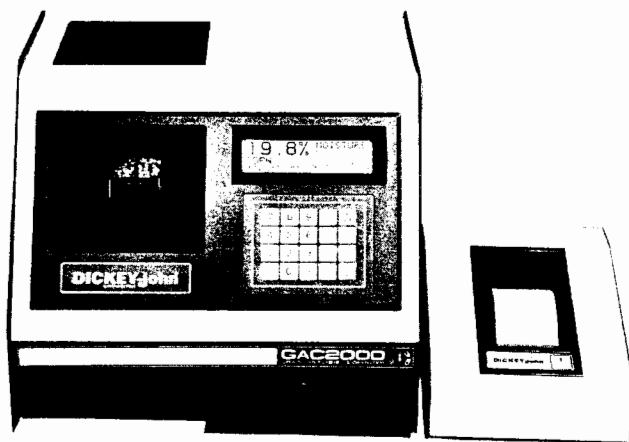


Model GAC2000 GRAIN ANALYSIS COMPUTER



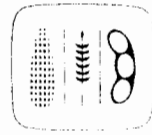
INSTALLATION and OPERATING MANUAL

first in agrionics



DICKEY-john[®]
CORPORATION

Open Doors) 5.6 Press Load

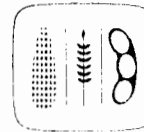


GAC2000

GRAIN ANALYSIS COMPUTER

TABLE OF CONTENTS

INTRODUCTION.....	1
CONDITIONS FOR USE.....	2
ACCESS CODE.....	2
INSTALLATION.....	3
UNPACKING INSTRUCTIONS.....	3
GRAIN DRAWER BOTTOM REMOVAL.....	4
KEYBOARD CONTROLS.....	5
DISPLAY CONTRAST CONTROL.....	6
STARTUP SCREEN.....	6
OPERATION.....	9
MAIN MENU.....	9
1. GRAIN MOISTURE MEASUREMENTS.....	10
A. ALPHA ENTRY.....	13
2. SELECT GRAIN MENU.....	14
3. CALIBRATION MENU.....	14
3.1 VIEW CALIBRATION.....	15
3.2 ENTER/CHANGE CALIBRATION.....	16
3.3 PRINT CALIBRATION LIST.....	19
3.4 OBTAIN CALIBRATION DATA.....	20
4. SETUP MENU.....	23
4.1 CLEAR COUNTER.....	23
4.2 ID OPTIONS.....	24
4.3 OUTPUT OPTIONS.....	25
4.4 EDIT ACCESS CODE.....	26
4.5 DATE/TIME MENU.....	27
4.5.1 SET TIME MENU.....	28
4.5.2 SET DATE.....	28
4.5.3 SET DATE FORMAT.....	29
4.6 LABELS MENU.....	29
4.6.1 EDIT USER NAME.....	30
4.6.2 EDIT TEXT STRINGS.....	31
4.6.3 EDIT FACTOR NAMES.....	32
4.7 COM MENU.....	34
4.7.1 COM PORT SELECT.....	34
4.7.2 OUTPUT FORMAT.....	35
4.7.3 COM1 DATA SETUP.....	36
4.7.4 COM1 CONTROL.....	37
4.7.5 NON-ACTIVE.....	37
4.7.6 COM2 FORMAT.....	37
4.7.7 COM2 DATA SETUP.....	38
4.7.8 COM2 CONTROL.....	39
4.8 SERVICE MENU.....	39
5. TEST MENU.....	40
5.1 NON-ACTIVE.....	40
5.2 COM1.....	40
5.3 COM2 TRANSMIT.....	40
5.4 NON-ACTIVE.....	41
5.5 DISPLAY.....	41
5.6 DIAGNOSTIC MODE.....	41
5.7 TEST NETWORK MODE.....	42
5.8 PARAMETERS MENU.....	42
GAC2000 MAINTENANCE.....	43
1. CELL CLEANING.....	43
2. FUSE REPLACEMENT.....	43
3. GAC2000 ERROR CODES.....	43
APPENDIX A.....	45
Dj GAC2000 COMMUNICATION PORTS.....	45



INTRODUCTION

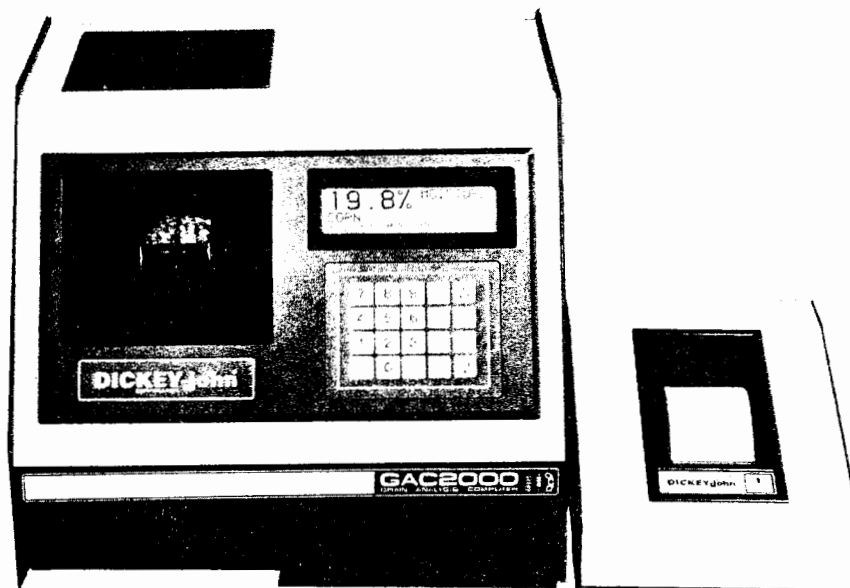



Figure 1

The DICKEY-john Grain Analysis Computer GAC2000 was designed to provide ease of operation and a direct readout of the moisture content, approximate density (test weight per bushel) and the temperature of a grain sample. Also displayed are the product name, calibration date and the sample ID number. Pressing the NEXT PAGE  Key, the display will show the D1(conductance), D2(capacitance), D3(weight) and D4(temperature) values along with the current date and time.

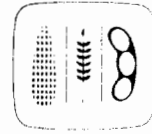
The GAC2000 with its microprocessor based electronics features:

- Memory for up to 32 different grain calibrations.
- Alphanumeric sample identification numbers.
- Automatic ranging, switching to predetermined calibrations if moisture is above or below limits.
- Two RS232 output ports (DCE and DTE) for a printer and external computer control.
- Self-check mode to assure proper operation.
- Error messages if sample moisture, approximate density or temperature is outside calibration limits.
- Help screens for simplified operation.

The grain sample handling system provides fully automatic operation which eliminates possible errors in weighing of samples, measuring sample temperature, reading charts and making calculations. The grain sample is simply loaded into a hopper and from that point the sample handling system takes over.

GAC2000

GRAIN ANALYSIS COMPUTER



The sample is automatically loaded into the test cell and leveled off to assure proper cell packing and consistent sample volume. While in the test cell the GAC2000 with its microprocessor based electronics makes the necessary measurements and computations for percentage moisture, approximate density (test weight) and sample temperature. After the measurement cycle is completed, pressing the UNLOAD or LOAD key will cause the test cell to rotate 180° to dump the sample and return to its upright position.

If an optional printer is connected to the GAC2000, a printout containing the facility name and address, current date and time, sample ID number, product name, calibration date, percent moisture, approximate density, temperature, machine serial number and D1 through D4 values will be printed. **NOTE:** This printout can be setup to be automatically printed at the end of the measurement cycle or printed only when the PRINT key is pressed.

CONDITIONS FOR USE

Supply Voltage and Frequency Limits: 85VAC to 264VAC 48-62Hz at 0.4A Max.

Operating Temperature Range: 41°F (5 °C) to 113 °F (45 °C) (For optimum results, operation should be restricted to the range 50 °F (10 °C) to 104 °F (40 °C)), if exceeded ERROR will appear.

Grain Temperature Limits: 32 °F (0 °C) to 122 °F (50 °C) (**NOTE:** The maximum allowable temperature difference between empty cell and grain under test is 36 °F (20 °C)), if exceeded ERROR will appear.

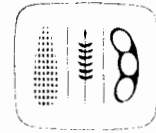
Classes/Kinds of Grain or Seed: See latest Calibration Bulletin.

GAC2000 Weight: 26 lbs. (11.8 kg) [Shipping Weight: 33 lbs. (15.0 kg)]

ACCESS CODE

THE GAC2000 ACCESS CODE IS SET TO **0000** AT THE FACTORY.

Refer to paragraph 4.4 EDIT ACCESS CODE if you wish to change the access code.



INSTALLATION

UNPACKING INSTRUCTIONS

Before shipment, the GAC2000 was inspected and tested and found to be free of mechanical and electrical defects. As soon as the GAC2000 is unpacked, visually inspect for any damage that may have occurred in transit. Save all packing materials until inspection is complete and no damage is found. If damage is found, file a claim with the carrier. Also, notify your DICKEY-john Sales Representative.

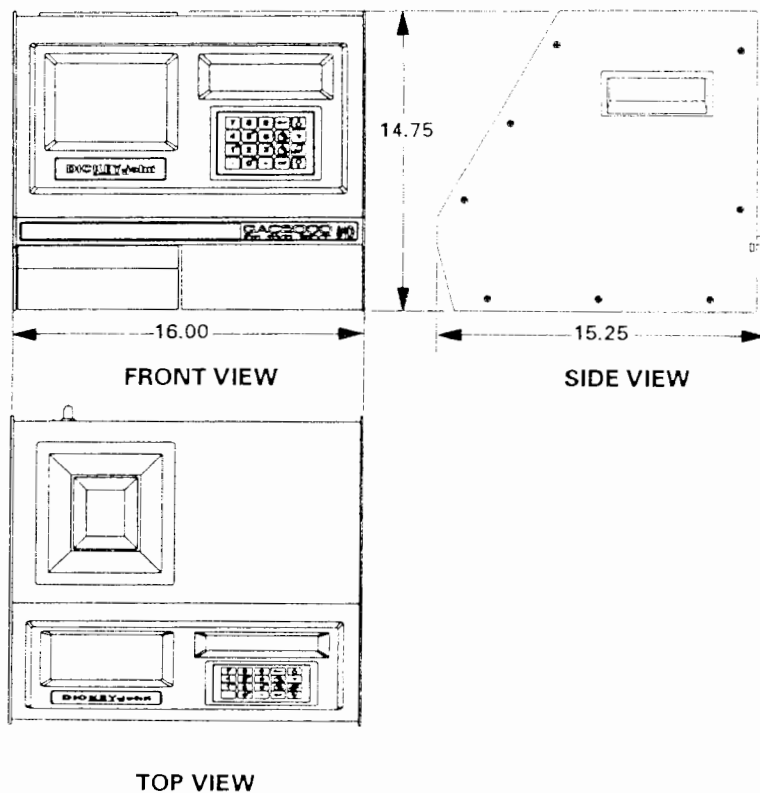


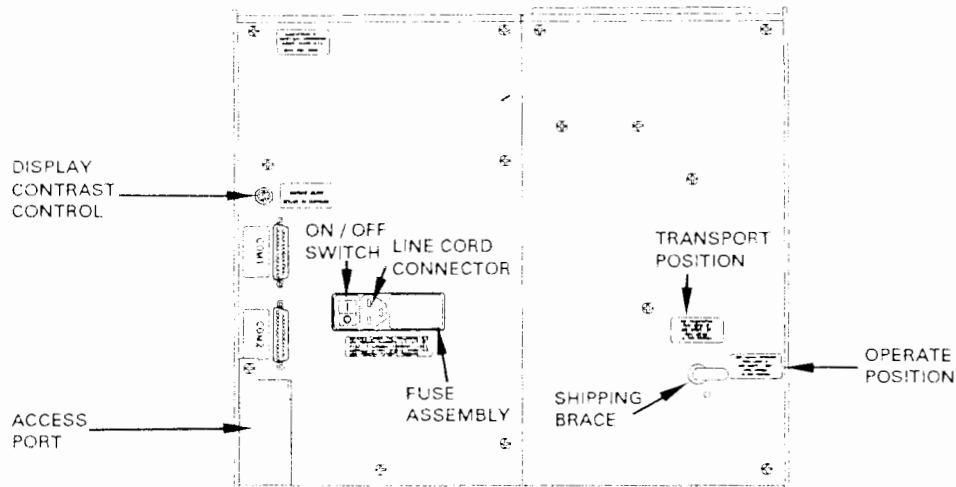
Figure 3

The GAC2000 should be installed and maintained in a level position and in a location where it will be protected from rapid changes in ambient temperature. Also, the GAC2000 must not be used in hazardous (classified) locations as defined in Article 500 of the NFPA Handbook of the National Electrical Code.

Refer to the above mounting and outline dimensions illustration and place the GAC2000 on a table, desk or shelf which has sufficient strength to support its weight. **NOTE:** A cutout in the mounting surface can be used under the sample drawer to allow tested samples to fall into a larger container. The bottom of the sample drawer is removable.

GAC2000

GRAIN ANALYSIS COMPUTER



GAC2000 REAR VIEW

Figure 4

The GAC2000 is shipped with the grain cell supported by a nonremovable shipping brace. This brace is controlled by a handle, located on the rear panel behind the grain cell. Push in on the handle and rotate counterclockwise to the operate position. **NOTE:** This brace must be in the shipping position anytime the GAC2000 is transported.

Connect the GAC2000 line cord to the connector on the rear panel and the other end to an appropriate 3-wire (grounded) outlet.

WARNING

THE GROUNDING PIN ON THE LINE CORD IS CONNECTED TO THE GAC2000 CHASSIS. IF AN ADAPTER WITH A GROUNDING WIRE IS USED, MAKE SURE THAT THE GROUNDING WIRE IS CONNECTED TO A GOOD EARTH GROUND, OTHERWISE A SHOCK HAZARD MAY BE PRESENT.

GRAIN DRAWER BOTTOM REMOVAL

To use a cutout on the work area so that the grain samples will fall into a separate container under the GAC2000, the bottom of the grain drawer may be removed by prying up on the two plastic tabs at the front of the grain drawer.

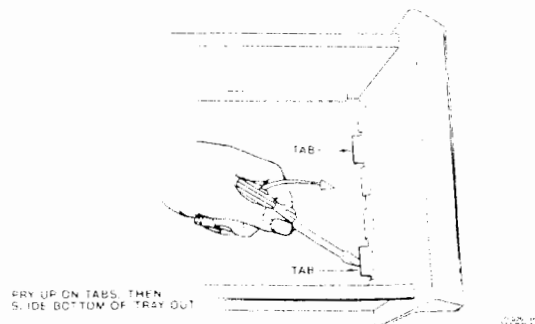


Figure 4a

Pry up on each of the two tabs with a small screwdriver and slide bottom cover away towards the rear of the grain drawer. **DO NOT BREAK TABS.**

Replace the grain drawer into the GAC2000 to keep grain from spilling onto the work surface.

To replace drawer bottom, slide bottom towards front of grain drawer until it latches under the two plastic tabs.



GAC2000 KEYBOARD CONTROLS

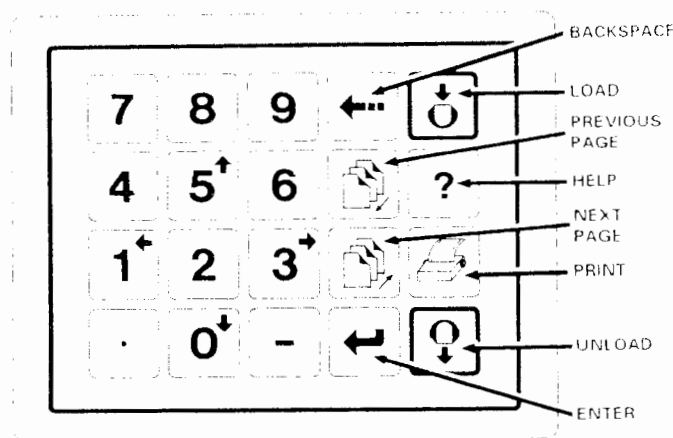


Figure 5

All the Operator Controls, except the Power ON/OFF switch, are shown in the above illustration; the Power ON/OFF switch is located on the rear of the unit to the left of the line cord.

KEYBOARD - The 20-key keyboard is a pressure sensitive device that takes only light finger pressure to actuate the keys. Each valid keystroke is accompanied by a short tone burst, and an invalid keystroke is accompanied by a longer tone burst.

FUNCTION KEYS



BACKSPACE - The BACKSPACE key is used when entering text or numbers to backup and delete the last entered character.



PREVIOUS PAGE - The PREVIOUS PAGE key is used to get back to the previous menu or page.



NEXT PAGE - The NEXT PAGE key is used when the <more> prompt is displayed (lower right corner of the display) and will result in more information being displayed.



ENTER - The ENTER key is used to accept an entered string of characters.



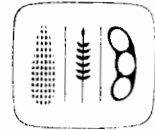
LOAD - The LOAD key initiates a grain cell loading sequence. **NOTE:** The display will prompt the operator to fill sample hopper, enter ID number, then press LOAD to begin.



HELP - Provides context sensitive help. Information for the selected mode will be displayed.



PRINT - The PRINT key is used to obtain a printout of moisture results, calibration data or the list of grain calibrations. Also used to obtain duplicate copies.



UNLOAD - The UNLOAD key is used to dump the cell.



DECIMAL POINT - The DECIMAL POINT key is used to enter a decimal point.



DASH - The DASH key is used to enter a dash.



&



LEFT AND RIGHT ARROWS - The LEFT and RIGHT ARROW keys are used to move the cursor horizontally when performing alpha entry and set a function to its desired state when in the SETUP mode.



&



UP AND DOWN ARROWS - The UP and DOWN ARROW keys are used to move the cursor vertically when performing alpha entry and are used to select a function when in the SETUP mode.



TO



NUMBERS - The NUMBER keys are used to make MENU selections and enter digits from the keyboard.

DISPLAY CONTRAST CONTROL

The DISPLAY CONTRAST CONTROL is located on the rear panel (see figure 4) above the printer ports and requires a flat bladed screwdriver to adjust.

This control sets the contrast between the displayed characters and the display background. Set the control to provide the desired contrast.

STARTUP SCREEN

Place the ON/OFF Switch to ON. The display will show the STARTUP SCREEN (approximately 15 seconds) as follows:

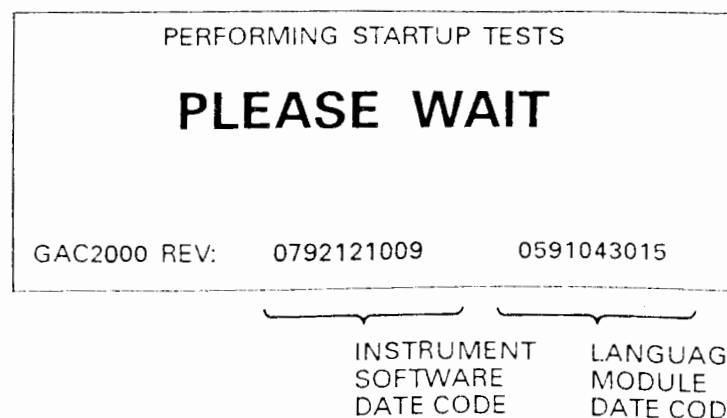


Figure 6

GAC2000

GRAIN ANALYSIS COMPUTER



Both the Instrument Software and Language Module Date Code consist of ten digits. The first two digits are the software version number (vv), the next six digits are the date code (yymmdd) and the last two digits are the Time (Hr) in 24 hour clock format.

GAC2000

GRAIN ANALYSIS COMPUTER



NOTES



OPERATION

The GAC2000 Grain Analysis Computer contains a backlighted Liquid Crystal display (LCD) which is used to display grain moisture information and prompting messages for the operator. After power up, the MAIN MENU is displayed.

MAIN MENU DESCRIPTION

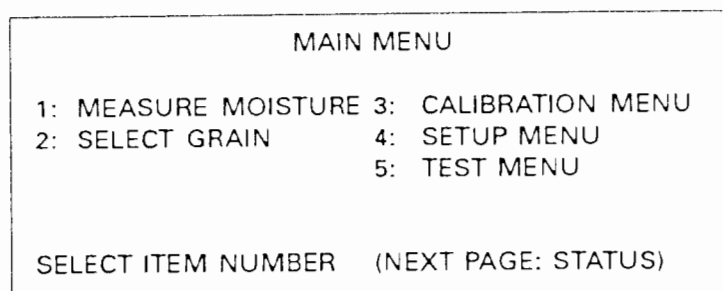



Figure 9

1. **MEASURE MOISTURE** - Measure Moisture provides the moisture content of a grain sample.
2. **SELECT GRAIN** - Select Grain is used to select the type of grain being measured. Up to 32 different grain calibrations can be installed.
3. **CALIBRATION MENU** - The Calibration Menu is used to view, edit/enter, and print grain calibration numbers. Calibration Data can be gathered for generating new calibrations.
4. **SETUP MENU** - Setup Menu is used to set date, time, printer/communications output formats and machine parameters.
5. **TESTS MENU** - Tests Menu is used to perform various test procedures that aid in troubleshooting and determining overall status of the GAC2000.

Each Main Menu selection is initiated by pressing the number key representing the location of the selection in the list (number shown to the left of the selection). The following procedures describe each section.



1. **MEASURE MOISTURE** - This selection is used to measure the moisture content of a grain sample.

Step 1. Turn power on, after the Startup Tests the MAIN MENU is shown. Select Measure Moisture by pressing numerical key 1. The display will show the first eight grains (page 1 of 4) of the calibration list. To select a grain, first note the number to the left of the grain and then press that number key. **NOTE:** Press the NEXT PAGE  key to display (page 2 of 4) the next eight grains (up to 32 grain calibrations, 4 pages, can be stored).

Once a grain has been selected (after power up), selecting Measure Moisture from the Main Menu, the following display will be shown:






Figure 10

After approximately 10 seconds the display will show the following (unless the ID WAIT option is on, if so go to Step 3):



Figure 10a

Step 2. Fill sample hopper with grain. Grain Name and its calibration issue date will be shown. If desired, key in a Sample Identification Number (15 characters maximum) and press ENTER . **NOTE:** See ALPHA ENTRY procedure if ID number is to contain alpha characters.

If LOAD  is pressed before ENTER , whatever is on the ID line is accepted as input.

After LOAD  is pressed, proceed to Step 4.



Step 3. When the ID WAIT option is on and Measure Moisture is selected, the display will show:


FILL SAMPLE HOPPER AND	
ENTER SAMPLE ID	
WHEAT HRW	880518
ID:	


Figure 11

Fill sample hopper then key in the Sample ID Number and press ENTER , the display will show:

PRESS LOAD TO BEGIN	
WHEAT HRW	880518
ID: AB1234	

Figure 11a

Press LOAD  to begin sample moisture measurement.

Step 4. After LOAD  has been pressed, the display will show the following (unless factors are defined, if so go to step 5):

MEASURING	
PLEASE WAIT	
WHEAT HRW	880518
ID: AB1234	

Figure 11b



After the measurement is complete the following Results 1 display appears (example):

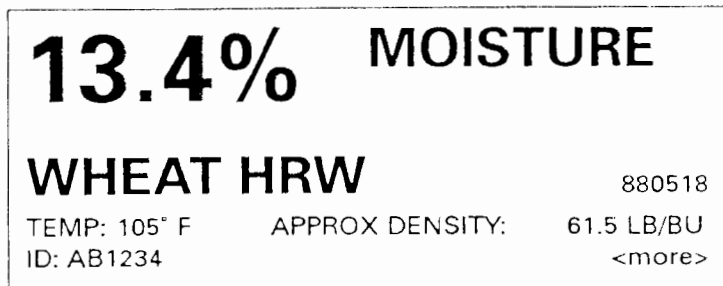



Figure 12

The display shows the Grain Name and percent moisture of the sample. Also displayed is the sample temperature in degrees Fahrenheit (Centigrade), Approx. Density in LB/BU (kg/hl), Sample ID and Calibration issue date.

Pressing NEXT PAGE  will provide the D1 through D4 values as follows:

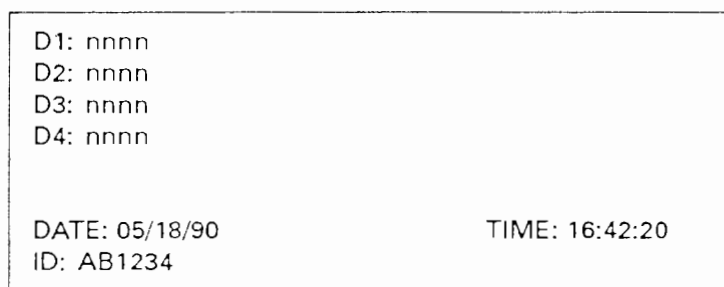




Figure 12a

If the MORE prompt is displayed in the lower right corner of the above screen, pressing NEXT PAGE  will display the FACTORS screen.

Step 5. When LOAD  is pressed and the grain calibration factors defined, the display will show:

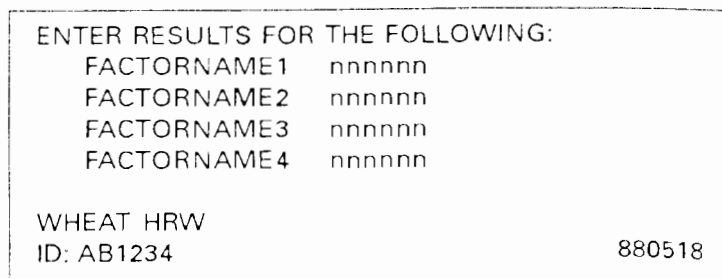
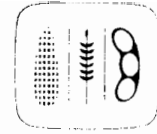



Figure 12b



The above is an optional screen which permits the user to enter data which will appear on the printed results. Up to four user defined factors can be displayed and printed if specified in the Calibration. If no factor names are specified, this screen will not appear.



IMPORTANT: When Factors are specified an entry must be made for each one before the Moisture Measurement routine can be completed. Entries can be up to six digits in length (numeric only).

A. ALPHA ENTRY



Alpha Entry is performed through a special alpha screen. When an entry contains letters the alpha screen is accessed by pressing the NEXT PAGE  Key; the display screen is as follows:

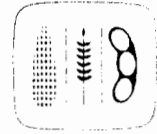
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
U	V	Q	X	Y	Z	_			#	\$	%	&	()	*	,	-	.	+
S1	S2	S3	S4	S5	S6	S7	S8	S9	S10										
TEXT: _																			

Figure 13

Step 1. The home position of the cursor is on the "Space" (blank) character. Use the arrow keys to position the cursor under the desired letter, press ENTER , letter will appear on the bottom line. Once the text string is formed, entering is accomplished by returning to the PREVIOUS PAGE and pressing the ENTER  key.

S1 through S10 are character strings which can be composed as described in paragraph 4.6.2 EDIT TEXT STRINGS. These strings can be frequently used character combinations (up to 12 characters in length) such as company names or truck identification numbers.

To use the character string place the cursor under the S number and press ENTER , the character string will appear on the TEXT line. Entering is accomplished by returning to the PREVIOUS PAGE and pressing the ENTER  key.



2. SELECT GRAIN MENU

The GAC2000 has the capability of storing up to 32 different grain calibrations. This menu allows the operator to select the grain calibration of interest.

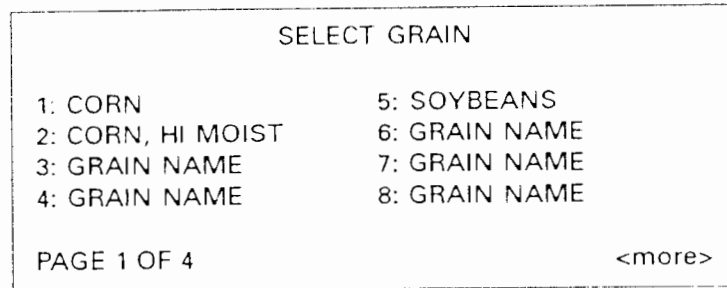




Figure 14

Step 1. From the MAIN MENU, press the 2 key, the Select Grain Menu will show the first eight grains.

Press the NEXT PAGE  key to display the next eight grain names. Note the prompts in the lower corners of the display; lower left is page number and lower right indicates if more pages are available. When page 4 is reached the <more> prompt disappears. PREVIOUS PAGE  key returns to the previous page.

Select a grain by going to the page number where the Grain Name is displayed, then simply press the number key that corresponds to the number adjacent to the desired grain.

Once the selection is made, the GAC2000 will automatically enter the Measure Moisture Mode.

3. CALIBRATION MENU

The Calibration Menu allows the operator to perform the following tasks: View the calibration constants of a selected grain, Enter a new calibration or change an existing one, Print the entire list of grain calibrations in memory and Obtain calibration data necessary to generate a new calibration. Selecting a function is achieved by simply pressing the number key that corresponds to the number adjacent to the desired function.




- 3.1. **VIEW CALIBRATION** - The View Calibration function allows the user to view and/or print a selected grain calibration. Editing cannot be performed in this function.

Step 1. Pressing numerical key 1 selects View Calibration. The display will show:

```
                SELECT GRAIN TO VIEW
1: CORN                5: SOYBEANS
2: CORN, HI MOIST     6: GRAIN NAME
3: GRAIN NAME         7: GRAIN NAME
4: GRAIN NAME         8: GRAIN NAME

PAGE 1 OF 4                <more>
```

Figure 15

Step 2. Select a Grain Calibration by pressing the number key corresponding to the number adjacent to the desired grain. **NOTE:** Use the NEXT PAGE  key to display pages 2, 3 and 4 of the SELECT GRAIN Menu. Displayed page number is shown in the lower left corner of the display.


Step 3. After a Grain is selected the display will show:

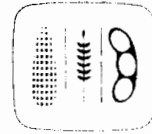
```
                VIEW CALIBRATION
GRAIN: WHEAT HRW      RANGE: nn - nn%
ISSUE: 890701
  K1: nnnn      K4: nnnn      K7: nnnn
  K2: nnnn      K5: nnnn      K8: nnnn
  K3: nnnn      K6: nnnn      K9: nnnn

                                <more>
```

Figure 15a

Step 4. The VIEW CALIBRATION screen shows the Grain Name, Calibration Issue Date, Moisture Range and the Calibration K numbers.

Pressing the PRINT  key will provide a printout of this screen. **NOTE:** If FACTORS have been defined and AUTO RANGE specified in the calibration this information will also be printed.



Pressing the NEXT PAGE  key will display the FACTORS screen.


```
VIEW CALIBRATION
GRAIN: WHEAT HRW

FACTOR1:
FACTOR2:
FACTOR3:
FACTOR4:

<more>
```

Figure 16

The FACTORS screen shows the Grain Name and up to four defined FACTORS. Factors are foreign material contained in grain, such as chaff, weedseed, etc.

Pressing the NEXT PAGE  key again will display the AUTO RANGE screen:

```
VIEW CALIBRATION

AUTO RANGE FOR: WHEAT HRW

IF ABOVE MAX MOIST TRY: GRAIN NAME
IF BELOW MIN MOIST TRY: GRAIN NAME
```

Figure 16a

Step 5. The AUTO RANGE screen shows the Grain Name, and calibration that is automatically tried if above Maximum Moisture Limit and calibration that is automatically tried if below Minimum Moisture Limit.

3.2. ENTER/CHANGE CALIBRATION - The Enter/Change calibration function is used to enter a new grain calibration or to change an existing calibration.

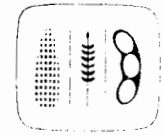
Step 1. Pressing numerical key 2 selects the Enter/Change Calibration function. The display will show:


```
SELECT GRAIN TO ENTER/CHANGE

1: CORN                5: SOYBEANS
2: CORN, HI MOIST     6: GRAIN NAME
3: GRAIN NAME         7: GRAIN NAME
4: GRAIN NAME         8: GRAIN NAME

PAGE 1 OF 4                <more>
```

Figure 16b



Step 2. To change an existing calibration or enter a new calibration, select the grain calibration (if new select a blank location) of interest by pressing the number key corresponding to the number adjacent the desired grain. **NOTE:** Use the NEXT PAGE  key to display pages 2, 3 and 4 of the SELECT GRAIN Menu. The display will show:

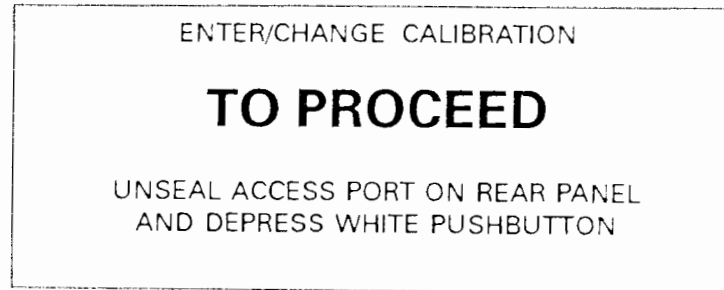


Figure 17

Step 3. To continue, the access plate on the lower right rear panel must be removed and the WHITE push button inside the access hole must be pressed. The display will show:

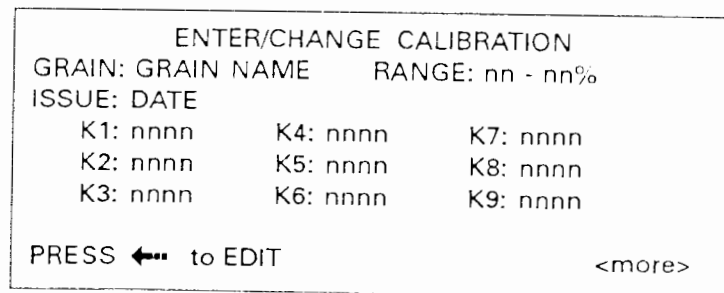




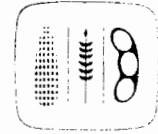



Figure 17a

Step 4. If an existing calibration is selected, the current values will be displayed. The cursor is located in the GRAIN title and is a large block (flashing) on the first character. The large block signifies that alpha characters may be entered using the special alpha screen.




Pressing the BACKSPACE  key causes the bottom prompt to disappear and the cursor to change to a line (flashing). Either alpha (using the alpha screen or numerical (using the number keys) characters may be entered at this time. Use NEXT PAGE  key to select the alpha screen. **NOTE:** Pressing NEXT PAGE  key before BACKSPACE  key, selects entry for AUTO RANGE function.







Pressing the NEXT PAGE  key (after BACKSPACE), the alpha screen will be shown as follows:



A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	
U	V	W	X	Y	Z	_				#	\$	%	&	()	*	,	-	.	+
S1	S2	S3	S4	S5	S6	S7	S8	S9	S10											
TEXT: _																				

Figure 18



Step 5. Enter GRAIN Name of up to 16 characters. Press ENTER  key after each selected character and note that the proper character appears on the TEXT line. After TEXT line is complete, press the PREVIOUS PAGE  key to return to the ENTER/CHANGE CALIBRATION screen. Note that the new grain title is now in place. Press ENTER  to accept GRAIN Title and advance cursor to next position (Issue Date).

Step 6. The cursor is now shown as a block (flashing) in the ISSUE Date position. The large block signifies that this entry can include alpha characters, but normally would contain the calibration issue date in the format YYMMDD.


Pressing the BACKSPACE  key causes the lower left prompt to disappear allowing NEXT PAGE  key to be used to select the alpha screen or remain on the ENTER/CHANGE CALIBRATION screen to enter digits. **NOTE:** Pressing the NEXT PAGE  key before BACKSPACE  key, selects entry for AUTO RANGE function.

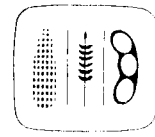
Enter the Calibration Issue Date (up to 8 characters) in the format YYMMDD. Press the ENTER  key to accept Issue Date. **NOTE:** BACKSPACE  key can be used to backspace and delete characters.


Step 7. The cursor will be shown as a line (flashing) under the first digit of K1 (constant). The flashing line signifies that this entry is numerical only.



Key in the K1 constant. Note that when the first digit is entered the remaining spaces are blanked. All four digits of the constant must be keyed in when making a change. Press the ENTER  key to accept the constant. **NOTE:** BACKSPACE  key can be used to backspace and delete characters.

Enter K2 through K9 as described for K1 above.

IMPORTANT: The ENTER  key must be pressed after each constant (4 digits) is entered. If not, the new K value will not be accepted.



Step 8. Press the PRINT  key to obtain a printout of the calibration.

Step 9. Press the PREVIOUS PAGE  key to return to the CALIBRATION MENU or press NEXT PAGE  key to enter the AUTO RANGE calibration selection.

Step 10. The AUTO RANGE screen is as follows:

```


ENTER/CHANGE CALIBRATION

AUTO RANGE FOR: GRAIN NAME

IF ABOVE MAX MOIST TRY: ■
IF BELOW MIN MOIST TRY:

PRESS ← TO SELECT GRAIN, 0 TO DELETE
    
```

Figure 19

Press the BACKSPACE  key and then select the grain calibration to use if the sample moisture is above the upper limit.

Repeat this procedure for the grain calibration to use if the sample moisture is below the lower limit.

Press 0 (zero) key to delete the AUTO RANGE calibration..

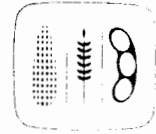
3.3. **PRINT CALIBRATION LIST** - The PRINT CALIBRATION LIST selection provides a printout of all the Grains for which calibrations are stored in memory. The format is as follows:

```

1
2 USER TITLE LINE NO 1      User programmable
3 USER TITLE LINE NO 2      User programmable
4
5 12/12/90      14:30:30      Date & Time
6
7 S/N: nnnnnnnn      Instrument serial no.
8 -----
9 PAGE 1:
10 1: GRAIN 1 NAME HERE      Grain name
11      880615      Calibration Issue Date
12 2: GRAIN 2 NAME HERE
13      870512
14 3: GRAIN 3 NAME HERE
15      891201
16 4: GRAIN 4 NAME HERE
17      nnnnnn
18 5: GRAIN 5 NAME HERE      Grain name
19      880615      Calibration Issue Date
20 6: GRAIN 6 NAME HERE
21      870512
22 7: GRAIN 7 NAME HERE
23      891201
24 8: GRAIN 8 NAME HERE
25      nnnnnn
26 -----
27 PAGE 2:
28 1: GRAIN 9 NAME HERE      (Page 2, grain 1)
29      nnnnnn
30      .
31      etc.
32      .
33      .
34 8: GRAIN 32 NAME ..      (Page 4, grain 8)
35      nnnnnn
36 -----
37
38
39
    
```

*Works only if
4.2.2 Format is
PRN 20. will
not work if
PRN 21 selected*

Figure 19a



- 3.4. OBTAIN CALIBRATION DATA** - The Obtain Calibration Data Mode is used to obtain GAC2000 readings on samples of known moisture percentages (moisture percentage readings obtained by means of an air oven or some other approved method). This procedure will ultimately provide a set of calibration constants for that grain. The GAC2000 readings obtained must be sent to DICKEY-john where the calibration constants for the new grain will be derived.

In order to obtain good calibration data, the samples must be as evenly distributed throughout the moisture range as possible, with no less than two samples per percent of the moisture range. The grain samples should extend at least 2% past each end of the moisture range. The samples should be free of broken pieces and foreign matter. Spoilage and condensation should be avoided.

Step 1. Turn the GAC2000 "ON" and allow approximately ten minutes of warm up time before taking sample readings. Turn printer power "ON".

Step 2. From the MAIN MENU select CALIBRATION MENU by pressing the 3 key.

From the CALIBRATION MENU select OBTAIN CALIBRATION DATA by pressing the 4 key, the display will show:



Figure 20

After self-checks are complete, the display will show:

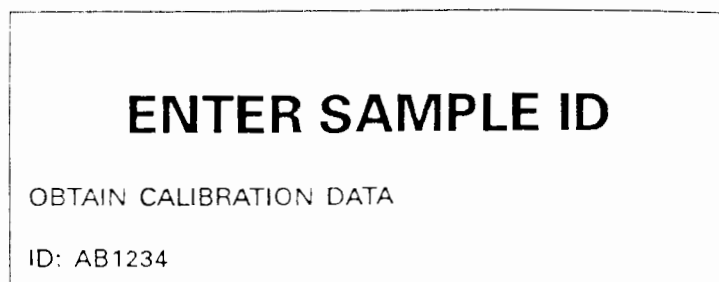




Figure 20a




Step 3. A Sample Identification Number must be entered so that each sample can be identified.

Keyboard enter a sample ID number (use NEXT PAGE  key if alpha ID desired). Press ENTER  key, the display will show:

```
FILL SAMPLE HOPPER AND  
  
PRESS LOAD TO BEGIN  
  
OBTAIN CALIBRATION DATA  
  
ID: AB1234
```

Figure 21

Pour the sample into hopper until it is nearly full. Press LOAD  key. The display will show:

```
MEASURING  
  
PLEASE WAIT  
  
OBTAIN CALIBRATION DATA  
  
ID: AB1234
```

Figure 21a

Step 4. After the measurement cycle is complete, the display will show the four D values as follows:

```
D1: nnnn  
D2: nnnn  
D3: nnnn  
D4: nnnn  
  
OBTAIN CALIBRATION DATA  
DATE: 05/18/90                      TIME: 16:42:20  
ID: AB1234
```

Figure 21b



If a printer is used the printer will print the following:

```

DICKEN JOHN          } FACILITY NAME
ENGINEERING          } AND LOCATION

08 21 98    08 08 04 } DATE/TIME

S N: 8281-          } GAC2000 SERIAL NUMBER
CALIBRATION DATA }
OATS              } WRITE GRAIN NAME
=====

ID: 10


STD. MOIST 13.5%   } WRITE MOISTURE CONTENT

01:    3.9
02:   749.7
03:  2244.2
04:   168.4

=====
    
```

Figure 22

Step 5. Write the grain type under the CALIBRATION DATA as shown. **NOTE:** The Facility Name and Location, Date/Time, GAC2000 Serial Number and CALIBRATION DATA will only be printed when the first sample is run in this mode.

Write the actual moisture percentage of each sample (as obtained by some independent means) next to STD. MOIST:, as shown. Run additional samples by pressing LOAD , fill hopper and enter ID.



```

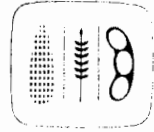
=====
ID: 11          ID: 12          ID: 13
STD. MOIST: 13.2%  STD. MOIST: 14.1%  STD. MOIST: 12.9%

01:    3.5          01:    4.5          01:    3.4
02:   749.2        02:   746.3        02:   754.2
03:  2255.5        03:  2238.3        03:  2244.6
04:   167.6        04:   168.         04:   169.6

=====
    
```

Figure 22a

Step 6. Run as many samples as possible, making sure to write in the actual moisture percentage for each sample. After running the last sample, press the UNLOAD  key. Press the PREVIOUS PAGE  key to return to the MAIN MENU.



4. SETUP MENU

The SETUP Menu is used to reset the cycle counter, set ID options, set output options, set date and time clocks, enter facility name and location, set access codes, communications, and service parameters. From the Main Menu, the Setup menu can be selected by pressing the 4 key.


SETUP MENU	
1: CLEAR COUNTER	5: DATE/TIME MENU
2: ID OPTIONS	6: LABELS MENU
3: OUTPUT OPTIONS	7: COM MENU
4: EDIT ACCESS CODE	8: SERVICE MENU
SELECT ITEM NUMBER	(NEXT PAGE: STATUS)

Figure 23

- 4.1. **CLEAR COUNTER** - Pressing the 1 key selects the CLEAR COUNTER function, the display will show:

CYCLE COUNTER:
ENTER ACCESS CODE:_

Figure 23a

Keyboard enter the access code, press ENTER  key. The display will show:


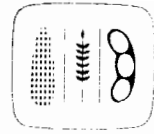

CYCLE COUNTER: nnnnn
THIS COUNTER INCREMENTS AFTER EACH SAMPLE MEASUREMENT OR DATA COLLECTION SEQUENCE IS SUCCESSFULLY COMPLETED.
PRESS  to CLEAR CYCLE COUNTER

Figure 23b



Step 1. This counter increments after each moisture measurement or data collection sequence is successfully completed.

Press the ENTER  key to reset the counter to zero. **NOTE:** The DATE, TIME and CYCLE COUNTER value are automatically sent to the COM 1 and COM 2 Communication Ports when the counter is cleared.

4.2. **ID OPTIONS** - Pressing the 2 key selects the ID OPTIONS screen, the display will show:

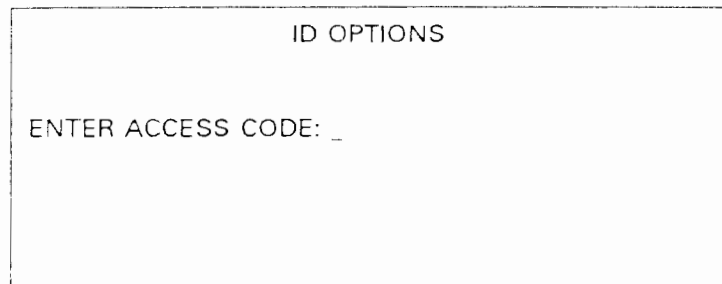



Figure 24

Keyboard enter the access code, press ENTER  key. The display will show:

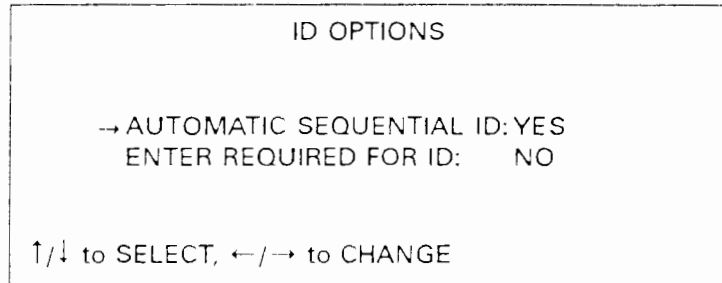




Figure 24a

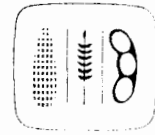
Step 1. Select the desired function by using the up or down arrow key (0 or 5 key). Use the left or right arrow key (1 or 3 key) to set that function to the desired value.

NOTE: The AUTOMATIC SEQUENTIAL ID and ENTER REQUIRED FOR ID functions are mutually exclusive in that they cannot both be enabled (YES) simultaneously.

When the functions are set as desired, press the PREVIOUS PAGE  key to return to the SETUP MENU.

AUTOMATIC SEQUENTIAL ID - If set to YES the trailing numeric portion of the sample ID will automatically increment at the completion of a measurement cycle. Setting to NO turns the Automatic Sequential function off.

ENTER REQUIRED FOR ID - If set to YES the ENTER  key must be pressed to accept the ID number. Setting to NO causes the ID number to be automatically accepted.



- 4.3. **OUTPUT OPTIONS** - The Output Options Mode is used to control what information is displayed and printed. Pressing the 3 key selects OUTPUT OPTIONS, the display will show:

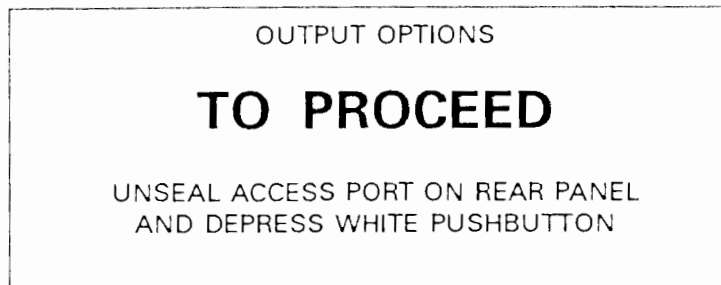


Figure 25

- Step 1. To proceed, the access plate located on the lower right rear panel must be removed and the WHITE pushbutton pressed. The display will show:

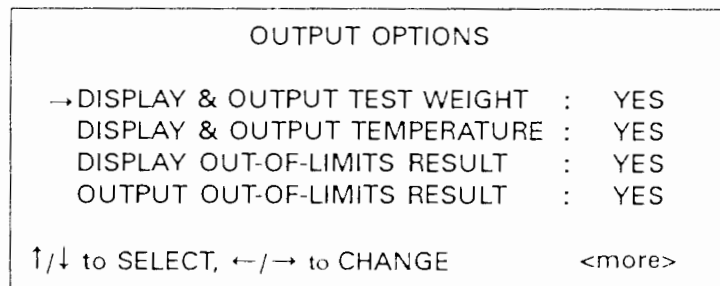


Figure 25a

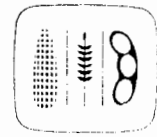
- Step 2. The display shows the first page of options that can be set to YES or NO. Use the UP or DOWN arrow keys (0 or 5) to select a function. Use the LEFT or RIGHT arrow keys (1 or 3) to set that function either YES or NO.

OUTPUT OPTIONS are as follows:

Page 1:

DISPLAY & OUTPUT TEST WEIGHT: If set to YES, the approximate TEST WEIGHT of the grain will be displayed and printed. Setting to NO turns approximate TEST WEIGHT off preventing it from being displayed or printed.

DISPLAY & OUTPUT TEMPERATURE: If set to YES, the TEMPERATURE of the grain sample will be displayed and printed. Setting to NO turns TEMPERATURE off preventing it from being displayed or printed.



DISPLAY OUT-OF-LIMITS RESULT: If set to YES, the out-of-limits results will be displayed. Setting to NO prevents the value of the out-of-limits results from being displayed.

OUTPUT OUT-OF-LIMITS RESULT: If set to YES, the out-of-limits results will be printed. Setting to NO prevents the value of the out-of-limits results from being printed.

Page 2:

OUTPUT REPORT OF ALL ERRORS: If set to YES, all internal machine check errors will be printed. Setting to NO prevents these errors from being printed.

MOISTURE PRINTOUT RESOLUTION: The resolution of the moisture printout can be set to one tenth (0.1) percent or one hundredth (0.01) percent.

RADIX POINT: The Radix Point can be set to be displayed and printed out as a decimal point (.) or comma (,).

TEMPERATURE FORMAT: The Temperature Format can be set to display and print the temperature in degrees F (°F) or degrees C (°C).

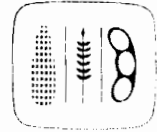
Page 3:

WEIGHT FORMAT: The Weight Format can be set to display and print pounds per bushel (lb/bu) or kilograms per hectoliter (Kg/hl).

4.4. EDIT ACCESS CODE - To provide security in selected GAC2000 Memory locations an access code, of up to four digits, will have to be entered prior to entering the mode of interest. This access code can only be changed by personnel who know the existing code. To change proceed as follows:

IMPORTANT: THE GAC2000 ACCESS CODE IS 0000 WHEN SHIPPED FROM THE FACTORY.


Pressing the 4 key selects the EDIT ACCESS CODE screen, the display will show:



EDIT ACCESS CODE

ENTER ACCESS CODE: _



Figure 27

Keyboard enter the existing access code, press ENTER  key. The display will show:

EDIT ACCESS CODE

ACCESS CODE:

Figure 27a

Keyboard enter the new access code (up to 4-digits), press ENTER  key. Press PREVIOUS PAGE  key to return to SETUP MENU.

- 4.5. **DATE/TIME MENU** - The date and time are displayed and printed for each moisture measurement. Pressing the 5 key selects the DATE/TIME MENU, the display will show:

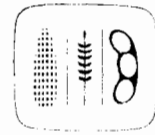
DATE/TIME MENU

1: SET TIME
2: SET DATE
3: SET DATE FORMAT

SELECT ITEM NUMBER (NEXT PAGE: STATUS)

Figure 27b

Select the item of interest by pressing the number key which corresponds to the number adjacent to the item of interest.



4.5.1. **SET TIME** - Press the 1 key, the display will show:

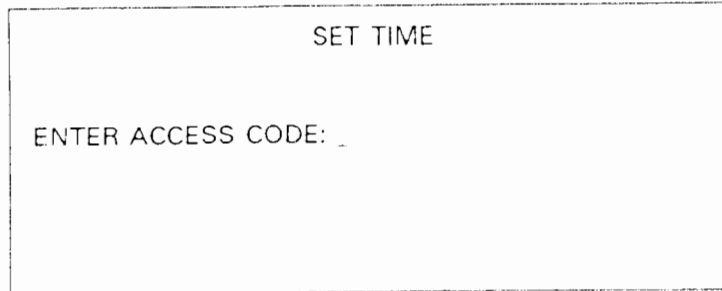



Figure 28

Keyboard enter the access code, press ENTER  key. If the access code is incorrect when the ENTER key is pressed, the alarm sounds and the cursor returns to the first digit location.

After entering the correct Access Code the display will show:

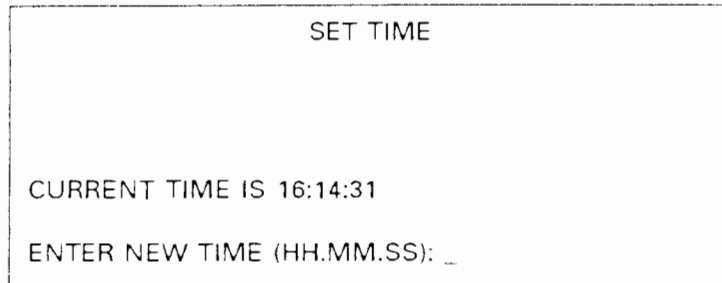




Figure 28a

Step 1. Time is displayed based on the 24 hour clock. The current GAC2000 time is displayed. If the time is incorrect, change it by entering the new time in the format of Hours, Minutes, and Seconds (HH.MM.SS). **NOTE:** All positions are 2 digits and are separated by decimal points. Press the ENTER  key to enter the corrected time.

Press PREVIOUS PAGE  key to return to DATE/TIME MENU.

4.5.2. **SET DATE** - The Set Date mode is selected by pressing the 2 key and entering the Access Code.

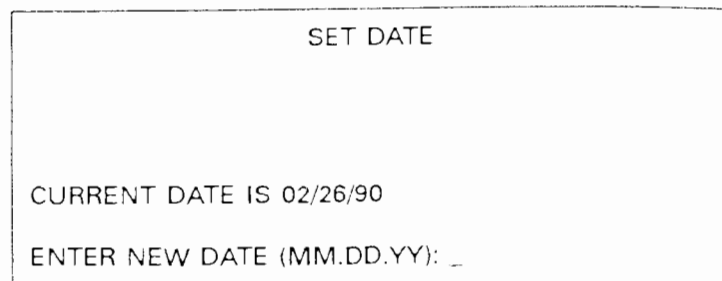




Figure 28b



Step 1. The GAC2000 date will be shown. If it is necessary to correct the date, enter it in the format shown on the bottom of the display. Month. Day. Year are all entered as 2 digits and separated with decimal points. Press the ENTER  key to enter the new corrected date. **NOTE:** Date format can be set by user.

Press PREVIOUS PAGE  key to return to DATE/TIME MENU.

4.5.3. **SET DATE FORMAT** - The Date Format can be set to MM.DD.YY, DD.MM.YY or YY.MM.DD. Press the 3 key and enter the Access Code. The display will show:

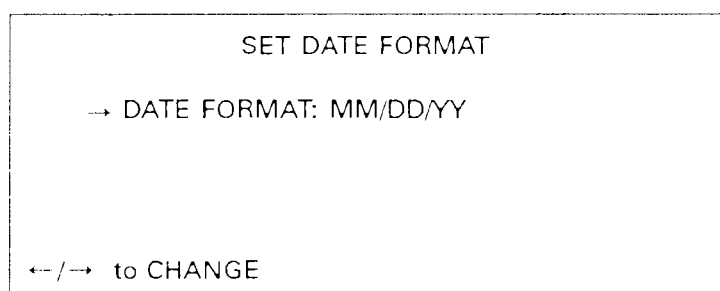



Figure 29

Step 1. Pressing the left or right pointing arrow keys(1 or 3) will sequence the Date Format through the available formats. With desired arrangement displayed, press PREVIOUS PAGE  key to accept the arrangement and return to the DATE/TIME MENU.

4.6. **LABELS MENU** - The Labels Menu allows entry of a facility name and location that will be printed as a heading on each measurement printout. Two lines of title, up to 16 characters per line, may be entered.

The LABELS MENU can be selected by pressing the 6 key from the SETUP MENU. The display will show:

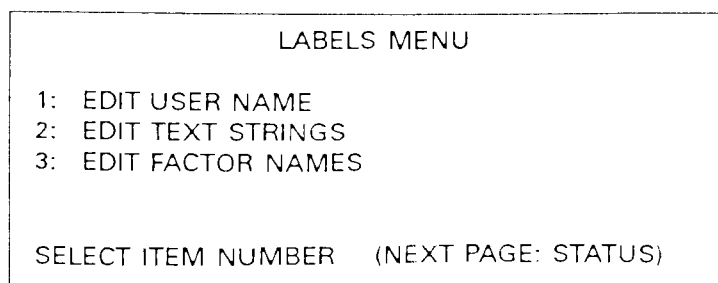
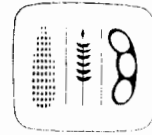


Figure 29a



4.6.1. **EDIT USER NAME** - Select Edit User Name by pressing the 1 key. The display will show:

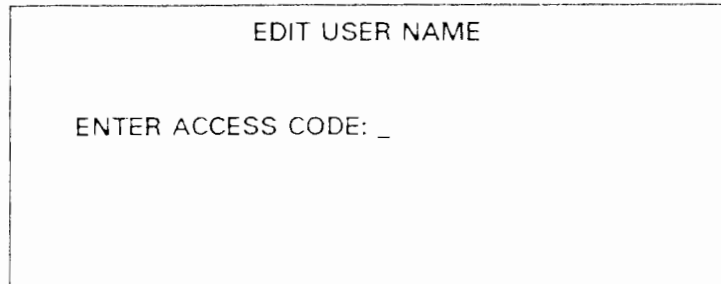



Figure 30

Step 1. To proceed the Access Code must be entered and the ENTER  key pressed. The display will show:

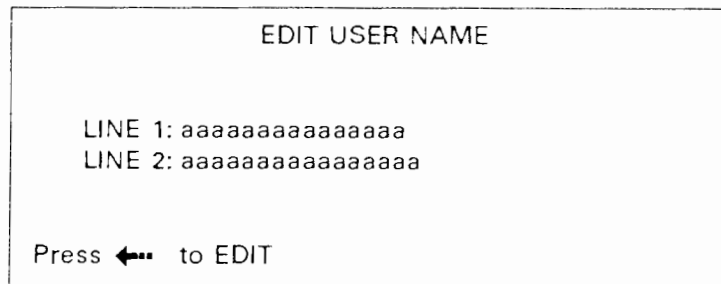









Figure 30a

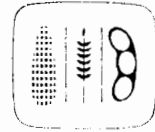
Step 2. The Cursor is a large flashing block appearing on first character of LINE 1. The flashing block signifies that alpha characters can be entered.


To enter or edit a facility name on line 1, press the BACKSPACE  key as directed by the prompt on the bottom of the display.

Once the BACKSPACE  key is pressed, the prompt will disappear and the cursor will change from a block to a line beneath the first character.

Step 3. Numbers can be entered directly from the keyboard. Alpha characters must be entered by means of the alpha screen which is accessed by pressing the NEXT PAGE  key. **NOTE:** Numbers and letters can be mixed by moving back and forth between screens using the PREVIOUS PAGE  and NEXT PAGE  keys.

Letters, spaces and symbols are selected through the alpha screen by moving the cursor with the arrow keys (0, 1, 3 and 5 keys) to beneath the desired character and then press the ENTER  key. The character string will show on TEXT line. Press the PREVIOUS PAGE  key to return to the EDIT USER NAME display.



When the desired character string is formed on LINE 1, press ENTER  key to accept the string. The cursor will go to LINE 2 where the location can be generated. Repeat the above procedure for LINE 2 (maximum length is 16 characters).

4.6.2. EDIT TEXT STRINGS - Select Edit Text Strings by pressing the 2 key. The display will show:

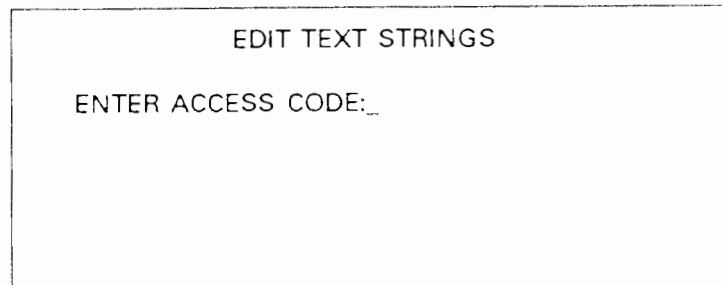



Figure 31

Step 1. Keyboard enter the access code and press the ENTER  key, the display will show:

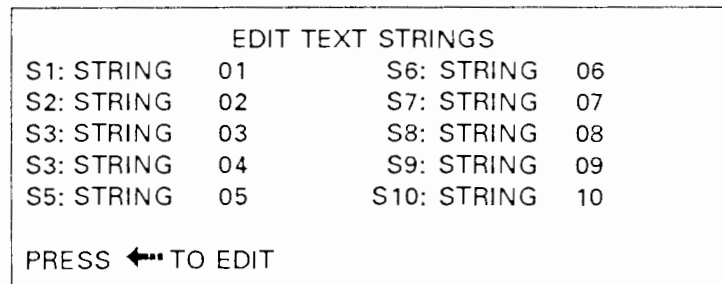






Figure 31a




The cursor is a large flashing block appearing on the first character of S1 string. The flashing block signifies that alpha characters can be entered.



NOTE: Pressing the ENTER  key with the flashing block showing will cause the cursor to increment from S1 through S10 and then repeat the sequence.


Step 2. To enter or edit a Text String (maximum length 12 characters) select the desired text string using the ENTER  key to position the flashing block on the first character of the string. Press the BACKSPACE  key as directed by the prompt on the bottom line of the display.

Once the BACKSPACE  key is pressed, the prompt will disappear and the cursor will change from a block to a line beneath the first character.



Step 3. Numbers can be entered directly from the keyboard. Alpha characters must be entered by means of the alpha screen which is accessed by pressing the NEXT PAGE  key. **NOTE:** Numbers and letters can be mixed by moving back and forth between screens using the PREVIOUS PAGE  and NEXT PAGE  keys.

Letters, spaces and symbols are selected through the alpha screen by moving the cursor with the arrow keys (0,1,3 and 5 keys) to beneath the desired character and then press the ENTER  key. The character string will show on the TEXT line. Press the PREVIOUS PAGE  key to return to the EDIT TEXT STRINGS display.

When the desired character string is formed on the selected string number line, press ENTER  key to accept the string. The cursor will go to the next string line as a flashing block. Repeat the above procedure for each text string desired.

4.6.3 EDIT FACTOR NAMES-Select Edit Factor Names by pressing the 3 key. The display will show:

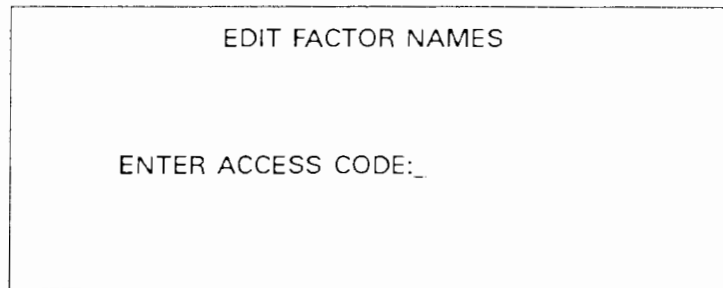



Figure 32

Step 1. Keyboard enter the access code and press the ENTER  key, the display will show:

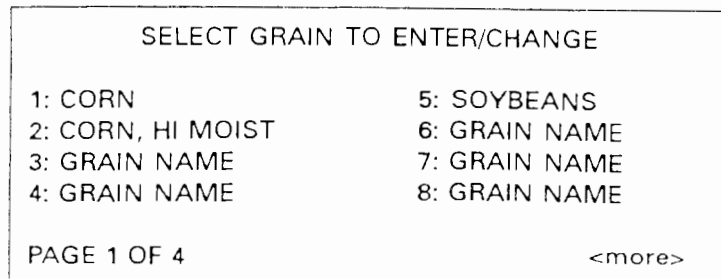

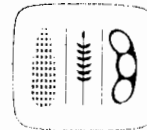


Figure 32a

Step 2. To enter or change FACTOR Names select the grain calibration of interest by pressing the number key corresponding to the number adjacent the desired grain name. **NOTE:** Use the NEXT PAGE  key to display pages 2, 3, and 4 of the SELECT GRAIN TO ENTER/CHANGE MENU.




Step 3. When the number key for the selected grain name is pressed, the display will show:



```
EDIT FACTOR NAMES
GRAIN: GRAIN NAME
FACTOR 1: █
FACTOR 2:
FACTOR 3:
FACTOR 4:


PRESS ← TO EDIT
```




Figure 33



The cursor is a large flashing block appearing on the first character of FACTOR 1. The flashing block signifies that alpha characters can be entered.


NOTE: Pressing the ENTER  key with the flashing block showing will cause the cursor to increment from FACTOR 1 through FACTOR 4 and then repeat the sequence.

Step 4. To enter or edit a FACTOR NAME (maximum length 12 characters), select the desired factor using the ENTER  key to position the flashing block on the first character of the name. Press the BACKSPACE  key as directed by the prompt on the bottom of the display.

Once the BACKSPACE  key is pressed, the prompt will disappear and the cursor will change from a block to a line beneath the first character.

Step 5. Numbers can be entered directly from the keyboard. Alpha characters must be entered by means of the alpha screen which is accessed by pressing the NEXT PAGE  key. **NOTE:** Numbers and letters can be mixed by moving back and forth between screens using the PREVIOUS PAGE  and NEXT PAGE  keys.

Letters, spaces and symbols are selected through the alpha screen by moving the cursor with the arrow keys (0, 1, 3 and 5 keys) to beneath the desired character and then press the ENTER  key. The character string will show on TEXT line. Press the PREVIOUS PAGE  key to return to the EDIT FACTOR NAMES display.

When the desired character string is formed on the selected Factor Name Line, press ENTER  key to accept the string. The cursor will go to the next Factor Line as a flashing block. Repeat the above procedure for each Factor Name desired.



TO DELETE A FACTOR NAME

1. Select EDIT FACTOR NAMES.
2. Select grain calibration of interest.
3. Select FACTOR NAME to delete.
4. Press backspace key, press Numeric key, press BACKSPACE key, press ENTER. The FACTOR NAME should be blank.

- 4.7. **COM MENU** - The COM (Communications) MENU is used to set the GAC2000 output parameters. COM1 (DCE) relates to the upper connector on the GAC2000 rear panel and the COM2 (DTE) is the lower connector.

The COM MENU can be selected by pressing the 7 key from the SETUP MENU. The display will show:

```

COMMUNICATIONS MENU

1: COM PORT SELECT          5: non-active
2: COM1 FORMAT              6: COM2 FORMAT
3: COM1 DATA SETUP        7: COM2 DATA SETUP
4: COM1 CONTROL            8: COM2 CONTROL

SELECT ITEM NUMBER      (NEXT PAGE: STATUS)
    
```

Figure 34


- 4.7.1. **COM PORT SELECT** - Press the 1 key to select the COM PORT SELECT screen, the display will show

```

COMMUNICATION PORT SELECTION

ENTER ACCESS CODE: _
    
```

Figure 34a

Keyboard enter the Access Code, press the ENTER  key, the display will show:

```

COMMUNICATIONS PORT SELECTION

-> AUTOMATIC RESULTS OUTPUT : COM1
   MANUAL RESULTS OUTPUT    : COM1
   ERROR REPORT OUTPUT      : COM1/COM2
   SETUP AND TEST OUTPUT    : COM1/COM2

↑/↓ to SELECT, ←/→ to CHANGE
    
```

Figure 34b



The Communications Port Selection Menu is used to set the COM1 and COM2 outputs to the desired configuration. The available configurations are NONE, COM1, COM2 or COM1/COM2.


NONE - No output to either port.

COM1 - Results output to COM1 port only.


COM2 - Results output to COM2 port only.

COM1/COM2 - Results output to both ports.

AUTOMATIC RESULTS OUTPUT - Provides an automatic printout of the results.


MANUAL RESULTS OUTPUT - Provides a manual printout of the results by pressing the PRINT  key. **NOTE:** Can be used to obtain duplicate copies of the results.

ERROR REPORT OUTPUT - Provides a printout of errors that occur during internal self checks. **NOTE:** Out of limit errors on measured results are not affected.

SETUP AND TEST OUTPUT - Allows the operator to print out Setup and Test data by pressing the PRINT  key.

Step 1. Use the up or down arrow keys (0 or 5 key) to select a function. The selected function is noted by the arrow in the left margin pointing to that function.

Pressing the left or right arrow keys (1 or 3 key) will cycle the function through its available settings.

When the functions are set as desired, press the PREVIOUS PAGE  key to return to the COMMUNICATIONS MENU.

4.7.2. **COM1 FORMAT** - Select the COM1 FORMAT by pressing the 2 key. Enter the Access Code and press the ENTER  key. The display will show:

```

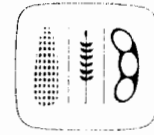
COM1 FORMAT SELECTION

-> OUTPUT FORMAT      : PRN20
   LINE TERMINATOR   : CR, LF (OD,OA HEX)

↑/↓ to SELECT, ←/→ to CHANGE
    
```

*PRN21 Takes
out SN, cal date,
+ D values*

Figure 35



OUTPUT FORMAT - The OUTPUT FORMAT can be set to 20 or 80 columns of print.


- PRN20 - Standard 20 column printer output.
- PRN80 - Standard 80 column printer output.
- TST20 - 20 column test output of machine parameters.
- PRN81 - Standard 80 column printer output (2 lines information).
- CSV01 - Comma separated values.
- PRN21 - Special 20 column printer output. PRN 20 format with the Grain Calibration Date Code, Instrument Serial Number and D-values removed.


LINE TERMINATOR - An RS232 line of input data must be terminated with one of the following characters or character pairs.

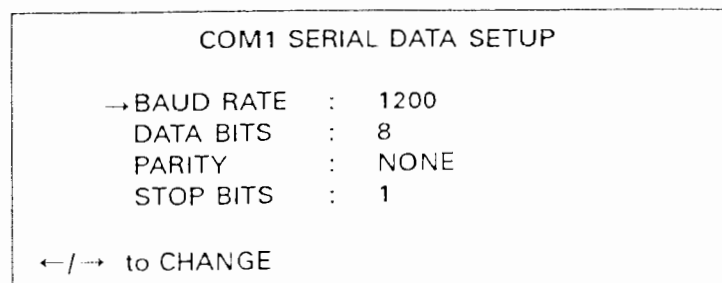
LF (Line Feed)	OA Hex
CR (Carriage Return)	OD Hex
LF + CR	OA, OD Hex
CR + LF	OD, OA Hex

Step 1. Select COM1 FORMAT by using the up or down arrow keys (0 or 5 key). The selected function is noted by the arrow in the left margin pointing to that function.

Pressing the left or right arrow keys (1 or 3 key) will cycle the function through its available settings.

When the COM1 FORMATS are set to the desired value, press the PREVIOUS PAGE  key to return to the COMMUNICATIONS MENU.

4.7.3. COM1 DATA SETUP - Select the COM1 DATA SETUP by pressing the 3 key. Enter the Access Code and press the ENTER  key. The display will show:





*OK for
STmp + STar
Printers*

Figure 36

BAUD RATE - The Baud Rate is the only settable parameter on this screen. Use the left or right arrow keys (1 or 3 key) to cycle the Baud Rate through the following values - 300, 600, 1200, 2400, 4800, 9600, and 19200 bits/second.



When the BAUD RATE is set to the desired value, press the PREVIOUS PAGE  key to return to the COMMUNICATIONS MENU.

- 4.7.4. **COM1 CONTROL** - Select COM1 CONTROL by pressing the 4 key. Enter the Access Code and press the ENTER  key. The display will show:

```
COM1 (DCE) CONTROL LEAD SETUP
      Strip          STar
->BUSY (11) : ACTIVE (+)   Active (-)
      DTR (20) : ACTIVE     Active
↑/↓ to SELECT, ←/→ to CHANGE
```

Figure 37


BUSY (11) - The Busy Line notifies the GAC2000 when the buffer in the printer (computer) is full and cannot accept more data.

Set this function to the polarity required to be compatible. The Control Lead Busy Sense can be set to IGNORE, ACTIVE (+) or ACTIVE (-).


DTR (20) - The DTR line notifies the GAC2000 when the printer (computer) is turned on. The Control Lead DTR Sense can be set to IGNORE or ACTIVE.

- Step 1. Select the COM1 CONTROL LEAD of interest using the up or down arrow keys (0 or 5 key). The selected function is noted by the arrow in the left margin pointing to that function.

Pressing the left or right arrow keys (1 or 3 key) will cycle the selected function through its available settings.

When the functions are set as desired, press the PREVIOUS PAGE  key to return to the COMMUNICATIONS MENU.

- 4.7.5. **NON-ACTIVE..**

- 4.7.6. **COM2 FORMAT** - Select COM2 FORMAT SELECTION screen by pressing the 6 key. Enter the Access Code and press the ENTER  key. The display will show:

```
COM2 FORMAT SELECTION
->OUTPUT FORMAT : PRN20
      LINE TERMINATOR: CR, LF (OD, OA HEX)
↑/↓ to SELECT, ←/→ to CHANGE
```

Figure 37a



OUTPUT FORMAT - The OUTPUT FORMAT can be set to 20 or 80 columns.

- PRN20 - Standard 20 column printer output.
- PRN80 - Standard 80 column printer output (1 line information).
- TST20 - 20 column test output of machine parameters.
- PRN81 - Standard 80 column printer output (2 lines information).
- CSV01 - Comma separated values.
- PRN21 - Special 20 column printer output. PRN 20 format with the Grain Calibration Date Code, Instrument Serial Number and D-values removed.


LINE TERMINATOR - An RS232 line of data must be terminated with one of the following characters or character pairs.

LF (Line Feed)	OA Hex
CR (Carriage Return)	OD Hex
LF + CR	OA, OD Hex
CR + LF	OD, OA Hex

Step 1. Select the COM2 FORMAT of interest using the up or down arrow keys (0 or 5 key). The selected function is noted by the arrow in the left margin pointing to that function.

Pressing the left or right arrow keys (1 or 3 key) will cycle the selected function through its available settings.

When the OUTPUTFORMAT and LINE TERMINATOR are set as desired, press the PREVIOUS PAGE  key to return to the COMMUNICATIONS MENU.

4.7.7. COM2 DATA SETUP - Select the COM2 DATA SETUP by pressing the 7 key. Enter the Access Code and press the ENTER  key. The display will show:

COM2 SERIAL DATA SETUP

→ BAUD RATE : 1200

DATA BITS : 8

PARITY : NONE

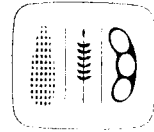
STOP BITS : 1

↑/↓ to SELECT, ←/→ to CHANGE

Figure 38

BAUD RATE - The Baud Rate can be set to one of the following values - 300, 600, 1200, 2400, 4800, 9600, and 19200.

DATA BITS - The Data Bits can be set to 7 or 8.





PARITY - The Parity can be set to NONE, EVEN or ODD.

STOP BITS - The Stop Bits can be set to 1 or 2.

Step 1. Select the COM2 SERIAL DATA SETUP function of interest using the up or down arrow keys (0 or 5 key). The selected function is noted by the arrow in the left margin pointing to that function.

Pressing the left or right arrow keys (1 or 3 key) will cycle the selected function through its available settings.

When the functions are set as desired, press the PREVIOUS PAGE  key to return to the COMMUNICATIONS MENU.

4.7.8. COM2 CONTROL - Select COM2 (DTE) CONTROL LEAD SETUP by pressing the 8 key. Enter the Access Code and press the ENTER  key. The display will show:

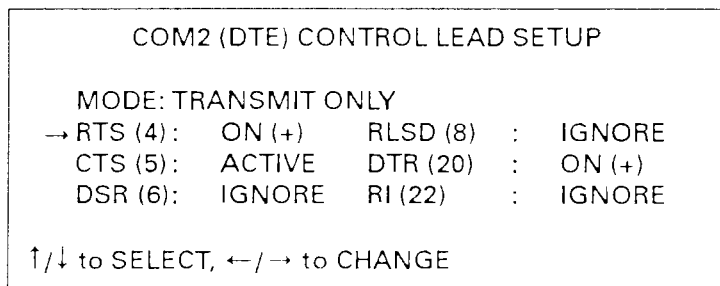


Figure 39

TRANSMIT ONLY MODE - The functions that may be set are:

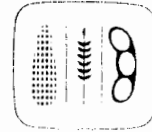
RTS - ON (+) or AUTO
DSR - IGNORE or ACTIVE

Step 1. Select the desired function by using the up or down arrow key (0 or 5 key). Use the left or right arrow key (1 or 3 key) to set that function to the desired value.

When the functions are set as desired, press the PREVIOUS PAGE  key to return to the COMMUNICATIONS MENU.

4.8. SERVICE MENU - The SERVICE MENU is used to edit the following parameters; Temperature Constants, Empty Cell Weight Counts, Weight Constants, Calibration Adjustment Constant, Serial Number and Factory modes.

IMPORTANT; THIS MENU SHOULD ONLY BE ACCESSED BY TRAINED PERSONNEL. INADVERTANT ALTERING OF A CONSTANT CAN GREATLY EFFECT MACHINE PERFORMANCE. A SEPERATE SERVICE MODULE IS REQUIRED TO EDIT THE SERVICE MENU PARAMETERS.



5. TEST MENU

The TEST MENU will provide diagnostic and status information about the GAC2000. Select TESTS MENU by pressing the 5 key from the Main Menu, the display will show:

```
TESTS MENU

1: non-active          5: DISPLAY
2: COM1               6: DIAGNOSTIC MODE
3: COM2 TRANSMIT     7: TEST NETWORK MODE
4: non-active        8: PARAMETERS MENU

SELECT ITEM NUMBER (NEXT PAGE : STATUS)
```

Figure 40

5.1. NON-ACTIVE.

5.2. COM1 - Select COM1 TEST by pressing the 2 key, the display will show:



```
COM1 TEST

BAUD RATE : 1200      BUFFER : EMPTY
DATA BITS  : 8        BUSY (11) : OFF (-)
PARITY     : NONE     DTR (20)  : OFF (-)
STOP BITS  : 1

Press PRINT to TRANSMIT CHARACTER SET
```

Figure 40a

The COM1 TEST screen displays the COM1 Serial Data Setup (Baud Rate, Data Bits, Parity, Stop Bits), Buffer Status and the COM1 Control Lead Setup.

Pressing the PRINT  key will provide a printout of the character set. Press PREVIOUS PAGE  key to return to the TESTS MENU.

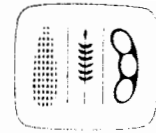
5.3. COM2 TRANSMIT - Select COM2 TRANSMIT TEST by pressing the 3 key, the display will show:

```
COM2 TRANSMIT TEST



MODE : TRANSMIT ONLY  BUFFER : EMPTY
BAUD RATE : 1200      RTS (4) : ON (+)
DATA BITS  : 8        DSR (6) : OFF (-)
PARITY     : NONE     RLSD (*) : OFF (-)
STOP BITS  : 1        DTR (20) : ON (+)
                                RI (22) : OFF (-)

Press PRINT to TRANSMIT CHARACTER SET
```

Figure 40b



The COM2 TRANSMIT TEST screen displays the COM2 Mode, Serial Data Setup (Baud Rate, Data Bits, Parity, Stop Bits), Buffer Status and the Control Lead Setup.

Pressing the PRINT  key will provide a printout of the character set. Press PREVIOUS PAGE  key to return to the TESTS MENU.

5.4. NON-ACTIVE.

5.5. DISPLAY - Select DISPLAY by pressing the 5 key. The display will show characters, symbols and digits. **NOTE:** Early Models of the GAC2000 have four screens of different size characters, symbols and digits.

5.6. DIAGNOSTIC MODE - Select DIAGNOSTIC MODE (PAGE 1) by pressing the 6 key, the display will show:

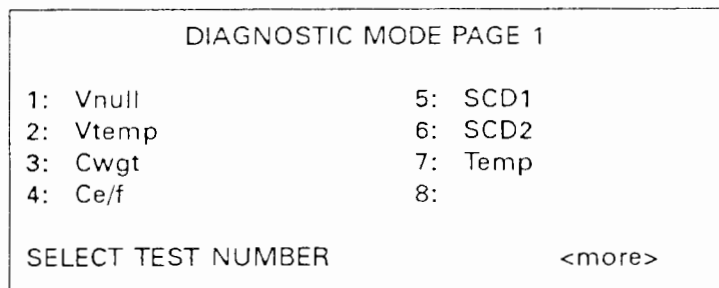



Figure 41

Step 1. Diagnostic information is obtained by pressing the number key that is adjacent to the function of interest.

- 1: Vnull - null voltage from cell board.
- 2: Vtemp - temperature diode voltage from cell board.
- 3: Cwgt - counts from weight oscillator.
- 4: Ce/f - ratio of empty cell weight osc. counts to full cell weight osc. counts.
- 5: SCD1 - D1 (conductivity) self-check - 375 ± 20 .
- 6: SCD2 - D2 (capacitance) self-check - 2500 ± 20 .
- 7: Temp - computed cell temperature in degrees C.

STEP 2. Press the NEXT PAGE  key, the display will show Page 2 of the DIAGNOSTIC MODE.

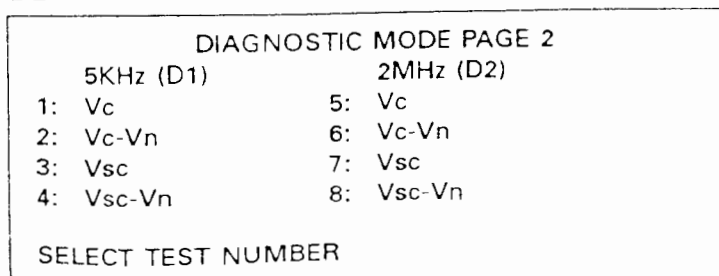
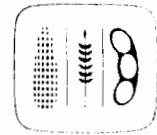


Figure 41a




5KHz (D1)

- | | |
|-------------|---|
| 1: Vc | 5KHz oscillator |
| 2: Vc - Vn | 5KHz oscillator voltage minus null voltage. |
| 3: Vsc | Internal 5KHz oscillator voltage with on-board test network engaged. |
| 4: Vsc - Vn | Internal 5KHz oscillator voltage with on-board test network engaged minus null voltage. |

2MHz (D2)

- | | |
|-------------|---|
| 5: Vc | 2MHz oscillator voltage. |
| 6: Vc - Vn | 2MHz oscillator voltage minus null voltage. |
| 7: Vsc | Internal 2MHz oscillator voltage with on-board test network engaged. |
| 8: Vsc - Vn | Internal 2MHz oscillator voltage with on-board test network engaged minus null voltage. |

Press PREVIOUS PAGE  key two times to return to the TESTS MENU.

5.7 TEST NETWORK MODE - The Test Network Mode is a service only mode for trained factory personnel.

5.8 PARAMETERS MENU - Select PARAMETERS MENU by pressing the 8 key, the display will show:

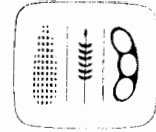
PARAMETERS MENU

1: VIEW TEMPERATURE CONSTANTS
2: VIEW EMPTY CELL WEIGHT COUNTS
3: VIEW WEIGHT CONSTANTS
4: VIEW CALIBRATION ADJUSTMENT CONSTANT
5: VIEW SERIAL NUMBER
6: VIEW FACTORY MODES
SELECT ITEM NUMBER (NEXT PAGE : STATUS)

Figure 40



The PARAMETERS MENU allows the operator to VIEW only the machine parameters listed above. Pressing the number key that is adjacent the parameter of interest will display that parameter.

Press the PREVIOUS PAGE  key to return to the TESTS MENU.





GAC 2000 MAINTENANCE

1. CELL CLEANING - DAILY

Step 1. To prepare the GAC2000 for cell cleaning: from the Main Menu press numerical key 5 to display the TESTS MENU, then press numerical key 6 to display the DIAGNOSTICS Menu. With the DIAGNOSTICS Menu displayed press the LOAD  key. The hopper flaps will open and remain open until the UNLOAD  key is depressed.

Use the brush supplied in the accessory kit to clean the inside of the grain cell.

Step 2. Slide the GAC 2000 to the front of the work table and remove the grain drawer. Reach up inside and very carefully clean the strike - off arm spring.

Step 3. Press the UNLOAD  key. Note the cell rotates 180 degrees to dump the residue from the cell cleaning procedure. The hopper flaps close and pressing PREVIOUS PAGE  key twice returns the display to the Main Menu.

2. FUSE REPLACEMENT

Step 1. Remove Line cord, and then using a small bladed screwdriver or similar tool remove the cover and fuse block assembly.

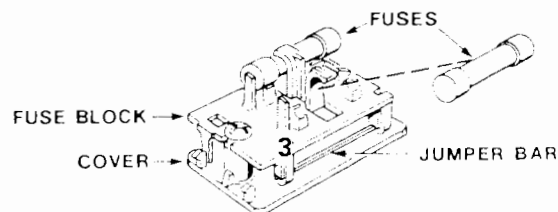


Figure 43

Step 2. Replace blown fuse with a 4/10 amp Slo-Blo fuse (Fuse Size = 0.197" (5mm) dia. x 0.787" (20 mm) long).

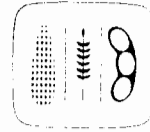
Step 3. Re-install cover and fuse block assembly in the reverse order of removal.

3. GAC 2000 ERROR CODES

The GAC 2000 contains a microprocessor which in addition to the measurements performed on a grain sample it performs self-checks which measures the integrity of the internal electronics. If a limit is exceeded or a malfunction occurs an error code is displayed. Following is a list of the error codes and their meanings. **NOTE:** Bold type describes the corrective action to be taken to clear the error condition.

GAC2000

GRAIN ANALYSIS COMPUTER



- ERROR 1:** The empty cell self check reading is out of limits. **Dump the cell and ensure it is empty.**
- ERROR 2:** The empty cell weight reading is out of limits. **Dump the cell and ensure it is empty.**
- ERROR 3:** The unload mechanism has malfunctioned. **Check the cell position and ensure it is free to operate.**
- ERROR 4:** The strike-off mechanism has malfunctioned. **Ensure the cell and strike-off arm are free to operate.**
- ERROR 5:** An invalid calibration has been referenced. **Reselect the same grain or select a new grain and try again. If the condition continues, contact the supervisor.**
- ERROR 6:** The moisture reading has exceeded the upper limit. **Select a new grain and try again.**
- ERROR 7:** The moisture reading has exceeded the lower limit. **Select a new grain and try again.**
- ERROR 8:** The empty cell ambient temperature has exceeded its limit. **Let the machine reach normal operating temperature.**
- ERROR 9:** The sample temperature has exceeded its limit. **Allow the sample to either cool down or warm up, then try again.**
- ERROR 10:** The difference in temperature between empty cell ambient and full cell condition has exceeded its limits. **Try again.**
- ERROR 11:** The test weight has exceed the stored average bulk density value by more than + 20 percent or - 30 percent. **Use more representative sample.**
- ERROR 12:** A system memory error has occured. **Turn the machine of then on. If the condition continues, contact the supervisor.**
- ERROR 13:** An onboard ram memory error has occured. **Turn the machine off then on. If the condition continues contact the supervisor.**
- ERROR 14:** NON-ACTIVE
- ERROR 15:** The real time clock battery has exhausted. **It needs to be replaced.**



APPENDIX A

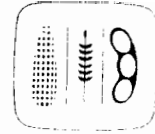
Dj GAC2000 COMMUNICATION PORTS

A. COM1 CONNECTIONS

Pin Number	Designation	Signal Name	Direction
1	AA	Protective Ground	NA
3	BB (RxD)	Received Data	To Device
6	CC (DSR)	Data Set Ready	To Device
7	AB	Signal Ground	NA
8	CF (RLSD)	Received Line Signal Detector	To Device
11		Busy	To GAC2000
20	CD (DTR)	Data Terminal Ready	To GAC2000

COM1 NOTES

1. COM1 is configured as Data Communication Equipment (DCE).
2. **Protective Ground (pin 1)** is electrically connected to the GAC 2000 frame.
3. Data from the GAC 2000 is transmitted on **Received Data** (pin 3).
4. **Data Set Ready (pin 6)** is ON (positive voltage) whenever the GAC 2000 is powered.
5. **Signal Ground (pin 7)** is the common ground reference for all other COM1 signals.
6. **Received Line Signal Detector (pin 8)** is ON (positive voltage) whenever the GAC 2000 is powered.
7. The **Busy (pin 11)** signal can be used to gate the transmission of data from the GAC 2000. On the **COM1 CONTROL LEAD SETUP** screen this line can be configured to be active positive, active negative or ignored. The GAC 2000 can buffer up to 2048 characters when this line is inactive. If not connected, this line should be configured to be ignored.
8. The **Data Terminal Ready (pin 20)** signal can be used to notify the GAC 2000 that the connected device is not available. The **COM1 CONTROL LEAD SETUP** screen is used to configure this line as active or ignored. If configured as active, an OFF condition (negative or zero voltage) will inhibit the transmission of data from the GAC 2000. Results will be displayed but not buffered for output on COM1. If not connected, this line should be configured to be ignored.



9. Prior to Version 06 software, the COM1 CSV01 output format is not operable. If this format is selected, no COM1 output will occur.

B. COM2 CONNECTIONS

Pin Number	Designation	Signal Name	Direction
1	AA	Protective Ground	NA
2	BA (TxD)	Transmitted Data	To Device
3	BB (RxD)	Received Data	To GAC2000
4	CA (RTS)	Request To Send	To Device
5	CB (CTS)	Clear To Send	To GAC2000
6	CC (DSR)	Data Set Ready	To GAC2000
7	AB	Signal Ground	NA
8	CF (RLSD)	Received Line Signal Detector	To GAC2000
20	CD (DTR)	Data Terminal Ready	To Device
22	CE (RI)	Ring Indicator	To GAC2000

COM2 NOTES

1. COM2 is configured as Data Terminal Equipment (DTE).
2. **Protective Ground (pin 1)** is electrically connected to the GAC 2000 frame.
3. Data from the GAC 2000 is transmitted on **Transmitted Data (pin 2)**.
4. **Received Data (pin 3)** is not currently used.
5. The **Request To Send (pin 4)** signal can be configured to be ON (positive voltage) whenever the GAC 2000 is powered OR to be ON (positive voltage) only when there is data in the COM2 buffer to be transmitted. The **COM2 CONTROL LEAD SETUP** screen is used to configure this line.
6. The **Clear To Send (pin 5)** signal can be used to gate the transmission of data from the GAC 2000. This line must be ON (positive voltage) to obtain data from the GAC 2000 on COM2. If an appropriate signal is not available from the connected device, connect **Clear To Send (pin 5)** to **Request To Send (pin 4)**. The GAC 2000 can buffer up to 2048 characters when this line is inactive.
7. The **Data Set Ready (pin 6)** signal can be used to notify the GAC 2000 that the connected device is not available. The **COM2 CONTROL LEAD SETUP** screen is used to configure this line as active or ignored. If configured as active, an OFF condition (negative or zero voltage) will inhibit the transmission of data from the GAC 2000. Results will be displayed but not buffered for output on COM2. If not connected, this line should be configured to be ignored.
8. **Signal Ground (pin 7)** is the common ground reference for all other COM2 signals.



- 9. Received Line Signal Detector (pin 8) is not currently used.
- 10. Data Terminal Ready (pin 20) is ON (positive voltage) whenever the GAC 2000 is powered.
- 11. Ring Indicator (pin 22) is not currently used.
- 12. Prior to Version 06 software, COM2 parity selection is faulty. The table below shows the relationship between the selected parity and the transmitted parity.

COM2 Setup Screen	Transmitted Parity
PARITY: NONE	ODD PARITY
PARITY: ODD	NO PARITY
PARITY: EVEN	NO PARITY

- 13. Prior to Version 06 software, it is not possible to obtain two stop bits on COM2. A single stop bit is transmitted even if two stop bits are selected.

Burn IN Mode

4.5.6

Burn IN Mode off - on
Error Store Mode off - on

DICKEY-john[®] WARRANTY

DICKEY-john warrants to the original purchaser for use that, if the product proves to be defective in material or workmanship within one year from date of original installation and written notice is given to DICKY-john within 30 days after such defect is discovered, DICKY-john will (at our option) either replace or repair said product either at purchaser's premises or, only if DICKY-john requests, upon return of the product or defective part thereof to DICKY-john. This warranty does not apply to damage resulting from misuse, neglect, accidental or improper installation or maintenance. Said product will not be considered defective if it substantially fulfills the performance specifications. THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY, FITNESS FOR PURPOSE AND OF ANY OTHER TYPE, WHETHER EXPRESS OR IMPLIED. DICKY-john neither assumes nor authorizes anyone to assume for it any other obligation or liability in connection with said product and will not be liable for consequential damages.

For information call DICKY-john: U.S.A. call 1-800-637-3302
ILLINOIS call 1-800-252-3363

DICKEY-john products

FARM EQUIPMENT INSTRUMENTATION
PLANTER MONITORS
COMBINE GRAIN LOSS MONITORS
MOISTURE TESTERS
COTTON HARVESTING MONITORS
SPEED/AREA MONITORS
SPRAYER CONTROL SYSTEMS
SPREADER CONTROL SYSTEMS
GRAIN DRILL MONITORS
ANHYDROUS AMMONIA CONTROL SYSTEMS
TRACTOR PERFORMANCE MONITORS
GRAIN ANALYSIS COMPUTERS

first in agrionics



DICKEY-john[®]
CORPORATION