin dump valve will operate in an attempt to empty the bin and bring the starting weight closer to zero. If the bin is empty but the weight reading is greater than 100 grams, then something is wrong. See TESTING the LOAD CELLS and LOAD CELL CALIBRATION.
If the ALARM flashes:	If the initial TARE weight is below -50 grams the Alarm will flash and the unit will not operate. Go to TESTING of LOAD CELLS and LOAD CELL CALIBRATION.
The DISPENSE sequence begins:	If initial tare weight is within limits, between -50 and +100, the sequence will begin.
DISPLAY during dispenses:	During all dispenses, the letter R, N, C, or A will be displayed indicating which component is being dispensed. The INITIAL display is the tare weight of the bin. This will not change during the dispense. Three seconds after each dispense, the new total weight of the material in the bin is updated and displayed.
REGRIND first:	If REGRIND has been requested the REGRIND dispense will occur first. The letter "R" will appear in the display. After this dispense an exact weight is taken to determine the space remaining in the weigh bin for the remaining dispenses. The weight of REGRIND dispensed will appear in the display 3 seconds AFTER the dispense has ended.
NATURAL second:	The NATURAL dispense occurs next in the sequence. The letter "N" will appear in the display. The exact weight of the NATURAL dispensed is now determined for calculating the COLOR and ADDITIVE dispenses. The TOTAL weight of NATURAL and REGRIND combined will appear in the display 3 seconds AFTER the Natural dispense has ended.

COLOR third and ADDITIVE fourth:	COLOR is dispensed followed by ADDITIVE as requested by the thumbwheel switch settings. Each dispense must meet requirements set by internal parameters or RETRIES will occur and sequence will not continue.
MATERIAL RUNS OUT:	If any material runs out or is not enough to meet criteria set by the internal parameters then the process will NOT CONTINUE past this component. RETRIES of this dispense will occur indefinitely until the full dispense occurs or power is turned off. The display will FLASH. The ALARM will sound after 4 retries. This number of retries before alarm is based on the ALARM (__AL) parameters. REGRIND may, or may not, be set to alarm when it runs out. See PARMETERS, (RAL00000), to change this.
If ALARM flashes:	More than four retries of any single component will cause the strobe light ALARM to begin flashing. The component that is causing the alarm will continue to retry the dispense. The display will blink and the LETTER in the display will signify which component is causing the problem. To continue with the dispense sequence, you must satisfy the requirements of the dispense or turn power off.
WEIGH BIN dump:	After all dispenses the weigh bin is emptied by the final dump of the weigh bin into the mixing chamber. The dump valve remains open for six seconds.
SENSOR covered:	While the sensor is covered, the dump valve remains open to ensure the weigh bin empties completely. Dispensing stops. The dump valve will remain open for as long as the sensor is covered. Uncovering the sensor will begin the next cycle.
FLOW CONTROL Valve: (optional)	If your unit has a Flow Control Valve under the mix chamber, this valve will stay closed for the 6 seconds immediately following a dispense into the mix chamber. (Time is based on the FCV parameter). At all other times it opens when the sensor is covered, and closes when the sensor has been uncovered for 2 full seconds.

VERIFYING LOAD CELL FUNCTION

Most problems are related to LOAD CELL function.

There are several ways to VERIFY that the load cells are functioning properly. The slightest touch on the weigh bin should result in a change in the readout. If this is not the case, something is wrong. When the light touch is removed, the display should return to its starting point. If this does not happen, something is interfering with free movement of the cell or the bin. Make a careful inspection of EVERYTHING around the load cells, the hanger bolts, the weigh bin tray and the weigh bin. NOTHING should interfere with free movement.

NOTE: It is normal for load cell readout to drift several grams over time and with different temperatures. Since all the component dispenses are weighed by a single set of load cells, this drift will affect all components equally and, therefore, the ratio of the components will remain accurate. Empty weight is always TARED so each dispense is accurately measured.

The following observations will verify proper load cell operation:

When the bin is empty, between cycles, the display should read near zero. An error of several grams is not important since this empty weight reading is "tared" from all dispense readings. The "empty weight" readings should be consistently within 1 or 2 grams.

The addition of several pellets to the weigh bin should result in a change in the readout. 1/10 of a gram is about four pellets, a gram about forty.

Most load cell problems are caused by interference to the movement of the load cell. The load cell must be free to respond to the weight of a single pellet as well as free to move far enough to record full load cell rated weight deflection.

If weight readout is very erratic check for damage to the load cell wires. Check for a pinched wire in the connector.

An over stressed load cell will read high. The top limit is (3100.0) for a GB100 or GB200 and (22444) for GB400. A load cell that was forced or pried upward too far will read (0.0).

We supply and replace load cells in matched sets and we always include the mounting enclosures. You may remove the back plate from the enclosure for visual inspection. It is not safe to remove the load cell itself from the enclosure. To do so may stress the cell itself.

To operate with damaged load cells, see KEYPAD, *87, VOLUMETRIC.

To RECALIBRATE the LOAD CELLS, see the MAINTENANCE MANUAL.

For further information, see the next section, RAW SIGNAL READOUT.

LOAD CELL RAW SIGNAL READOUT

Press "CE" key to check this RAW number for several seconds.

Load cells put out a very small voltage that varies slightly as the load cell is deflected. This voltage is converted, on the circuit board, to a pulse train and these pulses are counted for 1 full second to determine a weight load. The software can handle a range of counts from 0 to approximately 249,850.

A properly operating set of cells will range from about 55,000 to 120,000; a span of about 65,000 from empty weight (weigh bin in place), to a full bin weight of 2000 grams. The system will work correctly as long as the empty bin weight readout is between 1 and 149,248. 149,248 is the highest number that the software will accept for zero weight calibration (see parameters, LCZ). If the number is over this when you press the ZERO weight key, the display will say (ZERO LOW).

This RAW COUNT number is converted by the software, based on the load cell calibration information, to the proper gram readout.

The RAW COUNT numbers are more useful in diagnosing load cell problems because they eliminate any calibration errors that might have occurred.

Press "CE" key to display this RAW number for several seconds.

To observe this number continuously, use the *98 function in the PROGRAM mode.

Press: *	Display will say:	(PASSWORD)
Press: 22222	Display will say:	(P x)
Press: *	Display will say:	(INSTR __)
Press: 98	Display will say:	(CNT OFF)
Press: *	Display will say:	(CNT ON)
Press: EXIT	Display will say:	(P xxxxx)

A floating, drifting number usually indicates the load cells are not plugged in.
A readout of 0 indicates an open circuit, a damaged wire or cell.
A full scale readout of 249,850 indicates a damaged wire or cell.

A set of 3 K load cells will put out about 33 more counts for every gram of weight that is added. A test of sensitivity is to add a small weight to the bin. The RAW WEIGHT count should increase by about 33 counts for each gram added. (10 counts per gram for 10K load cells).

If you call us for help in solving a load cell problem, it is helpful if you can tell us what the RAW COUNT number is with the bin empty, and with a known weight in it. Pressing the CE key at any time will display the RAW COUNT number for the current weight.

To OPERATE with DAMAGED load cells in a VOLUMETRIC mode, see KEYPAD, *87, Volumetric mode.

SOFTWARE MAINTENANCE

Parameter Table - Summary
Explanation of Parameters
Changing Parameters
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COMPLETE TABLE OF PARAMETERS - SUMMARY LISTING

PARAMETERS are explained fully in the next section of this manual.
NOTE: Values shown here are initial ROM values of 220 series models.

TIMES	are in interrupts:	(244 Interrupts = 1 second) (00244 = 1 second)
WEIGHTS	are in tenths (1/10s) of grams: or full grams for 400:	(02000 = 200.0 grams) (04000 = 4000 grams)
PERCENTS	are expressed as XX percent:	(00000 to 00100) (0 - 100%) (00002 = 2%; 00090 = 90%)
SETTINGS	are expressed as 3 digits:	(00000 to 00999) (for regrind: 00500 = 50%)
FLAGS	are explained.	

All parameters are five digits. ALWAYS add leading zeros if required.

FLG 00000	Turns on the BATCH, RECIPE, REPEAT, TAG keys.
RAL 00000 NAL 00004 CAL 00004 AAL 00004	Last digit = number of retries before ALARM. 00001 TO 00009 = sound alarm, hold process. 00011 TO 00019 = sound alarm, continue process.
MIX 03010 FCV 00006 DTI 00006	MIX TIME and JOG interval time. TIME the Flow Control valve holds mix in the chamber. Weigh bin dump TIME at end of cycle.
KDF 00010 WDF 00010 BER 00200	Maximum variation in GRAMS between two consecutive Weight reading for reading to be accepted. Added GRAM weight before dispense is aborted.
CXT 00000 AXT 00000	Divide thumbwheel switch setting by this number. "00010" or "00100" will move decimal point on thumbwheels left.
ROC 00000 ROV 00000 RHL 00000	PERCENT of REG. to treat as NAT. for COL and ADD adds. Increase Regrind usage after too many full dispenses. Change regrind setting if high or low level sensor is covered.
FUL 20000 MAX 30000	The full batch weight in GRAMS; capacity of weigh bin. Maximum GRAM weight the software will target.
TH 01000 TL 00500	Hi and Lo error limits for tare WEIGHT.
PRT 00000	MINUTE interval between automatic print of TOTALS.

RSE 01000 CSE 01000 ASE 01000 RLO 00050	Upper SETTING limits for thumbwheels (0xxx.x). Settings greater than limit are held to limit. "01000" = 100%. Lower SETTING limit for REGRIND (00xx0).
DLY 00488	TIME the level sensor must be uncovered for cycle start.
LT1 00000 LT2 00000	Loader #1 time. Loader #2 time.
RPT 00000 NPT 00000 CPT 00000 APT 00000	Percent of target to reduce first try dispense.
RWT 26000 RTI 00976 NWT 26000 NTI 00976 CWT 10240 CTI 31232 AWT 10240 ATI 31232	WT/TI = the rate that will be used for calculating the next dispense time. WT = the Weight portion of the dispense rate, calculated such that WT/TI equals the average of the last two actual dispense rates. TI = the TIME portion of the dispense rate.
RMI 01000 NMI 02000 CMI 00020 AMI 00020	Minimum valid dump rate GRAMS/sec. Error correction is bypassed when dispense rate is lower.
RNC 00050 NNC 00050 CNC 00010 ANC 00010	Allowable GRAM error within which NO correction is made.
RRP 00010 NRP 00010 CRP 00010 ARP 00010	PERCENT shortage error that will force a retry.
RRD 00500 NRD 00500 CRD 00050 ARD 00050	GRAM weight shortage error that will force a retry.
RLA 00020 NLA 00020 CLA 00012 ALA 00012	Lag TIME before dumping ACTUALLY starts. (mechanical response time)
PRC 00010	Maximum allowable PERCENT rate change per cycle.
STL 00244	Dispense settle TIME before a weight reading is taken.

LCL 00027 LCH 00039 LCF 00079 LCZ 00583	LOAD CELL limits, low and high slope, frequency, zero. DO NOT CHANGE except for different weight load cells.

FULL EXPLANATION OF PARAMETERS

All WEIGH SCALE BLENDER controllers operate according to certain internal parameters. However, customer requirements and the type of metering equipment used on this system can vary widely. To accommodate these variations and unknown future requirements, we have made over 60 parameters accessible for change through the keypad.

These parameters that allow you to alter certain weights, times, percents, and settings are explained here.

Read the KEYPAD instructions on how to enter these parameters.

PARAMETERS of PARTICULAR INTEREST are:

FLG	Turns on the RECIPE, BATCH, FAST, and TAG keys.
__AL	Alarm routines if material runs out.
MIX	Time that the mixer motor runs each cycle.
__XT	Allows thumbwheel settings as low as .01%.
PRT	Print the material totals automatically.
__SE	Set upper limits to thumbwheel settings.
ROC	Allow some added color for the regrind portion.

These parameters are marked below with "*****".

PARAMETERS	are all given as 5 digits and must be entered as 5 digits. If less than five digits is required, use leading zeros to fill out the numbers to five digits.	
TIMES	are in interrupts:	(244 interrupts = 1 second) (00244 = 1 second)
WEIGHTS	are in tenths (1/10s) of grams: or full grams for 400 models:	(02000 = 200.0 grams) (04000 = 4000 grams)

PERCENTS	are expressed as XX percent:	(00000 to 00100) (0 - 100%) (00002 = 2%; 00090 = 90%)
SETTINGS	are expressed as 3 digits:	(00000 to 00999) (for regrind: 00500 = 50%)
FLAGS	are explained.	

Most parameters begin with R, N, C or A. These letters indicate which dispense function this parameter controls: REGRIND, NATURAL, COLOR, or ADDITIVE. In the following explanations, only the 2nd and 3rd letters are referenced for each group of codes that start with R, N, C, and A.

FLG ***** (change to enable the RECIPE, BATCH, FAST and INFO keys)

FLG is a SET of flags for turning on the RECIPE, BATCH, FAST and TAG keys. These four keys will NOT WORK and their associated functions are not available, unless this parameter is set properly.

When all digits are set to 0 (FLG 00000), all four functions are OFF.
The second digit set to 1 (FLG 01000), will turn the TAG key on.
The third digit set to 1 (FLG 00100), will turn the RECIPE key on.
The fourth digit set to 1 (FLG 00010), will turn the FAST key on.
The fifth digit set to 1 (FLG 00001), will turn the BATCH key on.

The TAG key (3rd row, 3rd key) is useful for entering information that you wish to be "tagged" to all printouts and computer retrievals. Work Order and Operator numbers may be entered and displayed. Any computer loaded recipe number may also be displayed.

The RECIPE key is useful for storing thumbwheel switch settings under a single numbered recipe. Up to 99 may be stored. To enable the RECIPE key, place a 1 in the 3rd position of the parameter.

The FAST key allows the unit to operate in a faster, higher output, mode. Output may be doubled in this way. To enable the FAST key, place a 1 in the 4th position of the parameter.

The BATCH key allows you to signal that you have processed a certain amount of material, or for filling a barrel or gaylord to the top without the need for a level sensor to stop the process. To enable the BATCH key, place a 1 or a 2 in the 5th (last) position of the parameter.

Set to one (00001), the unit will dispense until the preset batch amount is reached and then will stop and alarm. Set to two (00002), the unit will alarm but will continue running when the preset amount is reached.

See KEYPAD section, for full explanations of these 4 keys.

__AL ***** (You may want to change this)

__AL Alarm FLAGS. When material runs out, or for some other reason material does not dispense fully, these flags will instruct the controller what to do.

00000 = no alarm, no pause in process, no retries. This is the normal alarm configuration for the Regrind dispense.

00001 to 00009 = sound alarm after specified number of retries and continue retries until successful. The process will not continue until the fault condition is corrected. The last digit determines the number of retries before sounding the alarm. This is appropriate for all important components; natural, color, and additive, and sometimes regrind.

00011 to 00019 = sound alarm after specified number of retries but then stop the retries and continue with the remainder of the cycle. The alarm will continue until the fault condition is corrected or until the next cycle begins. The last digit determines the number of retries before sounding the alarm. This would be appropriate if you wish to make several attempts at a dispense, such as regrind, but you wish the process to continue even without the component.

MIX ***** (change to run the mixer a longer timed period)

MIX indicates the TIME that the mixer will run after the weigh bin dump valve opens, and the time INTERVAL that will pass before the blade is jogged.

The first three digits is the INTERVAL, in seconds, between pulses to the mix motor to jog the mix blade. This serves to level the pile of material in the mix chamber, insuring that the sensor does not remain covered for too long. A maximum of 20 jogs will occur. This number is limited to 299 seconds.

The last 2 digits is the initial mix time in seconds. Adequate mixing can be accomplished in a short time. Additional mixing may cause separation and may create a static problem with the material.

The default value of this parameter is (03010), allowing an initial mix time of 10 seconds, followed by a jog every 30 seconds thereafter. You may lengthen or shorten the mix time and jog time interval as required.

The MIXER switch must by in the down (TIMED) position for this time function to have control.

FCV

FCV is the TIME that the Mixer dump valve (or Flow control valve) delays before opening. If your unit is equipped with a Mixer Dump Valve, under the mix chamber, it is programmed to open whenever the sensor is covered. It will close again immediately when the sensor is uncovered. This assures that material has time to mix before dropping into a bin below. When a batch is dropped into the mix chamber the sensor is covered. To prevent unmixed material from dropping immediately out the bottom, the mix valve is delayed for a time to allow mixing to occur first. This parameter controls the time that the Mix Chamber Valve remains closed after a batch has been dropped.

DTI (probably no need to ever change this)

DTI is the TIME allowed for the weighing bin to dump at the end of the cycle. This time must be long enough to ensure that the bin will empty. If the valve closes on falling pellets, it will not close all the way. We have set this time to 6 seconds.

KDF/WDF (change only if you have an extreme vibration problem)

KDF/WDF is the maximum acceptable variation in GRAMS between two consecutive weight readings. One weight reading requires 1 second of time. Two readings are always taken and they must be within WDF grams of each other to be accepted as valid. Readings are taken continuously until two consecutive readings meet the criteria. This prevents a single accidental bump of the scale from causing a grossly inaccurate reading.

WDF is used for starting tare weight, and each component dispense weight. KDF is used for Load Cell calibration weights.

BER

BER is the BAILOUT ERROR weight. Dispenses are controlled by very accurate timing. However, as a precaution, the weigh bin is constantly monitored during each dispense. If bin weight is found to exceed target weight during the dispense, then a BAILOUT occurs. This ends the dispense immediately just as if the end of the dispense time period had been reached. This in no way effects the accuracy of the remainder of the cycle. The dispense is checked and retries will occur if required.

A bailout does not occur unless target weight is exceeded by the weight given in the BAILOUT ERROR parameter. This is primarily to prevent vibration from causing a false bailout to occur during a very small dispense. We set this parameter to a default of 00200 (20 grams or 200 grams). If vibration is causing false bailouts, then you may want to set a higher value in this parameter.

If the BER parameter has a 1 in the last position, (BER 00201), then a printout will occur of all cycle data anytime a bailout occurs for any single component. This is helpful if you want to be aware of occurrences where dispenses significantly exceed target. This will be the same information that you see when the PRINT flag is on (*54). A printer must be connected.

__XT ***** (change if you want less than 00.1 percent)

__XT, is a number that will alter the meanings of the thumbwheel switches for COLOR (CXT) or ADDITIVE (AXT). This number, when set, will be divided into the thumbwheel setting, thereby reducing it's value. When set to "00010" the decimal point is moved to the left one place and the setting is read as X.XX percent. When set to "00100" the decimal point is moved to the left two places and the setting is read as .XXX percent. This allows closer control where requested dispense is less than 1 percent. When set to "00000", this parameter has no effect.

ROC ***** (change if you want to add COLOR to your REGRIND)

ROC indicates the PERCENT of REGRIND that will be treated as natural when the COLOR and ADDITIVE dispenses are calculated. If you feel it is necessary to add a little color or additive to your regrind then this parameter will automatically see that this is accomplished.

In some cases, the addition of pre-colored regrind tends to produce overall better coloring because of more uniform dispersion of pigment. In this case you may want to add less color to the Natural portion when Regrind is present. Placing a 1 in the first digit of the ROC parameter (ROC 10000), will cause a portion of the Regrind to be SUBTRACTED from the Natural portion, instead of added.

EXAMPLE: roc SET TO (ROC 10020).
The 20 means take 20% of the REGRIND dispense and ADJUST the NATURAL dispense by this amount. The 1 means adjust by SUBTRACTION. Whatever amount of REGRIND is added, 20 percent of this amount will be subtracted from the Natural amount before a color calculation is made.

If Regrind dispense = 600 grams, and Natural portion = 1400 grams, at 4 percent, Color would be 56 grams, if ROC=00000. If ROCCCCCC=10020; reduce Natural by 20% of 600 (120 grams). So color is calculated to be 4% of 1280 grams (1400-120), which equals 51 grams.

ROV

ROV is a parameter that will allow your unit to AUTOMATICALLY change to a higher REGRIND USAGE in the event that the amount of regrind being produced exceeds the usage rate. The first two digits of the parameter number represent a CYCLE COUNT, the last three digits represent a PERCENT. When either number equals zero, the parameter has no effect.

If your system dispenses the full requested amount of regrind for the number of consecutive cycles specified by the CYCLE count, it automatically adjusts the PERCENTAGE that is being used. If the last 3 digits are set to 21 percent or more, then the controller will switch directly to this number. If the percentage specified is 20 percent or less, then current usage is increased by the percentage increment.

This parameter is useful if your process is one where a runner is molded, ground up, and loaded back into the regrind hopper immediately and continuously every cycle.

For example: Say your runner represents 20 percent of your shot weight. You set your controller to 25 percent regrind. Under normal conditions your system adds back the 20 percent of scrap that is produced each cycle, only occasionally dispensing up to the maximum 25 percent that the setting calls for. Since supply is limited to 20 percent, you never dispense a full 25 percent more than once or twice in a row.

Now say you start producing all bad parts and the entire shot is being fed into the grinder as scrap. Dispenses will now be a full 25 percent every cycle. The regrind hopper will also begin to fill.

With this parameter set to (ROV 10100) (10 cycles and 100 percent), after 10 cycles have occurred at the full 25 percent, the unit will automatically start using regrind at 100 percent.

This prevents your hopper from becoming full. This is critical in fully automated systems that are evacuating the chamber of a grinder continuously and rely on space in the regrind hopper to keep the grinder discharge clear.

As soon as one cycle occurs that does not dispense the new full amount, the system takes this to indicate that the regrind hopper is now empty, and the controls revert back to normal.

If, in the above example, the parameter is set to (ROV 10010) then the controller setting of 25 percent will be increased to 35 percent after 10 full dispenses. After 10 more it will be increased again to 45 percent and so on up to a full 100 percent if necessary. When a short dispense occurs, the setting is decreased by the incremental amount. Each short dispense cause an incremental decrease until the original starting point of 25 percent (thumbwheel setting) is again reached.

RHL (change only if you have regrind level sensors fitted)

RHL indicates what percentages to run regrind if optional level sensors in the regrind hopper indicate high or low conditions.

If set to all zeros (RHL 00000), then this parameter is ignored. If set to any value, the first 3 digits of the parameter indicate a new Regrind setting to run at when the High level sensor returns a signal. The last 2 digital indicate a new setting if hte low level sensor returns a signal. These percentages come into play only when a signal is returned from a sensor, or a contact closure occurs. The high sensor signal always has priority.

There are a number of different ways sensors can be wired to give a number of different effects, however, the logic rules given above apply.

FUL (change for extremely light or heavy material)

FUL is the full batch weight in GRAMS set at the factory to 2000 grams. The criteria for this number is to not exceed the volume capacity of the weigh bin and to not exceed the load cell capacity. Each load cell is rated for 3000 grams. Total load capacity is 6000 grams. The weigh bin, when empty, weighs about 1200 grams, leaving a net capacity of 4800 grams for weighing material. However, a dispense over 3000 grams probably would exceed the volume capacity of the bin and, therefore, not be accurate. We have set the full batch weight to 2000 grams which we considered a conservative full batch weight. Higher batch weights will increase maximum throughput rates.

If your regrind is very fluffy and you use a lot of it, you may find 2000 grams to be too much volume for the bin. Select a lower total batch weight such as 1500 to ensure that the bin never overflows or fills completely to the dump valve.

MAX (set automatically if FUL parameter is changed)

MAX is the maximum gram weight which the software will allow as a target for dispensing. The initial Full weight target is set by the FUL parameter. As dispenses progress, an over dispense of one component may cause a new target to be calculated for future dispenses in order to maintain proper requested ratios. A recalculated target is not allowed to exceed the value held in the MAX parameter.

If you change the FUL parameter, the MAX parameter will automatically be set to a value 50 percent higher than the FUL setting.

TH AND TL

TH and TL and acceptable error limits for TARE WEIGHT.

Before a dispense cycle begins, the software checks to see that the weigh bin is in place and that it is not already full of material. To do this it looks at the starting TARE weight.

If Tare weight is below the value of TL, (50 grams), the software assumes that the bin is either missing or hung up on something. In this case the ALARM sounds.

If Tare weight is above the value of TH (100 grams), the software assumes material is in the bin. In this case the ALARM sounds and the weight bin dump flap operates in an attempt to empty the weigh bin.

If you are processing a material that has a tendency to hang up in the corners of the bin, then you may wish to widen the range of acceptable starting tare weight. Since tare weight is always subtracted from dispense weights, these errors do not effect accuracy.

PRT ***** (change to get AUTOMATIC printing of material totals)

PRT, when set to any number other than zero, will cause the processor to output all current material usage totals, at regular time intervals, to the printer port. The number you enter will dictate the time interval in minutes. All timing starts from MIDNIGHT. For example, an entry of 00120 will cause totals to print at 2 AM, 4 AM, 6 AM, etc. A printer must be connected. If one is not, the routine will abort. Blending then continues.

__SE ***** (This might be useful)

__SE is the upper SETTING limits for the thumbwheel switches. This allows a reasonable cap to be set for each component so that an operator cannot accidentally set the controls to an excessively high setting. For color and additive, these limits will ensure that expensive material is no wasted. Thumbwheel settings that are greater than the limit are held to the limit.

EXAMPLE: If the highest color usage in your plant is 6%, then you can enter this upper limit in the parameter table. Since settings are stored as 1/10s of percent (##.#), the parameter would be:

CSE 00060

Color thumbwheel settings above 060 will be held to 6 percent.

NOTE: If you wish to positively fix the settings so that the thumbwheel switches have no control and no one can change them without authorization, you may do this by using the KEYPAD to enter any or all settings. To do so:

Press:	*	Display will say: (PASSWORD)
Press:	22222	Display will say: (P x)
Press:	SET	Display will say: (SETTING)
Press:	COL (or ADD or REG)	
		Display will say: (C = xx.x)
Enter:		New Setting
Press:	EXIT	Display will say: (P xxxxx)

An LED will light indicating this override condition. The LED will be lit ONLY when the thumbwheel settings does not match the internal setting.

To later return to thumbwheel control, use the same procedure as above except instead of entering a setting, press the "CE" key when you see the setting displayed.

To allow the operator the ability to stop running this component, a setting of all ZEROS (00.0) is still accepted as valid and will override any setting that has been entered by keypad. If you do not want this override option, enter a 1 as the first digit in the SE parameter. (__SE 1xxxx).

RLO (probably no need to ever change this)

RLO is the lower limit for SETTING the regrind thumbwheel switches. Settings lower than this number will be held to the low limit. Air operated dump valves are not intended to dispense very small quantities. We have set RLO at the factory to 5 percent (00050) allowing a minimum dispense of 5% of about 100 grams.

DLY (consider changing if mixing is a problem)

DLY is the TIME the mix chamber level sensor must be uncovered before a cycle begins. The sensor must be uncovered without interruption for the full specified DELAY time. To prevent false starts from the mix blade, a 1 second minimum (00244) is recommended.

Sometimes throughput is slow enough that each new batch buries the mix blade for a while. When this happens the material on top does not mix well. To reduce this, you can delay the start of a new batch by adding to the DLY parameter. The new batch is delayed and the level in the mix chamber has time to fall before the next batch is added.

__WT and __TI (set automatically by the CALIBRATE routine)

The __WT, and __TI parameters are related to the flow rate or dispense rate of each material. These can be changed manually or set AUTOMATICALLY by using the RATE CALIBRATION routine described in the KEYPAD section of the manual. These numbers are automatically corrected as necessary after each cycle.

__WT and __TI are WEIGHT and TIME numbers that, taken together, represent the actual flow rate for the specified material (WT/TI). This rate is used to calculate an exact time period to dump the required quantity of material.

Both of these numbers are adjusted by the computer logic after each cycle as a means of continuously calibrating the dispense times.

This rate correction takes place continuously and the battery-backed RAM maintains the correct rate even when power has been turned off.

If, for some reason, you were to set these numbers manually, (for example, if the load cells are damaged and you want to adjust the VOLUMETRIC flow rate), and example of a proper setting would be as follows: For a 1" auger feeder with a 60 RPM motor; this unit dispenses 8 grams per revolution which is 8 grams per second. Since the __WT gram number indicates tenths of grams (model xx) and the __TI number indicates interrupts (at 244 per second) then the proper numbers would be:

__WT 00080 and __TI 00244.

The computer automatically bumps both numbers up in value by doubling them both until at least one number exceeds 16,000. The ratio (rate) is still the same but error correction routines work better with higher numbers.

__MI (set automatically each time power is turned on)

__MI numbers are set to one half the amount of material, in grams, that can feed in one second based on normal valid dispense rates. A valid rate is considered the normal dispense rate that occurs under normal conditions with equipment functioning properly. When a rate lower than half this actually occurs, it is assumed that an equipment malfunction or loss of material has occurred. Under these circumstances, normal rate correction routines are bypassed.

EXAMPLE: For a 1" auger feeder with a 60 RPM motor drive, the normal metering rate is about eight grams per revolution or 8 grams per second. Since the __MI number is expressed as tenths of grams, (model xx), half of this is expressed as:

(__MI 00040)

It is safe to use a __MI number that is too low but NOT safe to use a number too high. Error correction routines will not work when this number is too high.

This number is set reset to 00001 every time power is turned on. After the system detects 10 good dispenses, (no retries, no Bailouts), then the MI parameter is AUTOMATICALLY set to 50 percent of current flow rate. The RATE CALIBRATION routine described in the KEYPAD section of the manual will also set this parameter. Periodically, during production, this number is reset again by the software. If dispenses have occurred in a very uniform manner for an extended period of time, the MI parameter is reset based on these dispenses.

__NC (changes itself AUTOMATICALLY over time)

__NC is the allowable GRAM error within which NO flow rate corrections are made by the software. Gram weight errors that are equal to, or less than, this number will be accepted and no error corrections will take place. Since no equipment is perfect, we must accept that a certain range of error is normal. To make corrections within this range only adds an additional error due to hunting, and broadens the error range. This parameter controls and prevents this. This parameter is adjusted automatically by the software according to the actual conditions of the metering.

This number has been set based on our experience with the dispense devices. If, over time, the computer finds that the number is too large or too small, it will automatically adjust it to match the actual conditions that exist with your equipment. These adjustments occur in increments of 1/10 gram and occur only once every 20 cycles. A change is made only if needed. Checking this number from time to time will indicate the normal error range that is occurring with each dispense device.

__RP and __RD (probably no need to ever change this)
(__RD is set AUTOMATICALLY each time power is turned on.)

These two parameters determine the dispense shortage error that is to be acceptable for each component.

__RP is the shortage expressed as a PERCENT of the target dispense weight and __RD is the shortage expressed in GRAMS. These parameters are used together, either on will force a "retry".

A "retry" is an additional dispense that is calculated to add the amount of material that is short. This comes into play only when the amount dispensed is less than expected.

Retries will occur until the difference between the required amount and the metered amount is equal to or less than the __RP percent difference AND the __RD weight difference.

These numbers dictate just how close to perfect the dispense has to be before going on. If the dispense overshoots the target, then the process continues. So this only controls the degree of weight SHORTAGE that is acceptable.

The __RP parameter is important when SMALL DISPENSE requests for color or additive are made. Large PERCENT errors are more likely to occur when very small dispenses are requested.

The __RD parameter is important when LARGE DISPENSE requests for color or additive are made. Large GRAM weight errors are more likely to occur when very large dispense percentages are being requested.

Depending on the accuracy of the metering device, a certain amount of hunting is to be expected from one dispense to the next. Allowing the software to stop trying when it gets sufficiently close to the tare results in more perfect average dispenses. The mix chamber and the barrel of your process machine average out the small errors that occur from cycle to cycle.

If no shortage is to ever be allowed then these parameters can be set to prevent any shortage from occurring. This will, however, cause an overall error on the plus side.

NOTE: Remember that EITHER ONE of the two parameters listed here will cause retries to occur. BOTH parameter conditions must be met before the process will continue, with one exception: If the ALARM parameter (__AL) is set to 00000, indicated that you do not want the process to stop, then these two RETRY parameters will have no effect. The first dispense will always be accepted and no retries will be made.

__LA (change if you change metering device)

__LA is the lag TIME before dumping actually starts. This lag time is the time it takes for the dispense system to mechanically respond to the controller's signal to start. Lag time is automatically added to all dispense times.

Changing the means by which a device is operated such as using a different diameter air cylinder, or a different drive system for an auger feeder may require a change in this parameter.

These parameters represent the number of interrupts (time) that pass before the feeder or dispense system actually begins to dispense. There are 244 interrupts per seconds. To determine these times, use the TIME dispense function in the Manual mode (KEYPAD instructions).

Following the instructions given in the KEYPAD portion of the manual (TIME key), start with a dispense time of 1 (001). Try successively higher time numbers until some movement is noted in the mechanical device and a minimum amount of material IS dispensed on each try. This is the MINIMUM lag time number; the lowest number that DOES cause some movement and DOES result in a minimum dispense. Add 5 to this time period and enter as the lag time. Lag times that are too short can cause problems. That is why the MINIMUM lag time determined above should be increased by 5 as a safety factor. Use minimum plus 5.

These numbers are preset at the factory for the equipment we have supplied. When a dispense of only a few grams or a fraction of a gram is required, the __LA number is very important. A lag time number that is too small will result in no dispense at all because of inadequate time for the device to operate. A lag time number that is too big may result in over dispenses when very small amounts are called for. Since too small a number may stall the process, always add 5 to the minimum as a safety.

Typical LAG TIMES are: (minimum plus five)
12 - for an AC motor being powered through a relay.
20 - for a 1" air cylinder sliding a dispense valve.
127 - for a CONAIR automatic speed controller.

PRC (not necessary to ever change this)

PRC is the maximum allowable PERCENT rate change per cycle. If a large dispense error occurs, flow rate corrections do not exceed this percent number. This prevents large swings in timing of dispenses and provides for stable dispense rates under difficult conditions. For example, when dispense quantities are very small (one or two grams), overfeeding by several grams is a distinct possibility. This type of error represents a very large percentage error to the controller. However, a large correction would not be appropriate but, instead, would cause a "hunting" of dispense time that would result in further large errors. This parameter prevents this.

STL (probably no need to ever change this)

STL is the TIME period allowed to pass after a dispense has occurred, but before a weight reading is taken. This settle time allows falling pellets to reach the bin and also prevents their impact with the bin from adding to the weight reading.

LCL, LCH, LCF and LCZ

These four parameters are set to match the characteristics of the type of load cells used in your system. DO NOT ALTER THEM. LCL and LCH are the acceptable LOW and HIGH limits of load cell output expressed as pulses per gram of weight. LCF is the lowest acceptable FULL scale load cell output expressed as raw signal pulses per second. LCZ is the highest acceptable ZERO scale output. The LCF and LCZ numbers stored here are multiplied by 256 before being used by the software.

CHANGING PARAMETERS

To change a PARAMETER, the sequence of keystrokes is as follows:

Press: *	Display will say:	(PASSWORD)
Press: 22222	Display will say:	(P x.x)
Press: PARA	Display will say:	(RRAxxxxx)
Press: PARA	Press again to walk FORWARD through list.	
Press: *	to BACK UP in the list.	

When the PARAMETER you want is displayed, enter a new setting using the number keys. You must enter 5 digits. Use leading zeros.

Press: EXIT	Display will say:	(P x.x)

Additional information can be found in the KEYPAD section

SAVING PARAMETERS IN THE EEPROM

If the changes you have made are PERMANENT, SAVE them in the EEPROM

Sometimes during normal operation, electrical noise of RF (Ratio Frequency) noise will corrupt the processor memory. It may be necessary to do a CLEAR to fix this problem.

A "CLEAR" will clear all data from memory and replace it with information stored in the EEPROM.

So it is a good idea to have an exact copy of RAM stored in the EEPROM for use in such an emergency.

To copy ALL PARAMETERS into the EPPROM, the sequence of keystrokes is as follows:

Be in PROGRAM mode, first 2 steps above:
Display will say: (P x.x)

Press:	*	Display will say:	(INSTR --}
Press:	23	Display will say:	(SAVING)
Wait:	when done,	Display will say:	(P x.x)
Press:	EXIT	Display will say:	(x.x)

With this done, all correct Parameters may be restored from EEPROM to RAM at any time by doing a CLEAR.

To do a CLEAR, hold the "CE" key down when turning POWER ONLY.

CLEAR - ROUTINE

A "CLEAR" routine is available that will clear all data, flags, and all other current information from memory. Since MEMORY is battery backed up, turning power off does not clear all fields. A great deal of information is intentionally held for later use. A "CLEAR" routine will clear all RAM data and start with the information stored in the EEPROM. This is the same data that existed when new or data that you may have intentionally saved earlier. All current flow rate calibration numbers that the unit has "learned" will be overwritten.

To execute a "CLEAR", hold down the "CE" key while turning POWER ON, then release. When done correctly, the display will say (CLEAR).

CLEAR does not clear EEPROM information but instead loads EEPROM into RAM. Load Cell weight calibration numbers are NOT lost.

(To load EEPROM with correct RAM information, see KEYPAD, *23).

CLEAR ALL - RESTART

The same as the CLEAR, above, but all EEPROM information is also cleared.

There are only TWO times when you want to do a CLEAR ALL.

1. When a NEW PROGRAM CHIP has been installed.
   New chips often have different PARAMETER table layouts. Information may reside in memory locations that do not match the new program. A CLEAR ALL - RESTART fixes this.

2. When all else fails.
   A CLEAR ALL - RESTART will sometimes fix problems that the simple CLEAR routine misses.

The keys to press on power up are VIEW, BTCH, and EXIT (Top row, left, center, and right). Hold all three down as power is turned on, then release. When done correctly the display will say (CLEARALL).

LOAD CELL calibration will be lost. You will have to follow the Load Cell calibration procedure given in this manual.

Since parameter table information is lost, you will want to reenter parameters that were previously modified. See BRIEF EXPLANATION of PARAMETERS for a quick review of which ones might have been changed.

Be certain that your unit displays the proper MODEL number when you turn on power. If not, see SELECTING CORRECT MODEL.

CORE DUMP

During production or between cycles, the controller can be forced to print a CORE DUMP of Memory. This is helpful to us when elusive problems are occurring related to non-predictable environmental problems. If you are having reoccurring problems, we may ask you to use this routine during production to help us diagnose the problem.

To obtain a MEMORY CORE DUMP, have a printer connected. Press three keys at the same time; the PARA, FULL, and ALRM keys; bottom row, left center and right.

SELECTING CORRECT MODEL

Controllers are programmed to control all SEVEN basic models of Weigh Scale Blenders. The MODEL number that your unit is set for will be displayed during the start up sequence every time power is turned on.

The possible models are:

MODEL	BATCH WEIGHT (GRAMS)	WEIGH BIN DIMENSIONS	# DISPENSE VALVES	LOAD CELL RATING
122	1000	10 x 6 x 6 high	2	1 @ 3 K
131	1000	10 x 6 x 6 high	3	1 @ 3 K
140	1000	10 x 6 x 6 high	4	1 @ 3 K
220	2000	10 x 10 x 7 high	2	2 @ 3 K
420	4000	10 x 10 x 10 high	2	2 @ 10 K

The addition of feeders will change the last digit of the model number. This digit can be ignored for selecting the correct Model.

1000 and 2000 gram systems with 3 kg. load cells; weights are displayed in tenths of grams (xxxx.x).

4000 gram systems with 10 kg. load cells; weights are displayed in full grams (xxxxx).

If your unit is NOT set correctly to match the hardware you have, you must change it. To do so:

Turn power on. From the NORMAL mode:

Press: *	Display will say: (PASSWORD)
Press: 97531	Display will say: (MOD 240) or whatever model it is currently set for.
Press: *	To walk the display through all five models. When the model you want is displayed, then:
Press: EXIT	Wait a few seconds. Unit will reset and restart as the system you have selected.

When switching models, all parameter table information is lost and the new "default" information for this model is loaded from ROM.

HARDWARE MAINTENANCE

Hardware Adjustments
Recalibration of Load Cells
Parts List
Wiring Diagram
Warranty

HARDWARE ADJUSTMENTS

AIR PRESSURE

Set AIR PRESSURE to about 80 PSI for best accuracy. However, lower pressures will work. If your plant air fluctuates, set the regulator to the low end so that the dispense valves always will see a consistent pressure.

LEVEL SENSOR

Sensor Position:

The sensor should protrude into the mix chamber about 1/4 inch past the inside surface of the stainless mounting plate. If it does not protrude far enough, it will sense the mounting plate itself. If it protrudes too far, it will sense the mix blade. Relocate the sensor if necessary.

Adjusting sensor sensitivity:

1. Remove the small black plastic screw from the rear of the sensor (next to the LED light). The adjustment screw is recessed in the sensor behind this access cover screw. You will need a very small screwdriver to reach it.
2. Fill the mix chamber until the sensor is about 3/4 covered.
3. Turn screw counter-clockwise until the LED goes OFF.
4. Then turn clockwise until the LED just goes ON.
5. Empty the chamber and check to be sure the sensor LED stays OFF when the mix blade passes near it.
6. Replace the plastic access cover screw.

WEIGH BIN DUMP VALVE (SOFT CLOSE)

The WEIGH BIN DUMP VALVE should be adjusted to close softly. An air flow needle valve is installed near the quick disconnect so that air flow to the flap air cylinder may be restricted. Adjust as required for a soft close.

SLIDE VALVES

Slide valves must move very freely. If they seem to jam slightly as they reach the full extended position (closed), this may be due to the air cylinder mount being slightly bent. If someone has pulled down or pushed up on the air cylinder, they may have bent the cylinder mount. You can correct this by pressing up or down on the cylinder as required to correct the problem.

If you process very hard pellets (polycarbonate and glass filled resins), your slide gate dispense valves may stick closed occasionally. We provide spacers that limit the full stroke of the air cylinder. This stops the slide from going any further than the just closed position and prevents jamming. Call us for information.

INTERNAL MIX MOTOR AND AUGER FEEDER FUSES

The MIX MOTOR timed power source and the AUGER FEEDER OUTLETS are driven by internal solid state plug-in relays. A small 5 amp glass fuse is located to the right of each relay. A spare fuse is also located on the board if replacement is necessary.

RECALIBRATION OF LOAD CELLS

This unit was properly calibrated at the factory to match the load cells that were supplied with it. If you are going to recalibrate, note the following.

Recalibration can not be done until the Recalibration flag is turned ON. The proper sequence of keystrokes is given below.

BE SURE the load cell plug is plugged into the side of the controller.
BE SURE the weigh bin is hanging from the load cells freely.
BE SURE the air line to the dump valve is connected as it would be during normal operation. (A disconnected air line adds weight.) Air pressure to the line is not necessary.
BE SURE there is nothing touching the weigh bin or air line.
BE SURE the bin is EMPTY when ZEROING the load cells.

ZERO WT. must be done before FULL WT. Since changes in ZERO WT will also shift the FULL WT scale by the same amount, it may not be necessary to go any farther than this.

When SETTING FULL WEIGHT, BE SURE you know the exact weight (in GRAMS) that you are adding to the bin. Place this weight in the bin and then press the FULL WT. key. Four dashes (FULL ____) will be displayed. Enter the EXACT weight in GRAMS that you have placed in the bin. The weight should be close to the design full batch weight for your system, (1000, 2000 or 4000 grams).

When done, there is no need to turn the Calibration Flag off. The next time power is turned off this flag will be reset to OFF.

The sequence of keystrokes is as follows:

Press: *	Display will say:	(PASSWORD)
Press: 22222	Display will say:	(P x.x)
Press: *99	Display will say:	(CAL OFF)
Press: *	Display will say:	(CAL ON)
Press: EXIT	Display will say:	(P x.x)
Press: ZERO	Display will say:	(--WAIT--)
	followed by:	(P 0.0)

Place a 1000 (or 2000 or 4000) gram weight in the bin.

Press: FULL	Display will say:	(FULL____)
Press: 2000	Display will say:	(--WAIT--)
	followed by:	(P 2000.0)
	If YOUR weight is not exactly 2000 grams, then enter the ACTUAL weight that YOU use.	
Press: EXIT	Display will say:	(2000.0)
Remove weights:	Display will say:	(x.x)

Actual displayed weights may be plus or minus a few grams.

After FULL weight calibration, if the display says (BAD CELL), the weight you are using does not match the weight you entered, the weigh bin is not free to move, OR the load cells are bad.