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INTRODUCTION

The DICKEY-john Grain Analysis Computer GAC 2100 quickly tests grain samples for moisture content and profile information. The unit loads a sample, weighs and checks temperature, runs the test, displays the results, and then unloads the sample. The test results calculate automatically to display the moisture content and, if enabled, the temperature and approximate test weight (density) of the grain sample. Also, the product name, grain calibration date and sample ID number display for identification. An additional screen of information includes readings for the conductance (D1), capacitance (D2), weight (D3) and temperature (D4) values along with the currently set date and time.

Figure 1

GAC2100 Unit

TESTING SAMPLES

Performing a grain sample analysis consists of six basic steps;

1. Select a grain for testing through keyboard entries. Up to 64 grain choices are available.
2. Pour grain sample into the hopper (top of the unit) and enter a sample ID number (optional).
3. Depress the **Load** key. The sample automatically loads (drops) the grain into the test cell and a strike-off arm levels and removes the excess.
4. Wait approximately 15 seconds for the test results to process. The moisture reading and grain temperature are displayed.

Load Key

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Print Key

Unload Key

5. Print a hard copy of the test results. With an optional printer connected, the date and time with sample identification number and all test information is printed. By selecting the **Print** key, additional copies may be printed.
6. Select the **Unload** key to empty the test cell contents. The test cell rotates 180° (inverts) to dump the grain into a sample drawer or into a larger container below the counter top. After the cell returns to the upright position, the unit is ready for the next test sample.

CONNECTING AN OPTIONAL PRINTER

An optional printer may be connected to the GAC 2100 to print test data results. The printout may include the facility name and address, current date and time, sample ID number, product name, grain calibration date, percent moisture, grain temperature, unit serial number and the D1 through D4 values. The data may either automatically print at the end of each measurement cycle or be manually initiated by selecting the **Print** key.

INTERFACING TO A COMPUTER

The GAC 2100 is capable of communicating with a personal computer (PC) either directly (using a cable) or at different locations through a modem. If the GAC 2100 and the PC are at the same site, a direct connection is made by an interconnecting null modem adapter available from DICKEY-john. The computer, operated by authorized personnel, is able to control most functions within the GAC 2100 from the remote location. The GAC 2100 stores changes for later recall and auditing. This storing process becomes an audit trail (or record) to track calibration changes. The most recent 1000 changes or events are retained. Operation from the computer is described in a separate communications software manual.

FEATURES

GAC 2100 features include:

- Memory for up to 64 different grain calibrations.
- Keyboard entry or computer accessibility for updating grain calibrations as revisions become necessary.
- Alpha/numeric sample identification numbers with automatic sequential numbering for record keeping purposes.
- Automatic ranging by switching to predetermined calibrations when moisture is above or below normal limits.
- Two RS-232 output ports (DCE and DTE) available for printer and external computer/modem control.
- Capability to interface with a personal computer either directly or through a modem.
- Self-check mode to assure proper continual operation.
- Error messages display when out-of-limits moisture, grain weight or grain temperature occur.
- Help screens to assist operator's questions.
- Quick keys.

OPERATOR'S MANUAL

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Figure 2

GAC 2100 Dimensions
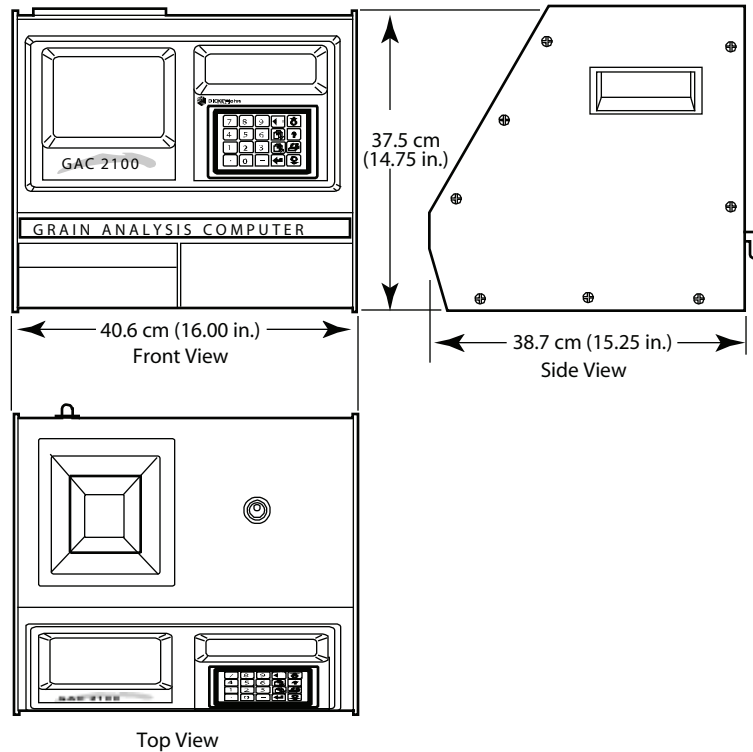
37.5 cm (14.75 in.)

40.6 cm (16.00 in.)
Front View

38.7 cm (15.25 in.)
Side View

Top View

SPECIFICATIONS

- **Supply Voltage and Frequency Limits**: 100 Vac to 240 Vac 50/60 Hz at 1 Amp Max.
- **Operating Temperature Range**: 2° C (35.6° F) to 45° C (113° F). If the unit temperature range is exceeded, an ERROR message displays.
- **Grain Temperature Range**: 0° C (32° F) to 45° C (113° F). If the grain temperature range is exceeded, an ERROR message displays.
- **Unit Temperature and Grain Temperature Difference Limit**: The maximum allowable temperature differential between empty cell and grain under test is 20° C (36° F). If exceeded, an ERROR message is displays.
- **Classes/Types of Grain or Seed**: Refer to the latest Calibration Bulletin.
- **Weight**: 11.8 kg (26 lbs) – **Shipping Weight**: 15.0 kg (33 lbs)

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INSTALLATION AND SETUP

Before shipping, the GAC 2100 is inspected and tested for mechanical and electrical defects. After unpacking, visually inspect for damage occurring during transit. Save all packing materials until the inspection is complete. If damage is found, immediately file a claim with the carrier and notify your DICKEY-john Sales Representative.

UNIT POSITIONING

Choose a clean environment for the GAC 2100 that is protected from rapid changes in ambient temperature. Avoid a hazardous (classified) location as defined in Article 500 of the NFPA Handbook of the National Electrical Code.

Use the self-contained level on the panel top to position the GAC 2100 on a flat level or nearly level surface. Adjust the four rubber foot pads to level and stabilize the unit (refer to Figure 3). When moving the unit to a different location, re-leveling may be necessary. After adjustment is complete, all four leveling foot pads should be set to the lowest level possible with one pad fully seated against the bottom panel. This assures minimum height above the counter top.

Figure 3

Leveling With Rubber Foot Pads

1. Use wrench to loosen the upper nut and then adjust height.

2. Ensure bottom nut is locked down against rubber foot pad.

3. Use a Phillips screwdriver in center of pad to change height and to hold the screw from turning while tightening nuts.

4. After adjustment, retighten nut up against bottom panel.

Rubber Foot Pads
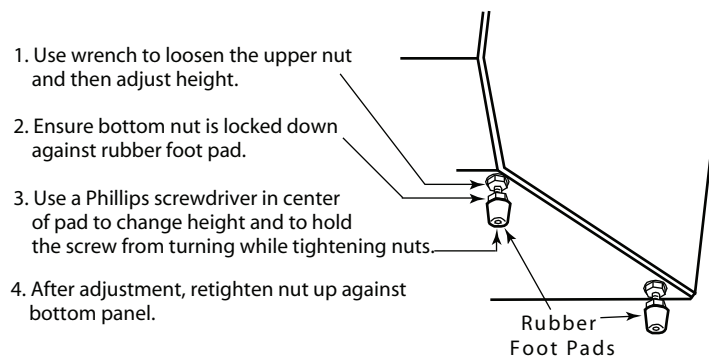
To adjust the foot pad height, unlock the upper nut from the bottom panel of the selected foot pad. Then, adjust the height as required.

After adjusting, use a Phillips screwdriver in the center of the foot pad to hold the screw from turning and tighten the upper nut against the bottom panel of the unit. Ensure the lower nut remains tight against the foot pad.

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⚠ CAUTION

The shipping brace must be moved to the operate position before applying power. Since the grain test cell cycles through an unload sequence during power up, damage may occur with the shipping brace in the transport position.

The GAC 2100 is shipped with the grain test cell supported by an internal shipping/transport brace. This brace is to support the test cell whenever the unit is transported. The position of the brace is controlled by a handle located on the rear panel behind the grain test cell (Figure 4). A small spool is placed over the handle during shipping to prevent possible bumping and releasing of the handle. Remove this spool and store as part of shipping materials. Push the handle in to unlock and rotate counterclockwise to the locked operate position as indicated on the back panel. The movement of the brace is viewable through the front window of the unit.

Figure 4

Rear View Of Unit
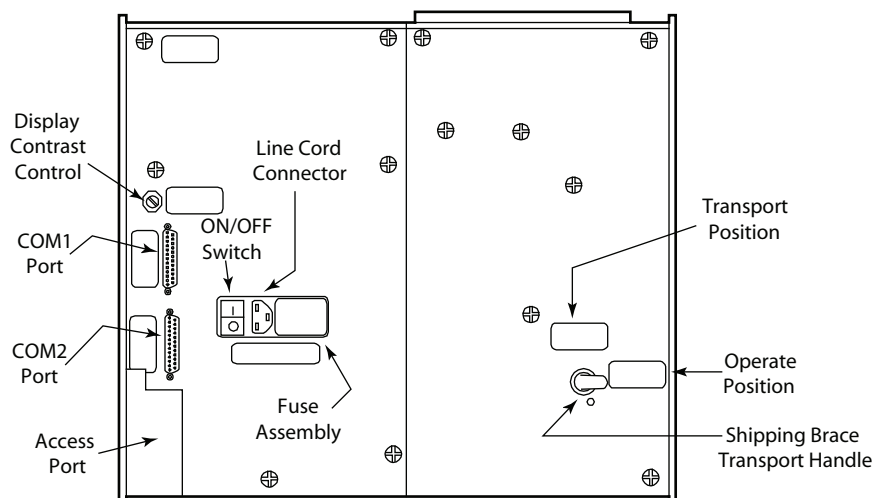
⚠ CAUTION

Rotate the brace back into supporting position before moving or shipping the unit. If the cell is not adequately supported operating performance may be adversely affected due to cell bouncing. Some effort is required to move the brace back into position. It may be helpful to reach inside the drawer front and lift up on the cell while attempting to lock the brace into the transport position. Place the spool over the handle to prevent the accidental release of the shipping brace.

CONNECTING AC POWER

Verify that the ON/OFF (I/O) switch is in the OFF (O) position and that the shipping brace is in the OPERATE position. Plug the line cord into the connector on the rear panel next to the ON/OFF switch. Plug the male end into an appropriate 3-wire (grounded) outlet.

> ⚠ **WARNING**
>
> **The grounding pin on the line cord connects directly to the GAC 2100 frame. When using an adapter with a grounding wire ensure the grounding wire is connected properly to a good earth ground to prevent a shock hazard.**

Normal use of the sample drawer can be bypassed by removing the drawer bottom and cutting a hole into the work counter to allow the tested grain samples to fall through to a larger container below. The size of the hole must be at least equal to the drawer dimension and located directly beneath the grain sample drawer.

Remove the bottom of the grain sample drawer by carefully lifting the two plastic tabs at the front of the drawer (Figure 5). Using a small screwdriver, gently pry up on each tab and slide the bottom panel out the rear of the drawer. BE CAREFUL NOT TO BREAK THE TABS.

Figure 5

Removing Drawer Bottom
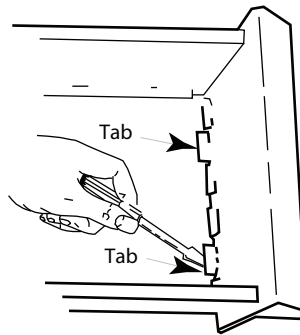
When finished, slide the grain drawer back into position. This prevents grain from spilling onto the work surface in front of the unit.

If replacing the drawer bottom later, slide the bottom toward the drawer front until it latches under the two plastic tabs.

CHANGING ACCESS CODES

A code is necessary to access certain screens. Whenever the code is required, a screen appears displaying ENTER ACCESS CODE. The factory preset access code is set to 0. If the access code requires changing for security reasons, refer to CHANGING THE ACCESS CODE in the ESTABLISHING PARAMETERS section.

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USING THE COMMUNICATION PORTS

Two communication ports located on the rear of the unit transfer data. The ports are: (a) Printer Output Port (COM1) and (b) Computer Output Port (COM2). Each must be properly configured to communicate with external devices. Port configuration is described in ESTABLISHING PARAMETERS.

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STARTUP AND FAMILIARIZATION

This section defines the keyboard layout, display messages, and other operator controls.

STARTUP PROCEDURE

Each time the GAC 2100 is powered, the unit performs a series of self checks to determine the status of the (1) load/strike-off mechanism, (2) unload function, (3) empty test cell weight, and (4) conductance/capacitance measurement circuitry. The self-checks begin when the hopper doors open, the strike-off arm swings across the cell and back again, and the cell dumps. When the cycle ends (about 15 seconds), the **Main** menu displays.

⚠CAUTION

Before starting the following procedures, ensure the ON/OFF (I/O) switch is in the OFF (O) position and that the shipping brace is in the OPERATE position. These are both located on the rear of the unit (Figure 4).

1. Turn the power switch ON. Initially, a language screen appears showing eight choices (Figure 6).

Figure 6

Start Up Screens

1: *ENGLISH US	5: ITALIANO
2: NEDERLANDS	6: PORTUGUES
3: FRENCH	7: ESPANOL
4: DEUTSCH	8: ENGLISH

PERFORMING STARTUP TESTS

PLEASE WAIT

MOD REV: 0798121009
GAC2100 REV: 0798121009

Instrument
Software
Number

Language Module
Software Number
(If installed)
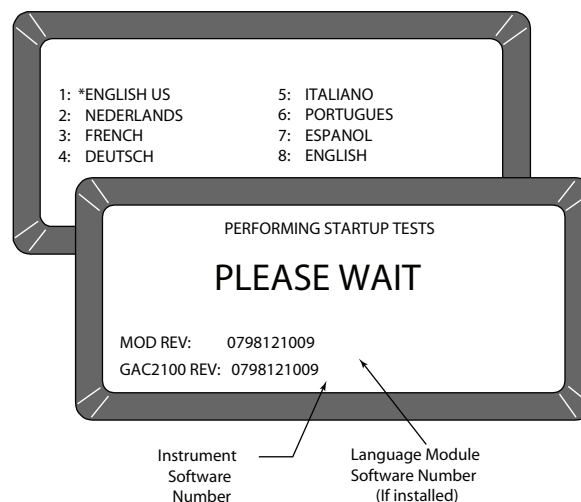
2. Select a language by pressing the key number indicated next to the desired language. This screen only remains available for approximately 8 seconds. Once selected, an asterisk appears and remains in front of the selection until changed again during another startup cycle.

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3. Wait for the remaining portion of the cycle to finish. A second screen will appear and display PLEASE WAIT while the unit is performing self checks. The bottom two lines of this screen display the software revision numbers (Figure 6).
4. After the **Main** menu displays proceed with general operation.

DISPLAY SCREEN

The display screen is a graphics Liquid Crystal Display (LCD) and is backlighted for low light level viewing.

ADJUSTING SCREEN CONTRAST

The Display Contrast Control is on the rear panel (Figure 4) immediately above the COM1 and COM2 ports. The contrast control changes the contrast between the displayed characters and the background. Adjust the control as necessary for a comfortable contrast level in varying light conditions.

DEFINING KEYBOARD KEY FUNCTIONS

All operator controls, except the Power ON/OFF switch and Contrast control, are located on the front panel. These two are on the rear panel.

The sealed membrane keyboard contains 20 pressure-sensitive keys requiring light finger pressure to actuate each key. Valid key closures result in short tone bursts while invalid keystrokes generate longer tone bursts. The function of each key or key group is defined as follows and illustrated in (Figure 7).

> Numbers (0 through 9), Decimal point (.) and Minus (–) keys

All numeric keys perform dual functions, making menu selections, and entering numeric values. The four numeric keys displaying small arrows have the additional function of screen navigation. When making a numeric entry, a prompt on the display identifies the value entered and a cursor shows the destination of each entry. The minus (-) sign is accepted at any point in the entry and displays at the front of the entered string.

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Figure 7

Keyboard Layout

PREVIOUS PAGE Key   BACKSPACE Key

NOTE: Keys 0, 1, 3, and 5 also function as arrow keys to navigate through certain screens.

LOAD Key

HELP Key

PRINT Key

UNLOAD Key
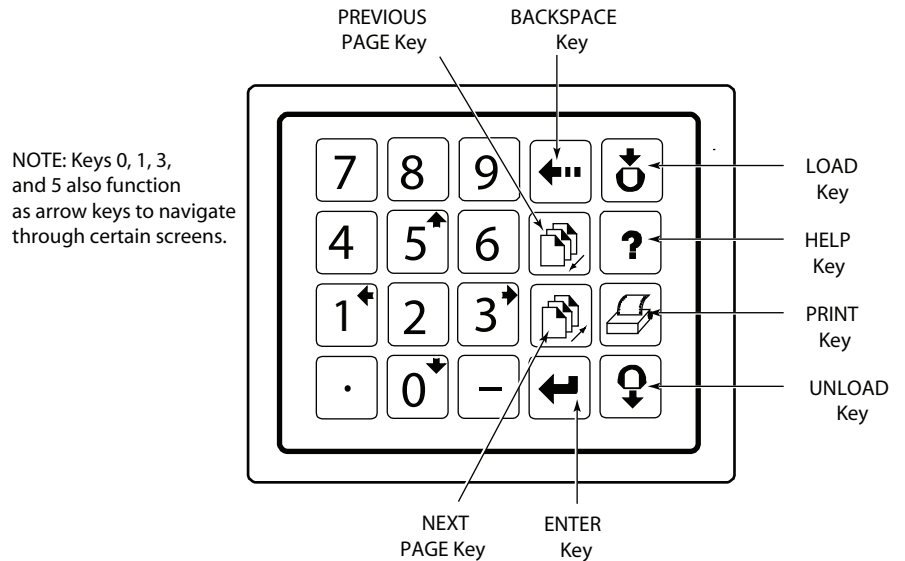
NEXT PAGE Key   ENTER Key

Each entry is immediately displayed as the cursor moves to the right in preparation for the next entry. Only the first entry of the decimal point is acknowledged.

The **Backspace** key moves the cursor to the left to delete the last keystroke or to clear an entire entry field.

Backspace Key

The **Next Page** key advances to the next page when the <more> prompt appears in the lower right corner of the display (refer to Figure 8). The **Next Page** key sequences the display forward to additional pages of information. The total page number and page count appear in the lower left corner of screen (i.e. PAGE 2 OF 8).

Next Page Key

Figure 8

Typical Screen Indicating More Pages

Indicates Number of Pages   Indicates Additional Page

SELECT GRAIN

1: CORN   5: SOYBEANS
2: CORN HI MOIST   6: FESCUE
3: WHEAT HRW   7: BARLEY
4: OATS   8: RYE

PAGE 1 OF 8   <more>
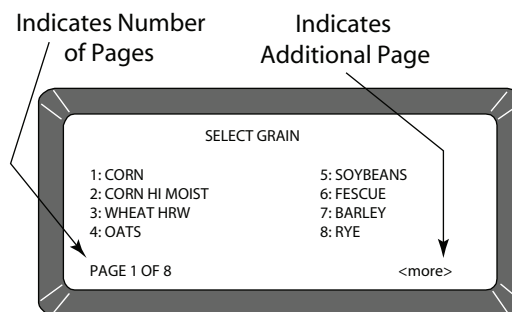
The **Previous Page** key sequences backward through previously displayed pages. Neither the **Previous Page** or **Next Page** keys roll-over the pages to the beginning or end.

The **Enter** key accepts the character string after an entry is complete.

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Previous Page Key

Enter Key

Load Key

Help Key

Print Key

Unload Key

1 & 3

Left and Right Keys

5 & 0
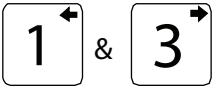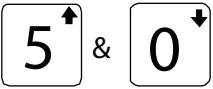
Up and Down Keys

The **Load** key initiates a grain cell loading sequence to begin a test cycle.

The **Help** key provides context sensitive help screens display. If the <more> message appears at the lower right of the screen, additional pages are accessible with the **Next Page** key. To use the HELP INDEX when in a **Help** screen, select the 0 key and then select the desired topic. To resume normal operation, select the **Help** key a second time.

The **Print** key initiates a printout of current information on the screen (e.g., grain moisture analysis, calibrations data, etc.). If the automatic printout option is selected, the **Print** key initiates duplicate copies. Help information does not print. COM SETUP options allows the **Print** key to transmit to either the printer port or the communications/modem port. For example, the system may be configured to automatically print results through the printer port while the **Print** key transfers results to the computer port.

Once the grain test completes, selecting the **Unload** key instructs the test cell to dump its contents.

The **Left** and **Right** keys move the cursor horizontally during alpha entries and certain functions during the SETUP mode.

The **Up** and **Down** keys move the cursor vertically during alpha entries and certain functions in the SETUP mode.

Figure 9

Main Menu Selections

```
                    MAIN MENU

1: MEASURE MOISTURE          3: CALIBRATION MENU
2: SELECT GRAIN              4: SETUP MENU
                             5: TESTS MENU

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

```
                    STATUS

CYCLE COUNTER:       435

THIS COUNTER INCREMENTS AFTER EACH
SAMPLE MEASUREMENT OR DATA COLLECTION
SEQUENCE IS SUCCESSFULLY COMPLETED
```
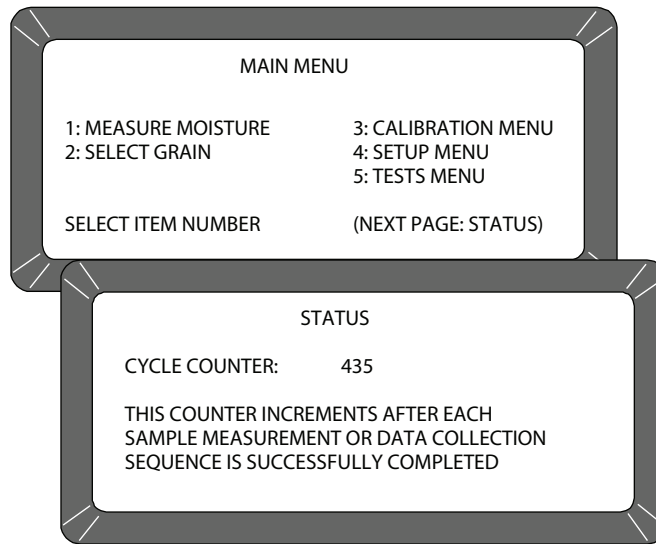
MENU SCREENS

The **Main** menu will be displayed once the start-up checks are successfully completed. The **Main** menu is the "home" screen through which all other screens are accessed. The **Main** menu displays five major selections or categories (refer to Figure 9).

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A number will appear next to each **Main** menu selection. Select the desired number to access the appropriate menu. Refer to Figure 10 for a general configuration of the Menu Tree layout.

ALARM

An audible alarm is enabled for 0.5 seconds at the end of each grain analysis or for an error condition. A shorter beep of 0.1 seconds sounds for each valid key stroke.

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Figure 10

Menu Tree

MAIN MENU

1: MEASURE MOISTURE 3: CALIBRATION MENU
2: SELECT GRAIN 4: SETUP MENU
5: TESTS MENU

SELECT ITEM NUMBER (NEXT PAGE: STATUS)

SELECT GRAIN

1: CORN 5: SOYBEANS
2: CORN HI MOIST 4: DURUM
3: AMARANTH 5: FESCUE
4: BARLEY 8: MILLET

PAGE 1 OF 8 <MORE>
PAGE 2 OF 8 <MORE>
PAGE 3 OF 8 <MORE>
PAGE 4 OF 8 <MORE>
PAGE 5 OF 8 <MORE>
PAGE 6 OF 8 <MORE>
PAGE 7 OF 8 <MORE>
PAGE 8 OF 8

CALIBRATION MENU

1: VIEW CALIBRATION
2: ENTER/CHANGE CALIBRATION
3: PRINT CALIBRATION LIST
4: OBTAIN CALIBRATION DATA
5: PRINT AUDIT MEMORY DATA

SELECT ITEM NUMBER (NEXT PAGE: STATUS)

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 <MORE>

1: QUICK KEYS MENU
2: TEST WEIGHT ADJUSTMENT

SELECT ITEM NUMBER (NEXT PAGE: STATUS)

SELECT GRAIN

1: CORN 5: SOYBEANS
2: CORN HI MOIST 4: DURUM
3: AMARANTH 5: FESCUE
4: BARLEY 8: MILLET

PAGE 1 OF 8 <MORE>
PAGE 2 OF 8 <MORE>
PAGE 3 OF 8 <MORE>
PAGE 4 OF 8 <MORE>
PAGE 5 OF 8 <MORE>
PAGE 6 OF 8 <MORE>
PAGE 7 OF 8 <MORE>
PAGE 8 OF 8

SERVICE MENU

1: EDIT TEMPERATURE CONSTANTS
2: EDIT EMPTY CELL WEIGHT COUNTS
3: EDIT WEIGHT CONSTANTS
4: EDIT CALIBRATION ADJUSTMENT CONSTANT
5: EDIT SERIAL NUMBER
6: EDIT FACTORY MODES

SELECT ITEM NUMBER (NEXT PAGE: STATUS)

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)

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)

LABELS MENU

1: EDIT USER NAME
2: EDIT TEXT STRINGS
3: EDIT FACTOR NAMES

SELECT ITEM NUMBER (NEXT PAGE: STATUS)

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)

DATE/TIME MENU

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

SELECT ITEM NUMBER (NEXT PAGE: STATUS)

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MEASURING MOISTURE

The **Main** menu appears immediately after all startup checks have successfully concluded (refer to STARTUP AND FAMILIARIZATION). The **Main** menu displays five major selections or categories. This chapter describes the MEASURE MOISTURE procedure.

PREPARING TO TEST MOISTURE

To measure moisture:

1. Choose MEASURE MOISTURE (1 Key) from the **Main** menu to display the **Select Grain** menu.

Figure 11

Moisture Testing Preparation

MAIN MENU

1: MEASURE MOISTURE   3: CALIBRATION MENU
2: SELECT GRAIN   4: SETUP MENU
                            5: TESTS MENU

SELECT ITEM NUMBER   (NEXT PAGE: STATUS)

SELECT GRAIN

1: CORN   5: SOYBEANS
2: CORN HI MOIST   6: MILO
3: WHEAT HRW   7: BARLEY
4: AMARANTH   8: OATS

PAGE 1 OF 8   <more>

PERFORMING SELF-CHECKS

PLEASE WAIT

WHEAT HRW   960918
ID: 14

Sample ID Number   Selected Grain Type for Testing
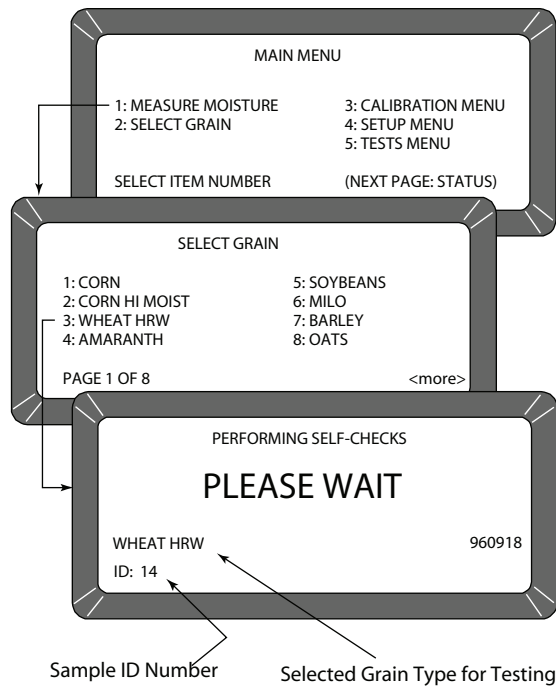
Next Page Key

Previous Page Key

2. Locate the grain type for testing and select the corresponding number to the left. If the grain to be tested is not shown on PAGE 1 OF 8, select the **Next Page** key to view PAGE 2 OF 8. This may be repeated for eight pages (up to 64 calibrations). After selecting a grain, the unit will cycle through self-check tests to ensure the program memory and calibrations are valid. Subsequent moisture measurements default to the previously selected grain.
3. If an additional measurement is desired for another grain, select the **Previous Page** key to return to the **Main** menu. Select the option SELECT GRAIN (2 key), and choose a new grain (refer to GRAIN SELECTION for additional information).

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0 ↓

Down Arrow Key

↵

Enter Key

4. Enter a sample ID number. This number identifies the sample tested on the paper printout. If the ENTER REQUIRED FOR ID is turned ON (refer to CHOOSING ID OPTIONS in the ESTABLISHING PARAMETERS section), the **Enter Sample Id** screen is displayed (Figure 12) and an ID number is required. Other ID numbering options bypass this screen. Details on how to use ID numbers are described later in this section. Use the **Down Arrow** key (0 key) to place the cursor next to the ID and enter any number.
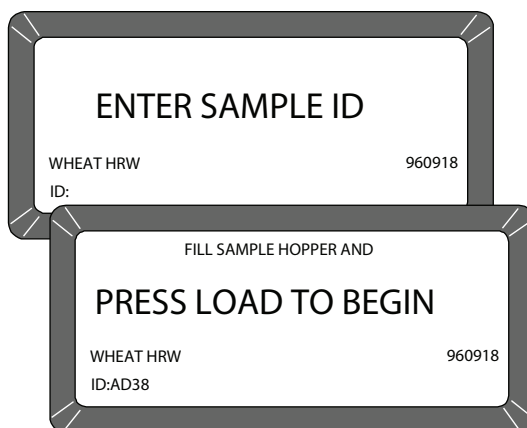5. Select the **Enter** key.

Figure 12

Screen Sequence Using Enter Required For ID

```
ENTER SAMPLE ID

WHEAT HRW                      960918
ID:
```

```
FILL SAMPLE HOPPER AND

PRESS LOAD TO BEGIN

WHEAT HRW                      960918
ID:AD38
```

MEASURING MOISTURE (BASIC METHOD)

After all calibration self-checks for the selected grain are complete (approximately 10 seconds), the message FILL SAMPLE HOPPER, ENTER ID NO. THEN…PRESS LOAD TO BEGIN will display (Figure 13).

To measure moisture:

1. Pour grain into the sample hopper. Fill the hopper until the grain is at least 1.25 cm (1/2 inch) above the separation line between the hopper top and hopper compartment (heap grain slightly). The exact volume is unimportant, except enough grain must be present to overfill the cell (approx 0.5 liter or 2 cups). Excess grain spills over the cell top and falls into the grain drawer below.
2. If the ID number has not already been entered, enter a number or skip to step 3.
3. Select the **Load** key to begin the test cycle. If factors (a type of label) are enabled, a screen will appear displaying the message ENTER RESULTS FOR THE FOLLOWING. Disregard this screen by entering a number and selecting the **Enter** key. Refer to FACTORS for additional information.
   After selecting the **Load** key, the hopper doors open and drop the grain into the test cell. The cell fills and the striker arm swings across the top to remove excess grain.

↓

Load Key

↵

Enter Key

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⚠️ **CAUTION**

Do not insert fingers or other foreign objects into the opened hopper doors.

4. Wait approximately 15 seconds for the moisture test to complete (Figure 13). A screen will appear displaying the message MEASURING - PLEASE WAIT.

Figure 13

Basic Moisture Measuring Cycle

```
FILL SAMPLE HOPPER, ENTER ID NO. THEN

PRESS LOAD TO BEGIN

WHEAT HRW                              960918
ID:AD1234
```

Select the Load Key

```
MEASURING

PLEASE WAIT

WHEAT HRW                              960918
ID:  AD38
```

```
13.4%   MOISTURE

WHEAT HRW                              960918

TEMP: 30 ℃
ID: AD38                               <more>
```

Select the Dump Key

```
PERFORMING SELF CHECKS

PLEASE WAIT

WHEAT HRW                              960918
```

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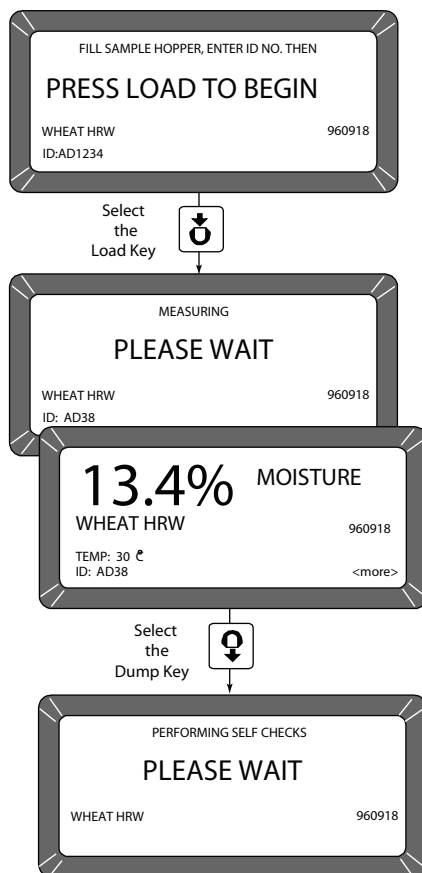
Next Page Key

Enter Key

Unload Key

5. The grain name and moisture percent will appear on the display, along with the sample temperature, sample ID, and grain calibration issue date.
6. The option <more> displays on the lower right corner of the screen. Select the **Next Page** key to view additional pages. The D1 through D4 values display along with the present date (lower left corner) and time (lower right corner).
7. If the <more> prompt is still displayed, select the **Next Page** key again. This page is only available if FACTORS are used. FACTORS are a type of label that allows the user to enter data for additional information on the paper printout. Up to four user-defined factors (or labels) may display and print as specified on the **Setup** menu. If this screen displays, enter numbers as desired and select the **Enter** key. If no factor names are specified, the screen will not display.
8. When the measurement is complete, select the **Unload** key. The test cell will invert dumping the grain and returning to the upright position.
9. Start a new moisture measurement for the same grain type. The GAC 2100 remembers the grain type until it is changed or power is turned OFF. The **Select Grain** menu does not appear again until it is selected.

USING GRAIN SAMPLE ID NUMBERS

Three sample ID options may be selected to number grain samples; (1) **Automatic number sequencing** (e.g., 1, 2, 3…), (2) **Manual entry** (numbers may be manually entered or skipped) and (3) **ENTER REQUIRED FOR ID** (produces the **Enter Sample Id** screen) which prompts a required entry before proceeding (Figure 12). The ID field may be either numeric or alphanumeric. If numeric only, the digits 0-9, the decimal point, and the minus sign are entered with the keyboard. Other characters are entered from an alpha screen.

ENTERING NUMBERS AND ALPHA CHARACTERS

Entering alpha characters (letters) into certain screens, such as an ENTER SAMPLE ID number, is accomplished through a special alpha screen. To access the alpha screen from the **Enter Sample Id** screen, select the **Next Page** Key. The **Next Page** key only functions if an alpha entry is possible.

Next Page Key

To view and/or use the alpha screen:

Down Arrow Key

1. Prepare for a moisture test. When the PRESS LOAD TO BEGIN message appears, stop and observe the screen. The ID field on the lower left corner below the grain type appears and a small cursor will blink. If necessary, use the **Down Arrow** key to position the cursor next to the ID field (ID: _). Numbers are entered directly from the keypad and completed by selecting the **Enter** key.
2. To enter letters, select the **Next Page** key to access the **Alpha** screen. The **Alpha** screen displays the alphabet, special characters, and a string of S numbers (S1…S10). On the lower left corner, the word TEXT will display (Figure 14).

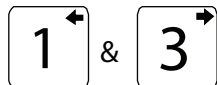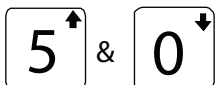Enter Key

1 & **3**

Left and Right Arrow Keys

5 & **0**

Up and Down Arrow Keys

Enter Key

Backspace Key

Previous Page Key

Figure 14

Alpha Screen


```
ABCDEFGHIJKLMNOPQRSTUVQXYZ _ #$%&'( ) *,-.+

ÇÓŽÄĆÉĹĽŚÓÜŤŁAÑŽĘCAÁÈŠ  ADD  ˇ ĔŇÍÍŤŮÓ ßÔŃŚŔÚÚ"

ÝŞŘ S1  S2  S3  S4  S5  S6  S7  S8  S9  S10


TEXT: -
```
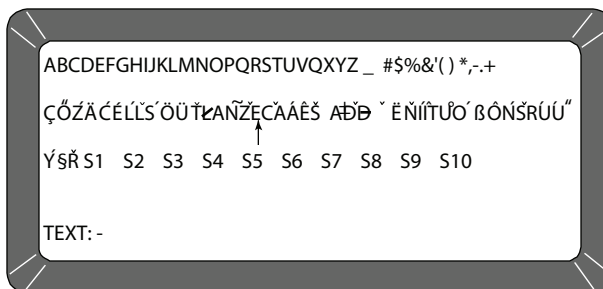
3. Move the vertical pointer (center of screen) to the first letter. The small vertical pointer identifies the selected character. The pointer is moved around the screen by using the four arrow keys (**Left/Right** and **Up/Down**).
4. After selecting a letter, select the **Enter** key. The letter will appear next to the word TEXT: on the lower corner. Repeat the process until the phrase is complete. If an error is made, select the **Backspace** key and re-enter the corrected character.
5. After completing the text string, select the **Previous Page** key. The text string will become part of the ID field on the **Press Load To Begin** screen. Additional numbers may be inserted after the text string as before. Deleting is accomplished by entering the alpha screen again and using the **Backspace** key to delete letters. Using the S1 through S10 character strings is described in ESTABLISHING PARAMETERS. Character strings are predetermined phrases to insert into an alpha text line when needed (i.e. BROWN).

USING ID OPTIONS

ID numbers are typically used to identify grain samples. The numbers may be a simple number (e.g., 1, 2, 3, etc.), a combination of letters and numbers (i.e. operator's initials plus sample number) or the customer's name (i.e. BROWN). The ID field may contain up to 16 alpha numeric characters.

The ID option is selected through the **Setup** menu, ID OPTIONS (refer to ESTABLISHING PARAMETERS). ID numbers are added to each tested sample using one of three methods:

1. **Inserted Manually** - Any ID field, including none at all, may be assigned to grain samples before each test. This flexibility allows the creation of individualized numbering schemes.
2. **Automatic Sequencing -** Numbers may be sequentially assigned automatically to each moisture test. For example, 1, 2, 3, etc. or specific letters (i.e. initials) may be placed in front of the numbers (i.e. JW12). Only the numbers at the end of the field change automatically.
3. **Entry Required For ID -** An ID field is required before each moisture test may proceed. This method ensures each sample is properly identified, typically for printer output. A screen will display before the

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moisture test requests the user to ENTER SAMPLE ID. Alpha characters may be used if desired.

USING FACTORS (LABELS)

Factors are predetermined labels that appear at the beginning of each moisture test similar to sample ID numbers. Up to four factors display and print as specified in the calibration. For each FACTOR specified, an entry must be made before initiating the moisture measurement. Entries (numeric only) may be up to six digits long (Figure 15). FACTORS are established on the **Setup** menu (refer to ESTABLISHING PARAMETERS).

Figure 15

Example of Factors

```
        ENTER RESULTS FOR THE FOLLOWING:

CUSTOMER ID          54
VEHICLE NUMBER       4
CODE                 382
LOAD WEIGHT          19535

WHEAT HRW                              960518
ID: AB1234
```

VIEWING THE NEXT PAGE

After the grain analysis is completed and the moisture content displays, <more> appears on the lower right corner of the screen indicating another page is available. Select the **Next Page** key to view the calculated values (D1, D2, D3 and D4) determined from the grain measurement (Figure 16). These values are relatively unimportant to the operator but are important to service personnel. A general definition of each value is as follows:

Next Page Key

D1 - Conductance measurement to indicate grain surface moisture.

D2 - Capacitance measurement to indicate internal grain moisture.

D3 - Weight measurement to indicate grain weight.

D4 - Temperature to indicate grain temperature.

Below the D calculations, the TEST WEIGHT OFFSET (as applicable) appears. This value is programmed on the **Setup** menu (refer to UP PARAMETERS). The current date, time, and sample ID also display.

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Figure 16

Next Page Typical Calculated D-Values

```
D1: nnnn
D2: nnnn
D3: nnnn
D4: nnnn


TEST WEIGHT OFFSET:   +0.4 LB/BU
DATE: 05/18/96
ID: 12                          TIME: 16:42:20
```

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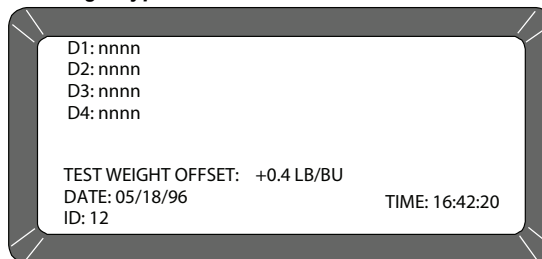
GRAIN SELECTION

The second item on the **Main** menu is the **Select Grain** menu that is used to select specific grain types for testing. The **Select Grain** menu is automatically displayed for the first moisture test each time power is applied. It may also be selected at any time to test different grain types. After the first test, the **Select Grain** menu must be selected manually. One exception is through the use of QUICK KEYS. However, these are limited to three grain choices, usually the most common grains. The use of QUICK KEYS allows a programmed grain to be selected prior to loading the grain into the test cell (refer to MEASURING MOISTURE).

USING SELECT GRAIN MENU

The GAC 2100 stores up to 64 unique grain calibrations. The first 40 are restricted and may only be changed by authorized personnel. The remaining 24 are less secure and may be changed using the Access Code.

To select a grain for testing:

1. Choose the **Select Grain** menu from the **Main** menu by selecting the 2 key. The first page of the **Select Grain** menu displays the first eight grain calibrations available. The prompts on each lower corner of the display indicate additional pages are available (Figure 17).
2. Select the **Next Page** key to advance to the next page. The next eight grain calibrations will display. The **Next Page** key allows access to all available eight pages. When the last pagedisplays, the <more> prompt no longer remains visible on the screen.
3. Select the **Previous Page** key to move backward. The **Previous Page** key is the counterpart of the **Next Page** key.

Next Page Key

Previous Page Key

Figure 17

Select Grain Menus
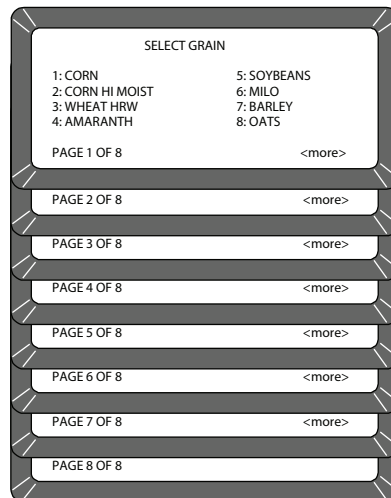
4. Choose the desired grain by selecting the number key corresponding to the desired grain. After selecting the grain, the GAC 2100

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automatically enters the MEASURE MOISTURE mode and retains the grain selection until a new grain is selected again or the power is turned OFF.

QUICK KEYS

Changing grain types is accomplished in one of two ways. The standard method uses the **Select Grain** menu as described above.

A faster method of changing between grain types is the use of QUICK KEYS. Up to three keys may be programmed to quickly change between the most often used grains without having to choose the **Select Grains** menu.

Keys 1, 2, and 3 may be programmed on the **Setup** menu to remember specified grain types (refer to ESTABLISHING PARAMETERS). After programming, the operator changes the grain type by using one of the QUICK KEYS prior to starting a new test cycle. Whenever the **Press Load To Begin** screen displays (Figure 13), select either the 1, 2, or 3 key. The grain type above the ID number will change to the selected grain type. The new measurement cycle is ready to measure the selected grain.

To begin, select the **Load** key.

Load Key

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CALIBRATING PROCEDURES

The **Calibration** menu allows

*   viewing calibration constants of selected grains,
*   entering new or changing existing calibrations,
*   printing the entire list of stored grain calibrations,
*   obtaining calibration data necessary to generate new calibrations, and
*   printing audit memory data.

Choosing a function is achieved by selecting the number key corresponding to the desired function (Figure 18).

Figure 18

Calibration Menu With Status Page

Allows viewing and printing of selected grain calibrations only.

Used to enter new or edit existing grain calibrations.

CALIBRATION MENU

1: VIEW CALIBRATION
2: ENTER/CHANGE CALIBRATION
3: PRINT CALIBRATION LIST
4: OBTAIN CALIBRATION DATA
5: PRINT AUDIT MEMORY DATA

SELECT ITEM NUMBER   (NEXT PAGE: STATUS)

Allows the printing of a list of grain calibrations.

Used to obtain data for determining calibration constants for a specific grain.

STATUS

CYCLE COUNTER: 435

THIS COUNTER INCREMENTS AFTER EACH SAMPLE MEASUREMENT OR DATA COLLECTION SEQUENCE IS SUCCESSFULLY COMPLETED

Allows printing and/or clearing of the Audit trail information.

Represent the total count of samples processed since the counter was last reset.

VIEWING CALIBRATION DATA (1 KEY)

The **View Calibration** menu allows for viewing and printing of a selected grain calibration (Figure 19). Editing cannot be performed in this function.

To view grain calibrations:

1. From the **Calibration** menu, choose **View Calibration** by selecting the 1 key. PAGE 1 OF 8 grain pages is displayed.
2. Choose a grain calibration to view from the grain list pages and then select the corresponding number key. Use the **Next Page** key to view additional pages (refer to GRAIN SELECTION).
3. The **View Calibration** screen displays the grain name, moisture range, calibration issue date, and the nine calibration K values.
4. If a printer is connected, select the **Print** key to print a copy of the screen. If FACTORS are defined and AUTO RANGE is specified in the calibration, this information is also printed. The lower right corner of the **View Calibration** screen will indicate <more> meaning another page is available.
5. Select the **Next Page** key to display the **Factors** screen. The **Factors** screen displays the grain name and up to four defined factors. If the grain does not have defined factors, the labels are empty. The <more> prompt will also display on this page.

Next Page Key

Print Key

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Next Page Key

6. Select the **Next Page** key again to view the **Auto Range** screen. The **Auto Range** screen displays grain name and calibrations automatically used to extend the moisture range if the normal maximum and minimum limits are exceeded. Separate grain calibrations or grains may be referenced for each limit.

Figure 19

View Calibration Menu Showing Wheat HRW


```
                    CALIBRATION MENU

        1: VIEW CALIBRATION
        2: ENTER/CHANGE CALIBRATION
        3: PRINT CALIBRATION LIST
        4: OBTAIN CALIBRATION DATA
        5: PRINT AUDIT MEMORY DATA

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

```
                   SELECT GRAIN TO VIEW

        1: CORN              5: SOYBEANS
        2: CORN HI MOIST     6: MILO
        3: WHEAT HRW         7: BARLEY
        4: AMARANTH          8: OATS

        PAGE 1 OF 8                      <more>
```

```
                    VIEW CALIBRATION
        GRAIN: WHEAT HRW        RANGE: 06-20%
        ISSUE: 960701
        K1: 0433    K4: 2821    K7: 2006
        K2: 3577    K5: 2500    K8: 0564
        K3: 1368    K6: 2577    K9: 1044
                                         <more>
```

```
                    VIEW CALIBRATION
        GRAIN: WHEAT HRW

        FACTOR 1:   VEHICLE NUMBER
        FACTOR 2:
        FACTOR 3:
        FACTOR 4:
                                         <more>
```

```
                    VIEW CALIBRATION

        AUTO RANGE FOR:  WHEAT HRW

        IF ABOVE MAX MOIST TRY: WHEAT HI MOIST
        IF BELOW MIN MOIST TRY:  WHEAT LO MOIST
```

ENTERING/CHANGING CALIBRATION VALUES (2 KEY)

This function allows for entering or changing grain calibrations. Grains 1 through 40 are restricted to authorized personnel only. Grains 41 through 64 are considered "unofficial calibrations" and may be accessed by using the Access Code. Changing calibrations is also possible through proper linking with a computer (refer to the computer manual). The same security code restrictions exist. After gaining access, changes to calibrations may be accomplished (Figure 20).

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Figure 20

Changing Calibrations

CALIBRATION MENU

1: VIEW CALIBRATION
2: ENTER/CHANGE CALIBRATION
3: PRINT CALIBRATION LIST
4: OBTAIN CALIBRATION DATA
5: PRINT AUDIT MEMORY DATA

SELECT ITEM NUMBER   (NEXT PAGE: STATUS)

SELECT GRAIN TO ENTER/CHANGE

1: CORN   5: SOYBEANS
2: CORN HI MOIST   6: MILO
3: WHEAT HRW   7: BARLEY
4: AMARANTH   8: OATS

PAGE 1 OF 8   <more>

ENTER/CHANGE CALIBRATION

TO PROCEED

UNSEAL ACCESS PORT ON REAR PANEL
AND DEPRESS WHITE PUSHBUTTON

ENTER/CHANGE CALIBRATION
GRAIN: WHEAT HRW   RANGE: 06 -20%
ISSUE: 960701
K1: 0433   K4: 2821   K7: 2006
K2: 3577   K5: 2500   K8: 0564
K3: 1368   K6: 2577   K9: 1044

Press ◀▮▮ to EDIT   <more>

ENTER/CHANGE CALIBRATION

AUTO RANGE FOR: WHEAT HRW

IF ABOVE MAX MOIST TRY: WHEAT HI MOIST
IF BELOW MIN MOIST TRY: WHEAT LO MOIST

To enter/change calibration values:

1. From the **Calibration** menu, select the 2 key to access **Enter/change Calibration** screen. PAGE 1 OF 8 of the **Select Grain To Enter/ Change** menu will display. The remaining pages are accessed by selecting the **Next Page** and **Previous Page** keys.
2. Select the grain to be altered or locate an empty position to enter a new calibration. Select the appropriate key corresponding to the listing.
3. Determine whether the selected grain is located in the first 40 or the last 24. If the selection is on one of the first five grain pages (5 x 8 = 40) changing the calibration is restricted to authorized personnel only. A screen will display stating TO PROCEED, UNSEAL ACCESS PORT ON REAR PANEL AND DEPRESS WHITE PUSHBUTTON.

IMPORTANT: Do not perform this action unless you are authorized (proceed to step 4).

If the grain selection is on pages 6, 7 or 8, a message will display stating UNOFFICIAL CALIBRATION. These calibrations may be altered after responding to the request to ENTER ACCESS CODE. Entering the access code and then selecting the **Enter** key will allow the user to proceed.

4. If selecting an existing calibration, a large flashing block appears on the grain selection.The screen displays the current K values for that

Next Page Key

Previous Page Key

Enter Key

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Backspace Key

Next Page Key

*NOTE: Selecting the **Next Page** key instead of the **Backspace** key (to change the large flashing block to the cursor), advances to the AUTO RANGE function (refer to Step 14).*
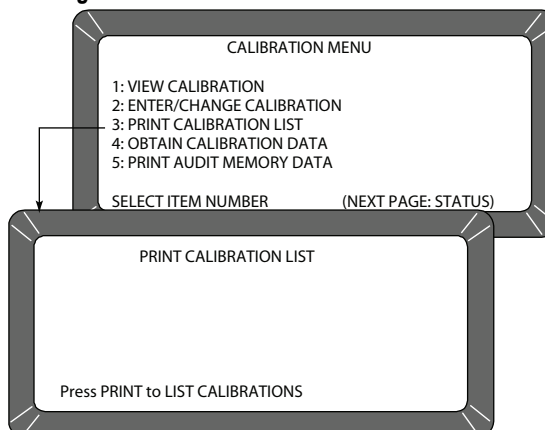
Enter Key

Previous Page Key

Print Key

grain. The large flashing block signifies that alpha characters may be entered from the alpha screen. Selecting the **Backspace** key, as prompted on the bottom of the screen, causes the bottom prompt to disappear and the large flashing block to change to a cursor (flashing line). When the cursor appears, the alpha screen may be accessed by selecting the **Next Page** key. If numeric entries are desired, those values are made directly with the number keys.

5. Use the alpha screen to enter a grain name (up to 16 characters). Select the **Enter** key after each character selection to place the character on the text line.

6. Select the **Previous Page** key to return to the **Enter/Change Calibration** screen. Note that the new grain title is now in place.

7. Select the **Enter** key to accept the new grain title. The cursor will advance to the next position (Issue Date).

8. Enter the Calibration Issue Date (up to 8 characters) and select the **Enter** key. The cursor will return to a flashing block in the ISSUE position. The block signifies the date may include alpha characters (i.e. 15NOV98) but normally is entered as numbers in a format such as YYMMDD (i.e. 981115). Selecting the **Backspace** key will cause the flashing block to disappear allowing the **Next Page** key to be used for selecting the alpha screen.

9. Select the **Enter** key to accept the date. The cursor appears as a line (flashing) under the first digit of K1 (constant). The flashing cursor (line) signifies this entry accepts only numbers.

10. Enter the K1 constant. Notice when entering the first digit the remaining spaces blank. All four digits of the constant must be entered when making a change. If more than four digits are entered, a long beep will indicate an illegal entry.

11. When finished, select the **Enter** key to accept the constant and to advance to the next position. If the screen is accidently advanced before finishing, select the **Enter** key as many times as necessary to cycle through all menu items.

12. Enter K2 through K9 constants in the same manner as K1. Select the **Enter** key after entering each constant (4 digits).

13. Select the **Print** key to print the calibration. The present screen values print.

14. Select the **Next Page** key to enter the **Auto Range** calibration selection. The **Auto Range** screen allows entry for grains using higher or lower moisture levels than the current calibration. These values are automatically selected if the grain moisture is outside the standard setting.

15. Select the **Backspace** key and choose a grain calibration to be used if the sample moisture is above the upper limit. After selecting a grain, the display will return to the **Auto Range** screen. Repeat this procedure again for the lower limit grain calibration.

16. Select the 0 (zero) key to delete either auto range calibration. Select the **Previous Page** key to return to the **Grain Calibration** screen.

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Figure 21

Printing Calibration Lists

CALIBRATION MENU

1: VIEW CALIBRATION
2: ENTER/CHANGE CALIBRATION
3: PRINT CALIBRATION LIST
4: OBTAIN CALIBRATION DATA
5: PRINT AUDIT MEMORY DATA

SELECT ITEM NUMBER   (NEXT PAGE: STATUS)

PRINT CALIBRATION LIST

Press PRINT to LIST CALIBRATIONS

PRINTING CALIBRATION GRAIN LIST (3 KEY)

A printout of all grain calibrations stored in memory can be obtained by selecting the **Print** key (Figure 21).

To print a calibration list:

1. Select the 3 key from the **Calibration** menu. The **Print Calibration List** screen will appear.
2. Select the **Print** key. The list of all grain calibrations will print.

OBTAINING BASIC CALIBRATION DATA (4 KEY)

This mode allows the generation of data for developing grain calibrations. The samples used for calibration should span the desired moisture range.

In order to obtain good calibration data, the samples must be as evenly distributed throughout the moisture range as possible. The grain samples should extend at least 2% past each end of the desired moisture range, should contain no spoilage or condensation, and be free of broken pieces or foreign matter. The GAC 2100 readings obtained may be sent to DICKEY-john to derive the calibration constants for the new grain.

To obtain accurate calibration constants:

1. Turn the GAC 2100 power switch ON and allow approximately thirty minutes to warm up before taking sample readings. Turn the printer ON. Be certain the GAC 2100 is set up and functioning properly.
2. From the **Main** menu, choose the **Calibration** menu by selecting the 3 key. Then access OBTAIN CALIBRATION DATA by selecting the 4 key.
3. Enter a sample identification number so the sample will be properly identified. Key in a sample ID number (use the **Next Page** key if an alpha ID is desired). Select the **Enter** key. Pour the sample into the hopper and select the **Load** key.
4. After the measurement cycle is complete, the screen displays four D values (Figure 22). If using a printer, a printout will automatically result. If a printer is not being used, record the D-values and sample ID.

Print Key

Next Page Key

Enter Key

Load Key

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Figure 22

Obtaining Calibration Data

```
CALIBRATION MENU

1: VIEW CALIBRATION
2: ENTER/CHANGE CALIBRATION
3: PRINT CALIBRATION LIST
4: OBTAIN CALIBRATION DATA
5: PRINT AUDIT MEMORY DATA

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

```
PERFORMING SELF CHECKS

PLEASE WAIT

OBTAIN CALIBRATION DATA
ID:
```

```
ENTER SAMPLE ID

OBTAIN CALIBRATION DATA
ID: 22
```

```
FILL SAMPLE HOPPER AND

PRESS LOAD TO BEGIN

OBTAIN CALIBRATION DATA
ID: 22
```

```
MEASURING

PLEASE WAIT

OBTAIN CALIBRATION DATA
ID: 22
```

```
D1:      8
D2:    674
D3:   2467
D4:    272

OBTAIN CALIBRATION DATA
DATE: 09/15/96              TIME: 20:10:19
ID: 22
```

5. Write the grain type under the CALIBRATION DATA. Write the actual moisture percentage of each sample (obtained by an accurate approved means) next to STD. MOIST. Run additional samples.
6. Run as many samples as possible and record the actual moisture percentage for each sample. After running each sample, select the **Unload** key.

NOTE: The facility name and location, date/time, GAC 2100 serial number and calibration data print when the first sample is run in this mode (Figure 23).

⟳
↓

Unload Key

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Figure 23

Calibration Data Printout

```
DICKEY-JOHN
10653

04/21/98  06:42:33

S/N: 1640-10653


  CALIBRATION DATA

==================


ID:      1

STD. MOIST:

        D1:       0
        D2:      14
        D3:       2
        D4:     179


==================
```

PRINTING AUDIT MEMORY DATA (5 KEY)

The audit memory records data changes made to parameters affecting moisture measurement or the display of the measurement data. The audit memory stores the following types of data:

- grain calibration settings
- output option settings
- date and time settings

The memory contents may be printed at any time. Printing audit memory can be initiated from either the unit or the computer site (Figure 25). For additional information concerning printing from the computer, refer to the Communications Software manual.

To print the audit memory contents:

1. From the **Main** menu, access the **Calibration** menu by selecting the 3 key. Access PRINT AUDIT MEMORY DATA by selecting the 5 key. A screen appears displaying PRESS PRINT TO BEGIN.
2. Select the **Print** key to obtain a printout of the audit memory (Figure 24). Multiple copies can be produced by selecting the **Print** key again when the printer finishes. If only the header, current date, current time, and GAC 2100 serial number print during this process, the audit memory is empty.

Print Key

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Figure 24

Audit Memory Data

```
DICKEY-JOHN
10653

CURRENT DATE/TIME
04/21/98   06:46:07

S/N: 1640-10653




EVENT COUNTER:      3

DATE OF CHANGE:
  02/23/98  MM/DD/YY
TIME OF CHANGE:
  11.28.49   HH.MM.SS
LOG ON TIME:
  00.00.00   HH.MM.SS
CHGCD:
  ******


PID: 00 - MPR
  0.01
```
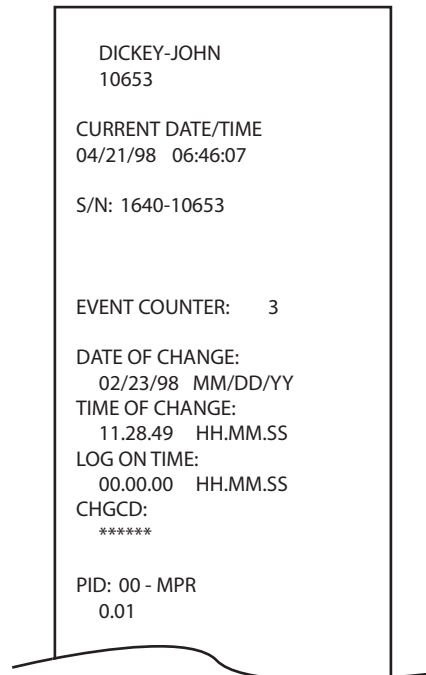
Each event lists the (1) date of change, (2) time of change, (3) log on time and (4) user code (Figure 24). The user code prints asterisks to maintain user code security. The event (or change) is identified with a PID (Parameter Identification), a colon and then a code to indicate the specific type of change (refer to Table 1). The printout begins with the most recent event and progresses in reverse order to the oldest event.

Figure 25

Printing Audit Memory Data

```
CALIBRATION MENU

1: VIEW CALIBRATION
2: ENTER/CHANGE CALIBRATION
3: PRINT CALIBRATION LIST
4: OBTAIN CALIBRATION DATA
5: PRINT AUDIT MEMORY DATA

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

```
PRINT AUDIT MEMORY DATA




Press PRINT to begin
```
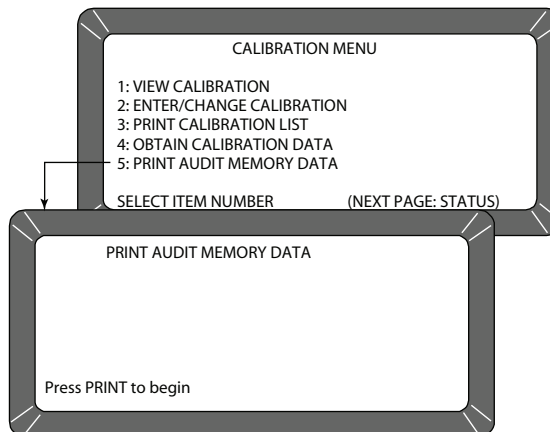
Previous Page Key

3. After printing, select the **Previous Page** key to return to the **Calibration** menu.

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| Table 1. Audit Memory Parameter Identification (PID) Codes	
PID:	**Definition of Terms**
CB*	Calibration
USRCD	User Code
OO - D&OTW	Output Option - Display & Output Test Wright
OO - D & OT	Output Option - Display & Output Temperature
OO - DOOLR	Output Option - Display & Out-Of-Limits Results
OO - OOOLR	Output Option - Output Out-Of-Limits Results
OO - OROAE	Output Option - Output Report Of All Errors
OO - MPR	Output Option - Moisture Printout Resolution
OO - RP	Output Option - Radix Point
OO - TF	Output Option - Temperature Format
OO - WF	Output Option - Weight Format
TIME	Time
DATE	Date
DATE FORMAT	Date Format

* If the grain number is greater than 40, UNOFFICIAL CALIBRATION is
printed under the CB designation - If less than 40, the space remains
blank indicating the printout is an official calibration.

When the unit reaches 1000 events, a memory full message displays and
no additional events can be recorded until audit memory is cleared. The unit
will not respond to keypad input and must be turned off and on to regain
control again and to resume normal grain measurement routines. If any
attempt is made to modify an auditable parameter, the warning reappears
and must be cleared again. This limitation persists until the memory is
cleared.

Figure 26

Audit Memory Full Screen

AUDIT MEMORY FULL!

OPERATION CANNOT BE PERFORMED
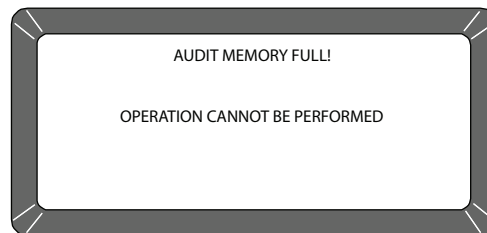
After printing audit memory:

1. Press the **Previous Page** key.
2. After printing, select (1 key) to clear audit memory or (2 key) to retain
   audit memory.

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Figure 27

Printing Complete Screen

PRINTING AUDIT MEMORY COMPLETE

1: CLEAR AUDIT MEMORY
2: DO NOT CLEAR AUDIT MEMORY

TO PROCEED

Unseal Access Port on Rear Panel
and Depress White Push Button
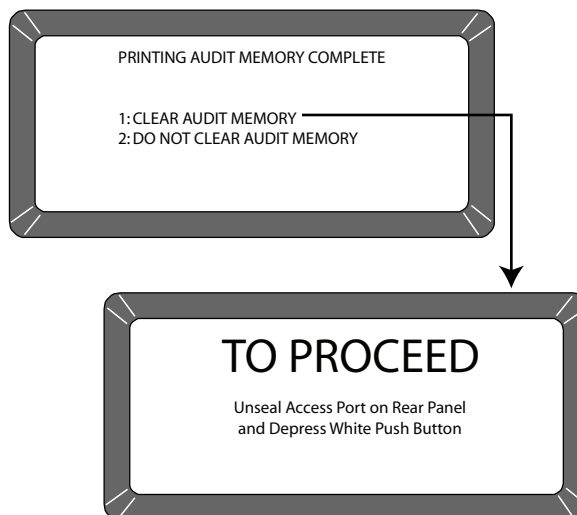
To clear audit memory:

3. Select the (1 key) Clear Audit Memory.
4. To clear memory, break the seal on the back of the unit (authorized personnel only).
5. Remove the access panel and press the white push button.
6. When the white push button is pressed, audit memory is cleared and the unit returns to the Calibration menu.

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ESTABLISHING PARAMETERS

The **Setup** menu establishes basic operating parameters for the unit. These parameters include resetting the cycle counter, ID options, output options, setting the access code, setting date and time, entering labels, configuring communication ports, and selecting quick keys.

From the **Main** menu, the **Setup** menu is accessed by selecting the 4 key (Figure 28). From the **Setup** menu, eight sub-menus appear on the first page along with two more on the next page. Most functions require the access code before changes can occur. If the access code has not been changed, the factory installed temporary code is set for 0 (zero).

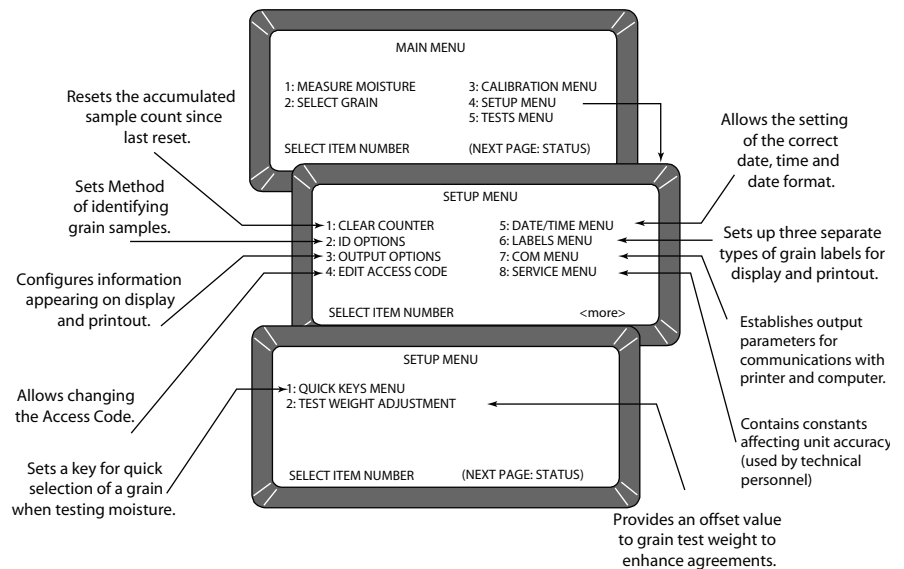*Figure 28*

Setup Menu Choices

CLEARING THE CYCLE COUNTER (1 KEY)

The CYCLE COUNTER increments once each time a moisture measurement or data collection sequence is successful. The screen displays the total counts accumulated since the last reset.

NOTE: *The date, time and cycle counter values are automatically sent to the COM1 and COM2 Ports each time the counter is cleared, resulting in a printout of the most recently cleared counter contents. The printout should be retained for records.*

To reset the cycle counter:

1. From the **Setup** menu, select the 1 key (Figure 29). A screen will appear displaying ENTER ACCESS CODE.
2. Enter the current personal access code (or 0) and select the **Enter** key. Enter 0 if the code has not been changed from factory settings.
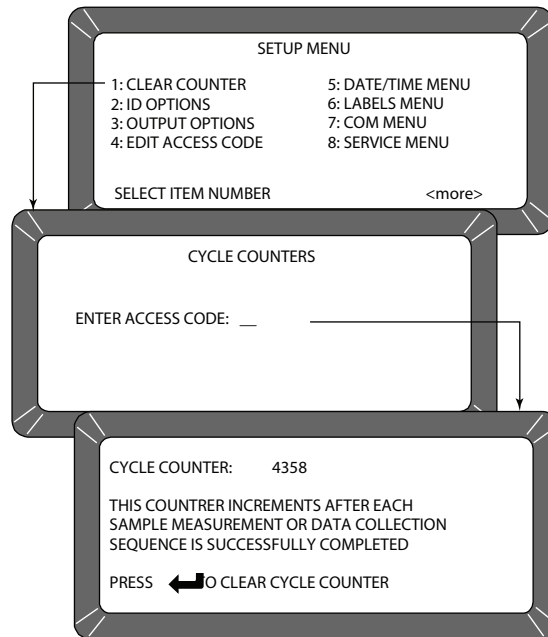3. Select the **Enter** key again to reset the number (count) to zero. The counter will return to zero.

Enter Key

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Figure 29

Clearing The Cycle Counter

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   <more>

CYCLE COUNTERS

ENTER ACCESS CODE: __

CYCLE COUNTER: 4358

THIS COUNTRER INCREMENTS AFTER EACH
SAMPLE MEASUREMENT OR DATA COLLECTION
SEQUENCE IS SUCCESSFULLY COMPLETED

PRESS ⬅ TO CLEAR CYCLE COUNTER

CHOOSING ID OPTIONS (2 KEY)

ID OPTIONS determine how each moisture measurement sample is identified on the output data. ID numbers appear in the lower left corner of each test result screen. All sample ID numbers may contain up to 16 alphanumeric characters. Three methods of sample identification are available for display:

- **AUTOMATIC SEQUENTIAL ID –** Automatically increments once for each measurement cycle, but resets each time the unit is turned OFF.
- **ENTER REQUIRED FOR ID –** With each measurement, a screen will appear displaying ENTER SAMPLE ID before the grain sample is measured. This option ensures a grain sample identification number/label is assigned for each test printout.
- **Optional Entry ID –** If both of the selections have been checked NO, the ID number may be added to each measurement manually or not at all. Manually added ID numbers do not require any specific format or sequencing.

To configure the ID Options:

1. From the **Setup** menu, select the 2 key to access the **ID Options** screen (Figure 30). A screen will appear displaying ENTER ACCESS CODE.
2. Enter the access code (or 0) and select the **Enter** key. The **ID Option** screen displays only two lines but allows three choices – the AUTOMATIC SEQUENTIAL ID and ENTER REQUIRED FOR ID functions cannot both be enabled (YES) at the same time.
3. Select the desired function. Use the up/down arrow keys (0 and 5 keys) to select and the left/right arrow keys (1 and 3 key) to set the

⬅

Enter Key

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desired value. If both selections are set to NO, grain sample ID is optional for each test.

Figure 30

Selecting ID Options
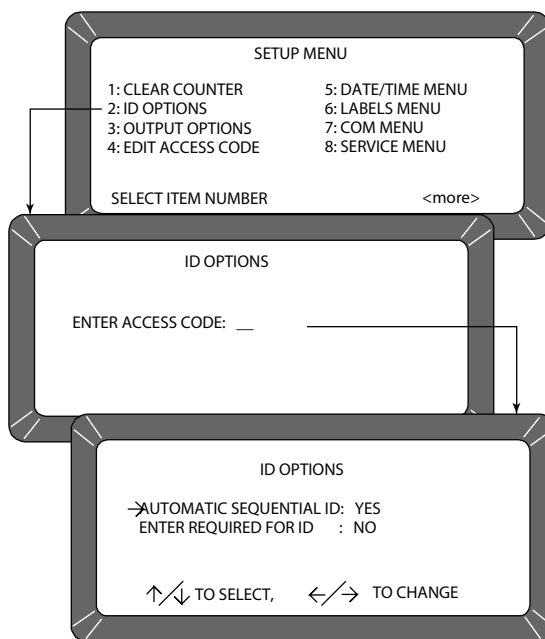
CONFIGURING OUTPUT OPTIONS (3 KEY)

OUTPUT OPTIONS configure information appearing on the display/printer for measured test results (Figure 31). These selections are typically made once and not changed again, but may be altered as necessary. Selections are available only to authorized personnel through either the User ID Code from the computer site or as outlined below.

To change the output options:

1. From the **Setup** menu, select OUTPUT OPTIONS (3 key). A screen will appear displaying instructions on how TO PROCEED.
2. If access is authorized, locate and select the small white push button under the sealed access panel at the rear of the unit. The panel is located in the lower left rear corner (viewed from rear) of the unit. The push button is on the circuit board assembly inside the cavity.
3. Verify each option and set as necessary.Three pages must be verified (Figure 31). Use the **Up/Down Arrow** keys (0 or 5) to select functions and the **Left/Right Arrow** keys (1 or 3) to set each function to the appropriate setting. Options include:
   – **DISPLAY AND OUTPUT TEST WEIGHT:** Enables/disables (YES/ NO) approximate grain test weight to display and print. **DISPLAY AND OUTPUT TEMPERATURE:** Enables/disables (YES/NO) grain temperature to display and print.
   – **DISPLAY OUT-OF-LIMITS RESULT:** Error messages flash on the display each time tested grain parameters exceed the normal range

5 & 0

Up and Down Arrow keys

1 & 3

Left and Right Arrow Keys

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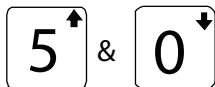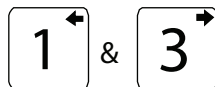
of that particular grain. If enabled, three standard parameters are displayed – moisture, grain temperature, and approximate grain test weight. Each measured parameter value appears next to its respective legend on the display. The display out-of-limit options selected below establish whether or not the enabled values appear on the display. Eight separate settings are available for suppressing the enabled grain parameters.

For the NTEP (National Type Evaluation Program) unit, the parameter values are to be suppressed if the temperature values are outside the established limits. Therefore, option MW is to be selected.

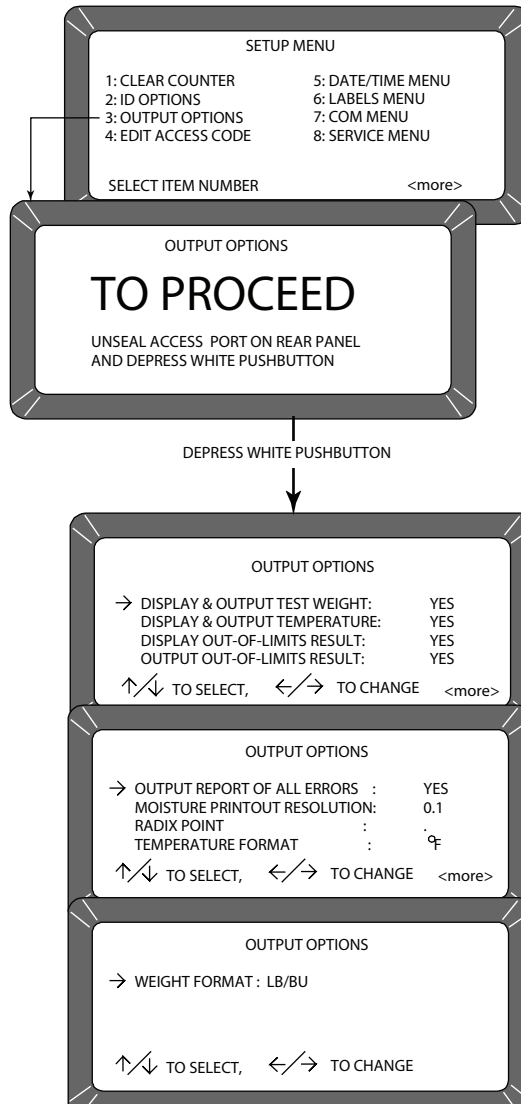1. **YES** - Enabled readings display for all out-of-limit conditions.
2. **NO** - Enabled readings do not display for any out-of-limit condition.
3. **M** - Enabled readings display if **moisture** is out-of- limits but do not display if either **weight** and/or **temperature** is out-of-limits.
4. **W** - Enabled readings display if **weight** is out-of-limits but do not display if either **moisture** and/or **temperature** is out-of-limits.
5. **T** - Enabled readings display if **temperature** is out-of-limits but do not display if either **weight** and/or **moisture** is out-of-limits.
6. **MW**- Enabled readings display if **moisture** and/or **weight** is out-of-limits but do not display if **temperature** is out of limits. This is the current approved setting for NTEP units.
7. **MT** -Enabled readings display if **moisture** and/or **temperature** is out-of-limits but do not display if **weight** is out-of-limits.
8. **WT** - Enabled readings display if **weight** and/or **temperature** is out-of-limits but do not display if **moisture** is out-of-limits.

– **OUTPUT OUT-OF-LIMITS RESULT:** If enabled, three standard parameters are printed – moisture, grain temperature, and approximate grain test weight. Each measured parameter value appears next to its respective legend on the printout. The output out-of-limit options selected establish whether or not the enabled values print. These choices are identical to the display out-of-limits conditions above and are selected in a similar fashion.
– **OUTPUT REPORT OF ALL ERRORS:** Enables all internal checked errors to print.
– **MOISTURE PRINTOUT RESOLUTION:** Selects the resolution to either one tenth (0.1) percent or one hundredth (0.01) percent for moisture printout.
– **RADIX POINT:** Selects a decimal point (.) or comma (,) to display and printout.
– **TEMPERATURE FORMAT:** Selects either degrees C (°C) or degrees F (°F) to display and print out for temperature.
– **WEIGHT FORMAT:** Selects either pounds per bushel (lb/bu) or kilograms per hectoliter (kg/hl) to display and printout.

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Figure 31

Setting Output Options

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 <more>

OUTPUT OPTIONS

TO PROCEED

UNSEAL ACCESS PORT ON REAR PANEL
AND DEPRESS WHITE PUSHBUTTON

DEPRESS WHITE PUSHBUTTON

OUTPUT OPTIONS

→ DISPLAY & OUTPUT TEST WEIGHT: YES
DISPLAY & OUTPUT TEMPERATURE: YES
DISPLAY OUT-OF-LIMITS RESULT: YES
OUTPUT OUT-OF-LIMITS RESULT: YES
↑/↓ TO SELECT, ←/→ TO CHANGE <more>

OUTPUT OPTIONS

→ OUTPUT REPORT OF ALL ERRORS : YES
MOISTURE PRINTOUT RESOLUTION: 0.1
RADIX POINT : .
TEMPERATURE FORMAT : °F
↑/↓ TO SELECT, ←/→ TO CHANGE <more>

OUTPUT OPTIONS

→ WEIGHT FORMAT : LB/BU

↑/↓ TO SELECT, ←/→ TO CHANGE

CHANGING THE ACCESS CODE (4 KEY)

The Access Code establishes a security level for nearly all **Setup** Menu functions. Also, this code allows changing/modifying the **unofficial grain calibrations** (refer to CALIBRATING PROCEDURES).

A higher security level is reserved for authorized personnel to make **official grain calibration** changes. Access to these changes is by breaking the seal on the rear panel of the unit and depressing the push button inside the access panel when prompted.

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NOTE: *The access code is set to 0 when shipped from the factory. After selecting a different code, record the new number and store for safe keeping. DO NOT lose the new code.*

NOTE: *Operation from the computer is described in a separate Communications Software manual.*

Enter Key

To change the access code:

1. From the **Setup** menu, select the EDIT ACCESS CODE (4 key). The screen will appear displaying ENTER ACCESS CODE.
2. Enter the present code (or 0 if set at factory code) and select the **Enter** key. The **Edit Access Code** screen will display a blank (to be filled in). The present access code will appear to the right (Figure 32).
3. Enter the new access code. Choose any numeric code of up to 4-digits. Enter the number and select the **Enter** key. The new number must be used from this point forward to enter the access code level secured screens.

Figure 32

Changing The Access Code

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   <more>

EDIT ACCESS CODE

ENTER ACCESS CODE: __

EDIT ACCESS CODE

ACCESS CODE ___   10

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Enter Key
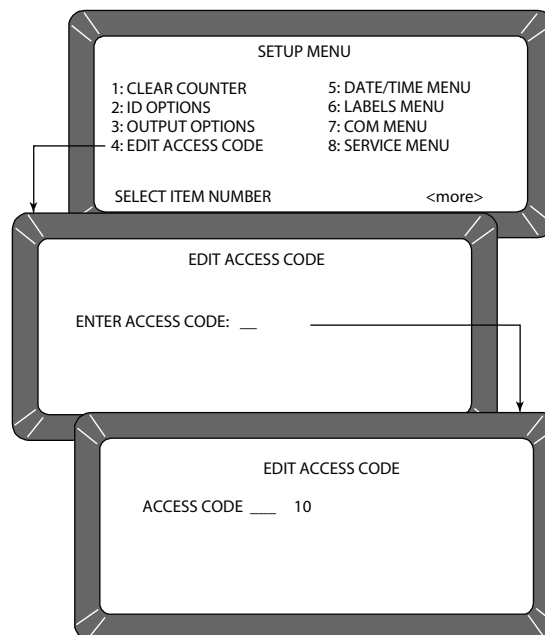
CHANGING DATE, TIME, AND DATE FORMAT (5 KEY)

This function establishes correct date and time for display and print out with each grain moisture measurement.

To set the time:

1. From the **Setup** menu, select the **Date/Time** menu (5 key). Three options are available; (1) SET TIME, (2) SET DATE and (3) SET DATE FORMAT (Figure 33).
2. From the **Date/Time** menu, select SET TIME using the 1 key. The **Set Time** screen will appear and display ENTER ACCESS CODE.
3. Enter the access code and select the **Enter** key. The time will display based upon a 24-hour clock.
4. Change the time by entering new numbers from the keyboard. The time format is in hours, minutes, seconds (HH.MM.SS). Each unit is two digits and is separated by a decimal point. For example, to enter 3:32:59 P.M., enter 15.32.59. Be sure to use the decimal point to separate units. If accuracy is desired, set the time slightly ahead and wait. At the exact time, select the **Enter** key to start the clock.

Figure 33

Setting The Time

DATE/TIME MENU

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

SELECT ITEM NUMBER   (NEXT PAGE: STATUS)

SET TIME

ENTER ACCESS CODE: __

SET TIME

CURRENT TIME IS 02 : 21 : 40

ENTER NEW TIME (HH. MM. SS) :
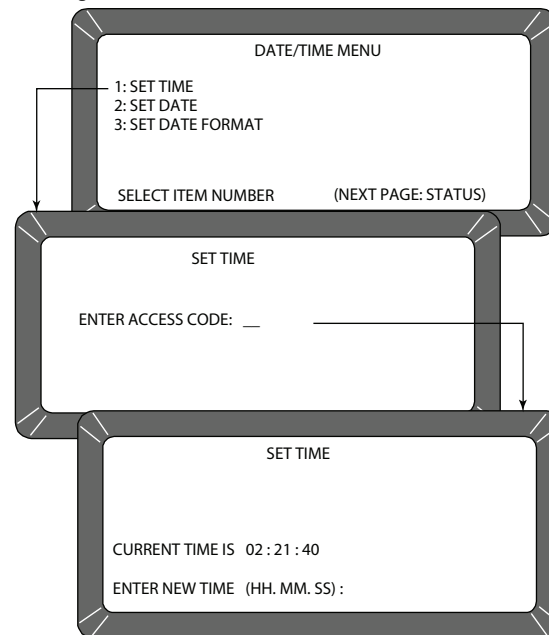
To change the date:

1. From the **Date/Time** menu, select the SET DATE (2 key) menu (Figure 34). The **Set Date** screen will display ENTER ACCESS CODE.
2. Enter the access code to gain and select the **Enter** key. Enter numbers in the format shown at the bottom of the display: month.day.year. Each date component is two digits in length and separated by a decimal point (i.e. to enter 9/15/98, enter 09.15.98). The number appears on

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Enter Key

the left end of the bottom line. Select the **Enter** key to accept the corrected date.

Figure 34

Setting The Date

```
DATE/TIME MENU

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


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

```
SET DATE


ENTER ACCESS CODE: __
```

```
SET DATE




CURRENT DATE IS  09 : 21 : 96
ENTER NEW DATE (MM. DD. YY) :
```
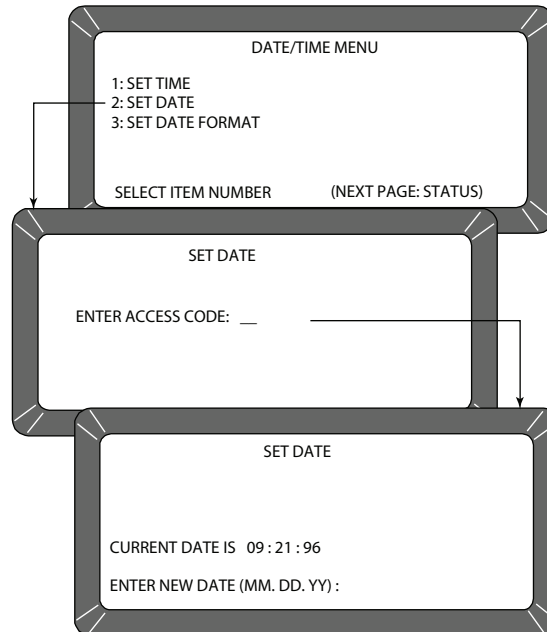
To change the date format:

1. From the **Date/Time** menu, select the SET DATE FORMAT (3 key) menu (Figure 35). The screen will display ENTER ACCESS CODE.
2. Enter the access code and select the **Enter** key. The date format may be configured in one of three formats:
   – MM/DD/YY
   – DD/MM/YY
   – YY/MM/DD.
3. Select the **Left** or **Right Arrow** keys (1 or 3) to select one of the three formats. When finished, select the **Previous Page** key to accept the choice and return to the **Date/Time** menu. Select the **Previous Page** key once more to return to the **Setup** menu.

1 & 3

Left and Right Arrow Keys

Previous Page Key

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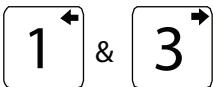
Figure 35

Setting Date Format

```
DATE/TIME MENU

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


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

```
SET DATE FORMAT


ENTER ACCESS CODE:  __
```

```
SET DATE FORMAT


→DATE FORMAT:  MM/DD/YY


←/→to CHANGE
```
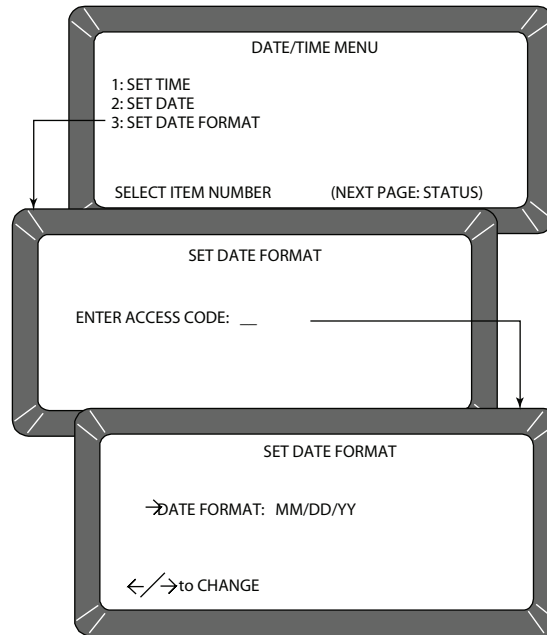
CHANGING THE LABELS (6 KEY)

The **Labels** menu allows editing of three label types:

– user name
– text strings
– factor names

Each of these labels attach to the grain moisture measurements in some fashion. Editing of each label type is similar. The basic procedure is outlined in the following five steps. Specific details and illustrations for each label follow the basic outline (Figures 34, 35 and 36).

- **USER NAME –** This heading appears on each measurement printout (not the display) and may be the organization's name. The user name may be two lines of up to 16 characters each.
- **TEXT STRINGS –** These are brief, commonly used words or phrases added to the alpha screen for quick selection (e.g., a name, company, etc.) when using alpha characters. After programming, each phrase is selected in the same manner as choosing a single character. Up to ten text strings may be preset. Each string is identified on the alpha screen by an S number (S1 through S10).
- **FACTOR NAMES –** These are entered as identifiers of specific details for particular grains. When using factors with particular grains, each factor name must be entered before the test may proceed.

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Figure 36

Editing User Name

```
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                    <more>
```

```
LABELS MENU

1: EDIT USER NAME
2: EDIT TEXT STRINGS
3: EDIT FACTOR NAMES



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

```
EDIT USER NAME


ENTER ACCESS CODE: __
```

```
EDIT USER NAME


LINE 1:  DICKEY-JOHN
LINE 2:    GAC2100


Press  ◀▪▪  to EDIT
```
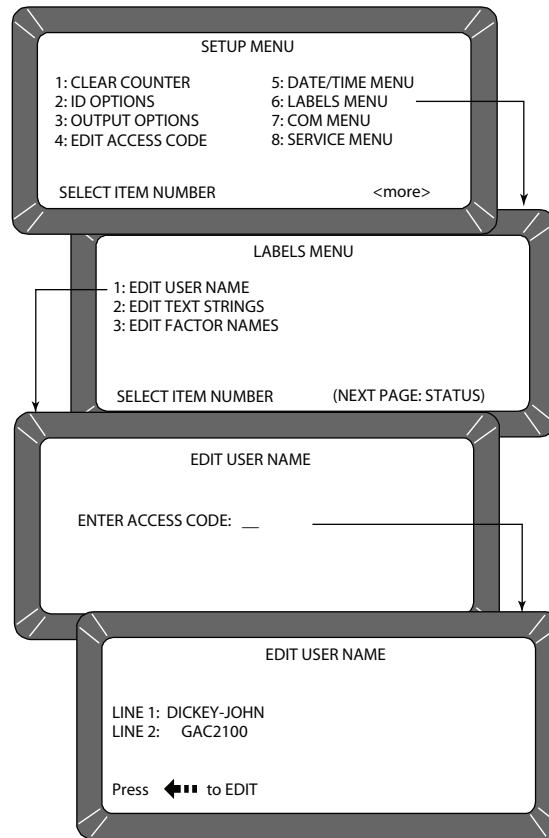
To create labels:

1. From the **Setup** menu, select the **Labels** menu (6 key). The **Labels** menu offers choices:
   – edit user name
   – edit text strings
   – edit factor names.
2. Choose the label of interest by selecting the key number next to the label type. The **Enter Access Code** screen will display.
3. Enter the access code and then select the **Enter** key. For the user name (Figure 36) or the text string (Figure 37) screens, a large flashing block will highlight the first character to be edited. Select the **Backspace** key as directed by the prompt on the bottom corner of the display. The prompt will disappear and is replaced with a cursor (underline) beneath the first character of the first line.
   FACTORS (e.g., customer id, vehicle no, load weight, etc.) are assigned to individual grains. For factor names (Figure 38), the **Select Grain To Enter/Change** menu will appear and request the selection of a grain name to assign the factor(s). Up to four factors may be assigned to each grain. After selecting a grain, the EDIT FACTOR NAMES will appear to be entered.
   To delete existing factor names from the grain calibration, begin by selecting the grain and the factor name to be deleted. Select the

◀┃

Enter Key

◀▪▪

Backspace Key

OPERATOR'S MANUAL

Backspace Key

Enter Key

Previous Page Key

Backspace key first, then any numeric key. Select the **Backspace** key a second time and then select the **Enter** key. The factor name should be blank.

4. Enter the selected characters/numbers to reflect the label. Numbers and letters may be mixed by using the alpha screen.
5. When completed, select the **Previous Page** key to return to the **Labels** menu.

Figure 37

Edit Text Strings

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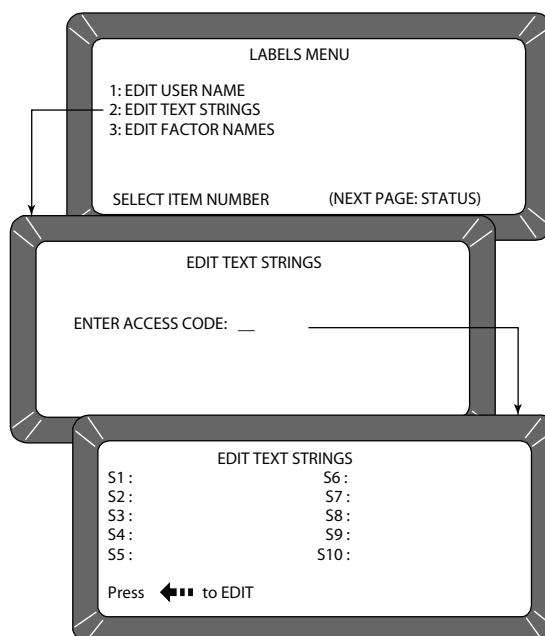
Figure 38

Edit Factor Names

```
LABELS MENU

1: EDIT USER NAME
2: EDIT TEXT STRINGS
3: EDIT FACTOR NAMES

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

```
EDIT FACTOR NAMES

ENTER ACCESS CODE: __
```

```
SELECT GRAIN TO ENTER/CHANGE

1: CORN              5: SOYBEANS
2: CORN HI MOIST     6: MILO
3: WHEAT HRW         7: BARLEY
4: AMARANTH          8: OATS

PAGE 1 OF 8                            <more>
```

```
EDIT FACTOR NAMES
GRAIN; CORN HI MOIST
FACTOR 1:
FACTOR 2:
FACTOR 3:
FACTOR 4:

Press ◀▪▪ to EDIT
```

DEPRESS NEXT PAGE KEY

```
ABCDEFGHIJKLMNOPQRSTUVQXYZ _  #$%&'( ) *,-.+

ÇŐŹÄĆÉĹĹ́S ÖÜ Ť▪ẦŇŽȨĈÀÁÊŠ  ÀÐÐ  ̆ ĒŃÍĨŤƯÒ ́ßÓŃŚŔÚÚ ̋

Ý§Ř S1   S2   S3   S4   S5   S6   S7   S8   S9   S10

TEXT: -
```

DEPRESS PREVIOUS PAGE KEY

SETTING COMMUNICATIONS PORT PARAMETERS (7 KEY)

Selection of the **COM (Communications)** menu is established through the Setup menu by selecting the 7 key. From this menu, the operator selects output parameters for communicating with external devices such as a PC computer and/or a printer. Two port connectors appear on the rear of the unit directly above the sealed access cover. The COM1 (Data Communications Equipment) port connector is located above the COM2 (Data Terminal Equipment) port connector. The **COM** menu contains eight items with number 5 non-active (refer to Figure 37). Selections 2, 3, and 4 configure the COM1 port while 6, 7, and 8 configure the COM2 port. Each of the **COM** menu items is edited in a similar fashion.

To configure the communications ports (Basic entry procedure – Follow-up to specific subject for finishing details):

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Enter Key

1. From the **Main** menu, select the 4 key (**Setup** menu) and then the 7 key (**COM** menu). The **Communications** menu will appear with seven active choices and one non-active selection.
2. Choose the desired function by selecting the key number next to the choice. The **Enter Access Code** screen will appear.
3. Enter the access code and then select the **Enter** key. The selected COM screen will appear, ready for editing.
4. Proceed with the necessary editing of the selection.
   The selections are:
   – COM port select
   – COM1 or COM2 format
   – COM1 or COM2 serial data setup
   – COM1 or COM2 control lead setup

Figure 39

Accessing the COM Menu


```
                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              <more>
```

```
             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)
```
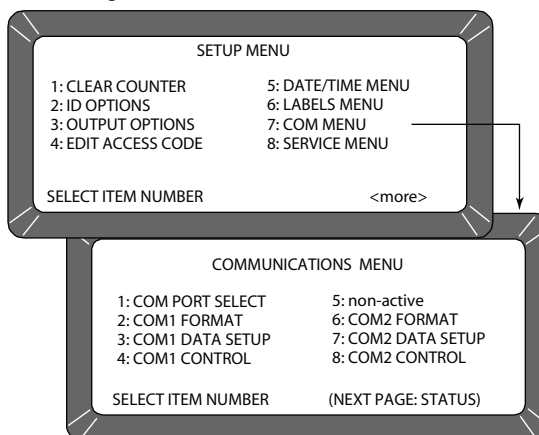
To configure COM PORT SELECT (select the 1 key on the **Communications** menu):

1. After completing steps 1 through 4 from the basic entry procedure, edit the configuration. Four items will appear on the menu for editing and configuring output information of both ports (COM1 and COM2). Each item may be set to NONE, COM1, COM2 or COM1/COM2 (both ports) using the **Left/Right Arrow** keys to cycle through the choices. The pointer in front of each item may be moved with the **Up/Down Arrow** keys.
   The four outputs are defined as follows (Figure 40):
   – **AUTOMATIC RESULTS OUTPUT -** The configured port produces an output to automatically print the moisture results.
   – **MANUAL RESULTS OUTPUT -** Produces a printout for the configured port of the results by selecting the **Print** key. Repeatedly selecting the **Print** key results in duplicate copies.
   – **ERROR REPORT OUTPUT -** The configured port produces a printout of errors occurring during internal self checks. Out of limit errors of measured results do not print.
   – **SETUP AND TEST OUTPUT -** The configured port produces a printout of setup and test data by selecting the **Print** key.

1 & **3**

Left and Right Arrow Keys

5 & **0**

Up and Down Arrow Keys

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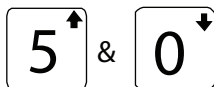
Print Key

Previous Page Key

2. Once editing is complete, select the **Previous Page** key to return to the **Communications** menu and for the next selection.

Figure 40

Accessing COM Port Select


```
                        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                    <more>
```

```
                    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)
```

```
               COMMUNICATIONS  PORT SELECTION


        ENTER ACCESS CODE:  __
```

```
               COMMUNICATIONS  PORT SELECTION

        → AUTOMATIC RESULTS OUTPUT : COM1
          MANUAL RESULTS OUTPUT    : COM1
          ERROR REPORT OUTPUT      : COM1
          SETUP AND TEST OUTPUT    : COM1

          ↑ ↓ TO SELECT,    ← → TO CHANGE
```
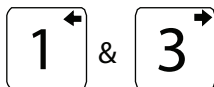
To configure COM1 or COM2 format (2 or 6 key from the **Communications** menu):

1. After completing steps 1 through 4 from the basic entry procedure, edit the configuration. Both the COM1 FORMAT and COM2 FORMAT selections are similar and therefore are described together. The **COM Format Selection** menu will display two lines each containing several choices (Figure 41).

2. Select the OUTPUT FORMAT using the pointer (Figure 41). Place the pointer in front of the correct line with the **Up/Down Arrow** keys.

3. Edit the line by using the **Left/Right Arrow** keys to cycle through six variations. Select the appropriate format from the following six choices:
   – PRN20 - Standard 20 column printer output.
   – PRN80 - Standard 80 column printer output.
   – TST20 - 20 column test output of printer parameters.
   – PRN81 - Standard 80 column printer output (2 lines).
   – CSV01 - Comma separated variables.
   – PRN21 - Special 20 column printer output. PRN 20 format with the Grain Calibration Date Code, Instrument Serial Number and D-values removed.

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$\boxed{5}$ & $\boxed{0}$

Up and Down Arrow Keys

$\boxed{1}$ & $\boxed{3}$
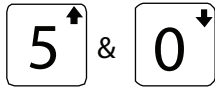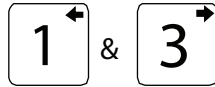
Left and Right Arrow Keys

Previous Page Key

4. Select the LINE TERMINATOR with the pointer. An RS-232 line of input data must be terminated with one of the following characters or character pairs.
   – LF (Line Feed) 0A Hex
   – CR (Carriage Return) 0D Hex
   – LF + CR 0A, 0D Hex
   – CR + LF 0D, 0A Hex
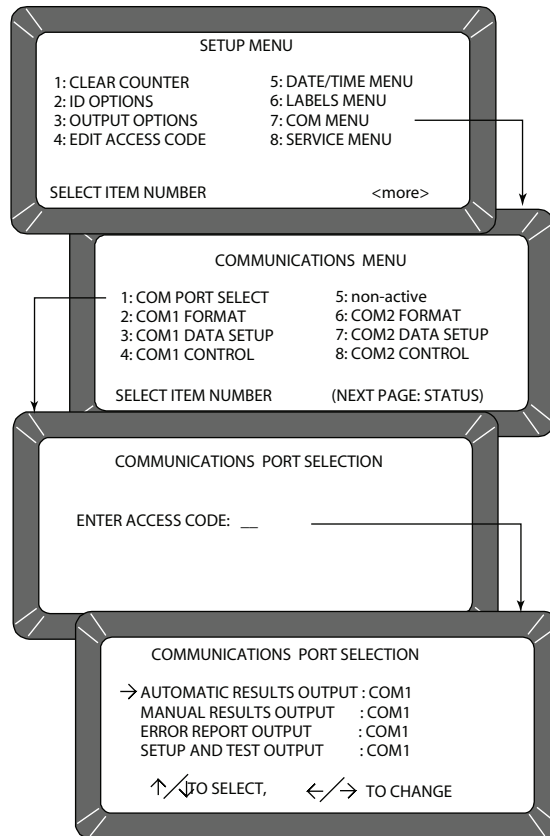5. After editing is complete, select the **Previous Page** key to return to the **Communications** menu for the next selection.

Figure 41

Setting Output Format


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   <more>

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)

COM1 FORMAT SELECTION

ENTER ACCESS CODE: __

COM1 FORMAT SELECTION

→ OUTPUT FORMAT   : PRN20
   LINE TERMINATOR : CR, LF   (0D, 0A HEX)

↑/↓ TO SELECT,   ←/→ TO CHANGE

To configure COM1 or COM2 SERIAL DATA SETUP (3 and 7 keys on the **Communications** menu):

Both the COM1 and COM2 SERIAL DATA SETUP selections are similar and therefore described together.

1. After completing Steps 1 through 4 from the basic entry procedure, edit the configuration. Either of the **COM Serial Data Setup** menus display four lines, but only the top line (Baud rate) may be changed for the COM1 SERIAL DATA SETUP (Figure 42). Select the baud rate line for the COM1 SERIAL DATA SETUP of the printer. Use the **Left/Right Arrow** keys (1 or 3 key) to cycle the Baud Rate through seven choices: 300, 600, 1200, 2400, 4800, 9600, and 19200 bits/second. Choose the one that matches the rate of the equipment in use.

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NOTE: For modem use of COM2, the Baud Rate should be set to 4800 or higher. Refer to your modem manufacturer's instructions for correct operation.

1 & 3
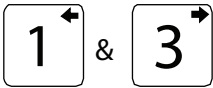
Left and Right Arrow Keys

Previous Page Key

2. Select the DATA BITS, PARITY and STOP BITS in that order. These items for the COM1 port cannot be changed. The COM2 port items may be adjusted. Definitions of each item is as follows:
   – DATA BITS – Set for 7- or 8-bit character lengths.
   – PARITY – Set to NONE, EVEN or ODD by using the **Left/right Arrow** keys.
   – STOP BITS – Set to 1 or 2.
3. After editing is complete, select the **Previous Page** key to return to the **Communications** menu for the next selection.

Figure 42

Accessing the COM1 Serial Data Setup Screen

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   <more>

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)

COM1 SERIAL DATA SETUP

ENTER ACCESS CODE: __

COM1 SERIAL DATA SETUP

→ BAUD RATE : 1200
   DATA BITS : 8
   PARITY   : NONE
   STOP BITS : 1

← / → TO CHANGE

To Configure COM1 or COM2 CONTROL LEAD SETUP (4 or 8 Keys from the **Communications** menu):

Both the COM1 and COM2 CONTROL LEAD SETUP selections are similar and therefore described together in this procedure (Figure 43). Differences are noted as applicable.

1. After completing steps 1 through 4 from the basic entry procedure, edit the configuration of the COM1 Port screen. The **COM1 (DCE) Control Lead Setup** menu will display two lines (refer to Figure 41, **Accessing COM Control Lead Setup** screens).
   The busy line, BUSY (11), notifies the GAC 2100 when the buffer in the printer (computer) is full and cannot accept more data. The polarity of this line is important and is set to be compatible with the printer. The

OPERATOR'S MANUAL

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Previous Page Key

control lead busy sense has three polarity choices: IGNORE, ACTIVE (+) or ACTIVE (-).

The DTR (20) (data terminal ready) line notifies the GAC 2100 that the printer (computer) is turned ON. The Control Lead DTR Sense has two states: IGNORE or ACTIVE.

2. Edit the configuration of the COM2 Port screen. The COM2 (DTE) **Control Lead Setup** menu displays seven items (refer to Figure 41, **Accessing COM Control Lead Setup** screens), but only three lines may be edited.
   – MODE : TRANSMIT ONLY or AUTO ANSWER
   – RTS (4): ON (+) or AUTO
   – DSR (6): IGNORE or ACTIVE
3. After editing is complete, select the **Previous Page** key to return to the **Communications** menu for the next selection.

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Figure 43

Accessing COM Control Lead Setup Screen

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   <more>

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

OR

SELECT ITEM NUMBER   (NEXT PAGE: STATUS)

COM1 (DCE) CONTROL LEAD SETUP

ENTER ACCESS CODE: __

COM1 (DCE) CONTROL LEAD SETUP

COM1 PORT SCREEN

→ BUSY (11) : IGNORE
   DTR   (20) : ACTIVE

↑ ∕↓ TO SELECT,   ← ∕ → TO CHANGE

COM2 (DTE) CONTROL LEAD SETUP

COM2 PORT SCREEN

→ MODE   : TRANSMIT ONLY
   RTS (4) : ON (+)   RLSD   (8) : IGNORE
   CTS (5) : ACTIVE   DTR   (20) : ON (+)
   DSR (6) : IGNORE   RI   (22) : IGNORE

↑ ∕↓ TO SELECT,   ← ∕ → TO CHANGE

Figure 44

Definitions Of Common Acronyms

BUSY	– Line busy	DTR	– Data Terminal Ready
CTS	– Clear To Send	RI	– Ring Indicator
DCE	– Data Communications Equipment	RLSD	– Receive Line Signal Detect
DSR	– Data Set Ready	RTS	– Request To Send
DTE	– Data Terminal Equipment	RxD	– Receive Data
		TxD	– Transmit Data

NON-ACTIVE (5 Key from **Communications** menu)

The non-active selection (refer to Figure 37) has no function and only emits a long beep when depressed. No other action results.

USING THE SERVICE MENU (8 KEY)

The **Service** menu contains individual unit calibration constants and is accessed by DICKEY-john trained and equipped service personnel.

QUICK KEYS MENU

QUICK KEYS makes changing between frequently used grains easier during moisture measurements by bypassing the **Select Grain** menu. Up to three frequently used grains may be programmed for keyboard keys 1, 2, and 3. The desired key (grain) changes the grain to be tested whenever the **Press Load To Begin** screen appears just prior to starting the moisture measuring cycle.

To program a Quick Key:

1. Select the 4 key (**Setup** menu) from the **Main** menu and then the **Next Page** key to access PAGE 2 of the **Setup** menu.
2. Select the 1 key to choose the **Quick Keys** menu. Three choices are available (Figure 45).
3. Select 1, 2 or 3 to program as a Quick Key. The **Enter Access Code** screen will appear.
4. Enter the access code and select the **Enter** key. The **Program Quick Key** screen will appear.
5. Use the **Left/Right Arrow** keys to select the desired grain. The grain name and the number to the right will change with each key stroke. Keep advancing until the correct grain is located. When the end is reached, the list wraps around to the beginning and starts again.
6. Select the **Previous Page** key to accept the selection.
7. Repeat the process to program or change each Quick Key as desired.

Next Page Key

Enter Key

1 & 3

Left and Right Arrow Keys

Previous Page Key

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Figure 45

Programming The Quick Keys

```
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                    <more>
```

```
SETUP MENU

1: QUICK KEYS MENU
2: TEST WEIGHT ADJUSTMENT

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

```
QUICK KEY MENU

1: SET QUICK KEY 1
2: SET QUICK KEY 2
3: SET QUICK KEY 3
```

```
PROGRAM QUICK KEY

ENTER ACCESS CODE ___
```

```
PROGRAM QUICK KEY

QUICK KEY 1
GRAIN SELECTED:  OATS            8

←/→  to CHANGE   PAGEUP to set
```

Note: *This procedure is only applicable for instruments approved or authorized to display or output approximate test weight (bulk density).*

Next Page Key

1 & **3**

Left and Right Arrow Keys

USING TEST WEIGHT ADJUSTMENT MENU

The test weight adjustment allows entering a correction factor for differences between the GAC 2100 grain test weight and the official test weight method. An offset value may be introduced by authorized personnel.
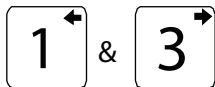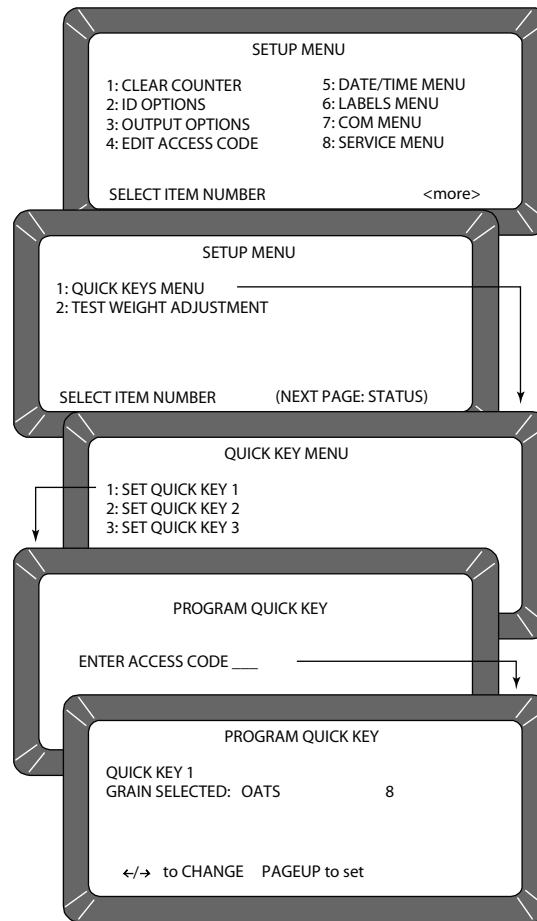
To change the offset value:

1. Select the 4 key (**Setup** menu) from the **Main** menu and then the **Next Page** key to access PAGE 2 of the **Setup** menu.
2. Select the 2 key to choose TEST WEIGHT ADJUSTMENT. The **To Proceed** screen will appear with the message UNSEAL ACCESS PORT ON REAR PANEL AND DEPRESS WHITE PUSH BUTTON (Figure 46).
3. Use the **Left/Right Arrow** keys to select the grain type for correction. The grain name and its number to the right change with each key stroke. Advance until the correct grain displays. If the end of the list is reached, the list will wrap around to the beginning and start again.

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Enter Key

1 & 3

Left and Right Arrow Keys

5 & 0

Up and Down Arrow Keys
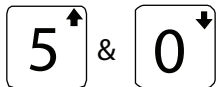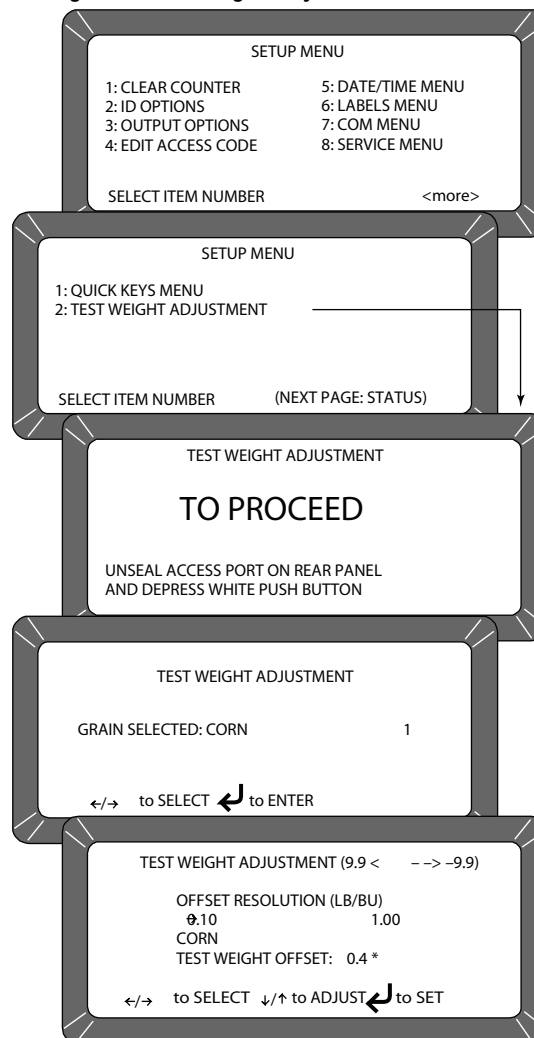
Previous Page Key

4. When the correct grain is found, select the **Enter** key. The final screen will appear for editing the TEST WEIGHT OFFSET value. The adjustment consists of two settings– the whole number and the tenths.
5. Select either the tenths or the whole number field with the **Left/Right Arrow** keys.
6. Change the selected value with the **Up/Down Arrow** keys. The value of the number is monitored on the TEST WEIGHT OFFSET line toward the bottom of the screen.
7. When finished, select the **Enter** key to accept the final offset value. An asterisk will appear next to the value to indicate the number is recorded. An asterisk will also appear next to the test weight value, along with the moisture value, if the test weight option is enabled and a test weight offset has been applied.
8. Select the **Previous Page** key to return to the **Setup** menu.

Figure 46

Setting The Test Weight Adjustment

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   <more>

SETUP MENU

1: QUICK KEYS MENU
2: TEST WEIGHT ADJUSTMENT

SELECT ITEM NUMBER   (NEXT PAGE: STATUS)

TEST WEIGHT ADJUSTMENT

TO PROCEED

UNSEAL ACCESS PORT ON REAR PANEL
AND DEPRESS WHITE PUSH BUTTON

TEST WEIGHT ADJUSTMENT

GRAIN SELECTED: CORN   1

←/→ to SELECT ↵ to ENTER

TEST WEIGHT ADJUSTMENT (9.9 <   – –> –9.9)

OFFSET RESOLUTION (LB/BU)
  0.10   1.00
CORN
TEST WEIGHT OFFSET: 0.4 *

←/→   to SELECT ↓/↑ to ADJUST ↵ to SET

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TESTING UNIT PERFORMANCE

The **Tests** menu displays diagnostic tests and status information for operating values. The information is useful to technicians in evaluating overall performance and isolating problems. During normal operation, these are not generally referenced. However, problem identification can be assisted by reviewing certain values occasionally and observing changes. Most values may not be edited, but the contents may be printed for record retention. Also, while viewing the Factory Modes, earlier encountered errors stored in memory may be printed.

To access the **Tests** menu, select the 5 Key on the **Main** menu. The **Tests** menu will appear displaying eight choices (Figure 47).

NON-ACTIVE KEYS

The 1 and 4 key selections (Figure 47) are non-active and have no functions assigned. Selecting either key will only result in an audible beep.

Figure 47

Entering The Tests Menu
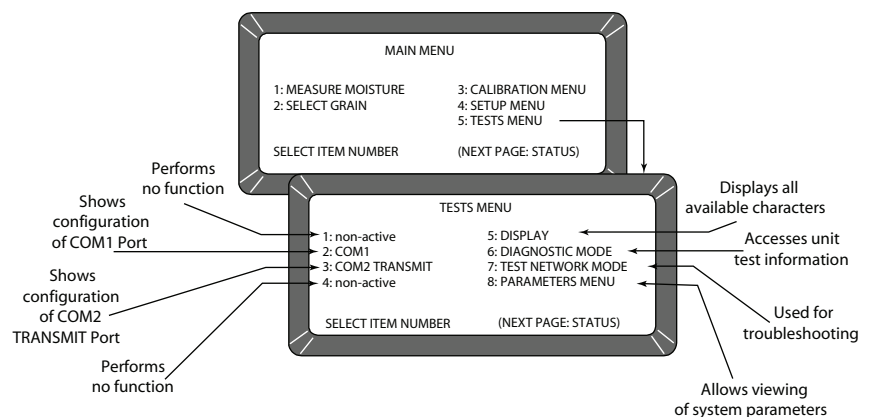
VIEWING COM1 PORT (2 KEY)

The **COM1 Test** screen displays the configuration of the COM1 (communications) port. Values are set from the SETUP MODE to match the driving device (i.e. printer) of the port.

To access the COM1 port:

1. Access the **COM1** Menu by selecting the 2 key on the **Tests** menu (Figure 48). The **COM1 Test** screen will appear displaying the COM1 serial data setup status (Baud Rate, Data Bits, Parity, Stop Bits) on the left half of the screen. The COM1 control lead setup status is displayed on the right side showing the Buffer Status. The buffer line will indicate either BUSY or EMPTY.

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Print Key

Previous Page Key

2. Verify that a printer is connected and select the **Print** key to print a sample of the entire TRANSMIT CHARACTER SET. When completed, select the **Previous Page** key to return to the **Tests** menu.
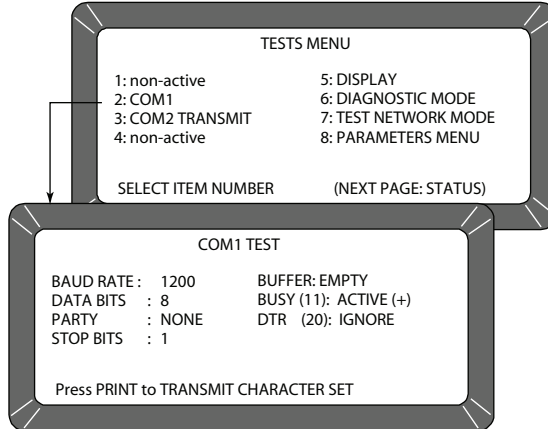
Figure 48

Entering The COM1 Test Menu

```
                    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)
```

```
                    COM1 TEST

    BAUD RATE :  1200      BUFFER: EMPTY
    DATA BITS  : 8         BUSY (11):  ACTIVE (+)
    PARTY      : NONE      DTR  (20): IGNORE
    STOP BITS  : 1


    Press PRINT to TRANSMIT CHARACTER SET
```
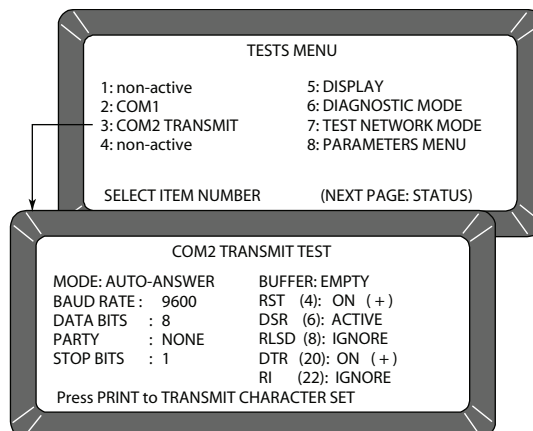
VIEWING COM2 TRANSMIT PORT (3 KEY)

The **COM2 Transmit Test** screen displays the configuration of the COM2 TRANSMIT port. Values are set from the SETUP MODE to match the communicating device (i.e. computer) of the port.

To configure the COM2 TRANSMIT port.

1. From the **Tests** menu, select COM2 TRANSMIT TEST using the 3 key (Figure 49). The screen will display the COM2 Mode, Serial Data Setup (Baud Rate, Data Bits, Parity, Stop Bits), Buffer Status and the COM2 Control Lead Setup. If the buffer contains information, the line will indicate BUSY; otherwise EMPTY is indicated. Select the **Print** key to produce a printout of the character set through the COM2 port. Select the **Previous Page** key to return to the **Tests** menu.

Figure 49

Entering the COM2 Transmit Test Menu

```
                    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)
```

```
                COM2 TRANSMIT TEST

    MODE: AUTO-ANSWER      BUFFER: EMPTY
    BAUD RATE :  9600      RST  (4):  ON  ( + )
    DATA BITS  : 8         DSR  (6): ACTIVE
    PARTY      : NONE      RLSD (8): IGNORE
    STOP BITS  : 1         DTR (20): ON  ( + )
                           RI  (22): IGNORE
    Press PRINT to TRANSMIT CHARACTER SET
```

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Previous Page Key

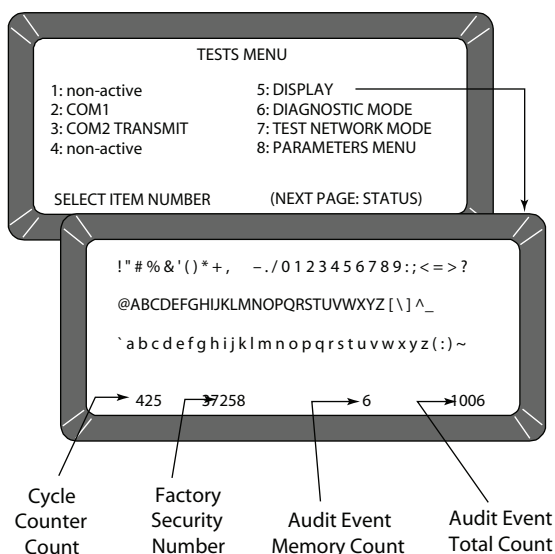## VIEWING DISPLAY CHARACTERS (5 KEY)

The display screen allows the operator to view typical characters the unit is capable of producing for operator-generated messages (Figure 50).

To access characters:

1. From the **Test** menu, select the 5 key to choose DISPLAY. The screen will show characters, symbols, and digits that may display by the unit. After viewing, select the **Previous Page** key to return to the **Tests** Menu.

Figure 50

Display Mode Screen

Cycle Counter Count

Factory Security Number

Audit Event Memory Count

Audit Event Total Count

VIEWING DIAGNOSTIC MODE (6 KEY)

The Diagnostic Mode accesses unit operating values. Most of the readout values relate to the test cell circuitry.

To access diagnostic details:

1. Select the 6 key to enter DIAGNOSTIC MODE (PAGE 1). Two pages of information are available (Figure 51).
2. Choose the number key next to each selection, one key at a time. Each value calculates and is displayed next to the line title. If the printer is connected, a printout of each result is automatically printed (Figure 52) for PAGE 1 printout and (Figure 53) for PAGE 2 printout. The meaning of each line is as follows:
   - **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 oscillator counts to full cell weight oscillator counts. When the 4 key is selected, item 3 blanks to recalculate. The message PLEASE WAIT followed by PLACE WEIGHT ON CELL THEN PRESS ENTER displays. A

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Enter Key

test weight is placed on top of the test cell and then the **Enter** key is selected. After a short wait, the results will be displayed.
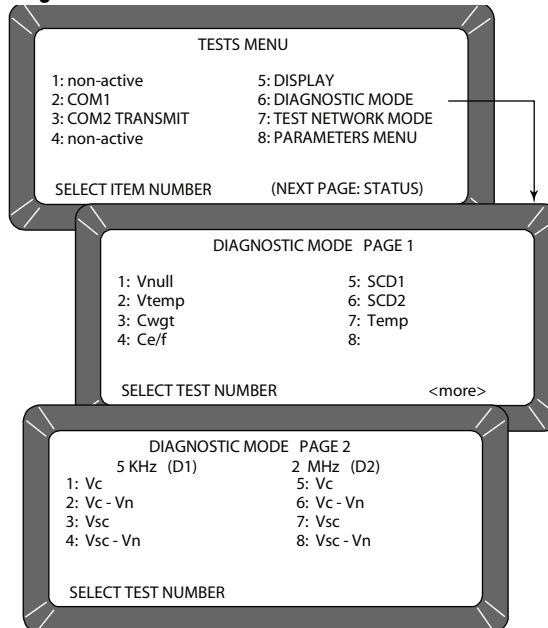
5: SCD1 - D1 (conductivity) self-check - 379 ±20. When either the 5 or 6 key is selected, these two items calculate.

6: SCD2 - D2 (capacitance) self-check- 2500 ±20.

7: Temp - Computed cell temperature in degrees C.

Figure 51

Diagnostic Mode Screens

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)

DIAGNOSTIC MODE   PAGE 1

1: Vnull	5: SCD1
2: Vtemp	6: SCD2
3: Cwgt	7: Temp
4: Ce/f	8:

SELECT TEST NUMBER   <more>

DIAGNOSTIC MODE   PAGE 2

5 KHz (D1)	2 MHz (D2)
1: Vc	5: Vc
2: Vc - Vn	6: Vc - Vn
3: Vsc	7: Vsc
4: Vsc - Vn	8: Vsc - Vn

SELECT TEST NUMBER

Next Page Key

Previous Page Key

3. Select the **Next Page** key to view PAGE 2 of the DIAGNOSTIC MODE. The display screen is divided into two columns: 5 kHz and 2 MHz (Figure 51).

  – **5 kHz (D1) – Left half of screen**

   1: Vc - Voltage of 5 kHz oscillator.

   2: Vc-Vn - Voltage of 5 kHz oscillator minus null voltage.

   3: Vsc - Voltage of 5 kHz oscillator with on-board test network engaged.

   4: Vsc - Vn - Voltage of 5 kHz oscillator with the on-board test network engaged minus null voltage.

  – **2 MHz (D2) – Right half of screen**

   5: Vc - Voltage of 2 MHz oscillator.

   6: Vc - Vn - Voltage of 2 MHz oscillator minus null voltage.

   7: Vsc - Voltage of 2 MHz oscillator with on-board test network engaged.

   8: Vsc - Vn - Voltage of 2 MHz oscillator with on-board test network engaged minus null voltage.

When finished, select the **Previous Page** key twice to return to the **Tests** menu.

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Figure 52

Diagnostic Mode Printout of Page 1

```
VNULL:    0,0496
VTEMP:    1,1838
CWGT:     38908
CE/F:     1,05377
S/N:      0261-2360
SCD1:     378
SCD2:     2499
NEC:      0,04941
KEC:      1,50218
KSC:      1,22889
MEC:      1,40597
MSC:      0,43373

TEMP:     18,26
```

Figure 53

Diagnostic Mode Printout of Page 2

```
5 KHZ  VC:      1,5024
5 KHZ  VC-VN:   1,4528
5 KHZ  VSC:     1,2291
5 KHZ  VSC-VN:  1,1795
2 MHZ  VC:      1,4943
2 MHZ  VC-VN:   1,4446
2 MHZ  VSC:     0,4416
2 MHZ  VSC-VN:  0,3920
```

USING TEST NETWORK MODE (7 KEY)

This mode is used by trained, authorized personnel in troubleshooting. The screens and printout are shown for reference only.

To access the TEST NETWORK:

1. Select the 7 key - TEST NETWORK MODE (Figure 54). The **Please Wait** screen will appear followed by the **Press Load To Begin** screen.
2. Select the **Load** key to start the measuring cycle. When the test is completed, the results will be displayed and will print automatically if a printer is connected (Figure 55).

Load Key

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Figure 54

Displaying Test Network Mode Results

```
┌─────────────────────────────────────────┐
│               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)│
└─────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────┐
│           PERFORMING SELF CHECKS         │
│                                          │
│              PLEASE WAIT                 │
│                                          │
│  TEST NETWORK MODE                       │
│  ID: __                                  │
└─────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────┐
│                                          │
│         PRESS LOAD TO BEGIN              │
│                                          │
│  TEST NETWORK MODE                       │
│  ID: __                                  │
└─────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────┐
│                MEASURING                 │
│                                          │
│              PLEASE WAIT                 │
│                                          │
│  TEST NETWORK MODE                       │
│  ID: __                                  │
└─────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────┐
│   D1:      0.0                           │
│   D2:     14.3                           │
│   D3:      0.0                           │
│   D4:    222.7                           │
│                                          │
│   TEST NETWORK MODE                      │
│   DATE: 09/15/96        TIME 15: 38: 53  │
│   ID:                                    │
└─────────────────────────────────────────┘
```

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Figure 55

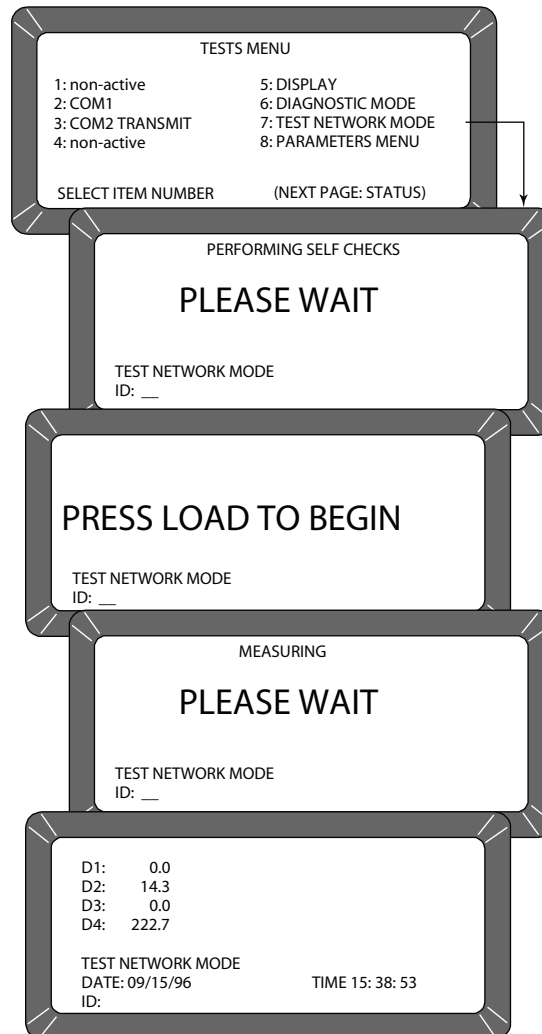*Test Mode Printout*

```
        DICKEY-JOHN,
        CORP. GAC2100

05/18/96              09:18:59

ID:

NF:       490
NE:       490
D1:       0,0
D1CF:     15000
D1CE:     15000
D2:       14,4
D2CF:     14853
D2CE:     14853
D3:       0,0
D4:       204,3
D4TF:     20,43
D4TE:     20,39
SELECT TEST NUMBER
```

Print Key

Previous Page Key

VIEWING/PRINTING PARAMETERS (8 KEY)

The **Parameters** menu (8 key) operates similarly to the **Service** menu located under the **Setup** menu. The major difference is the inability to edit values in these screens. However, the **View Factory Mode** screen is useful in viewing the number of currently stored errors in memory.

To view the **Parameters** menu:

1. Choose the **Parameters** menu by selecting the 8 key from the **Tests** menu (refer to Figure 54). This menu allows the operator to view the unit parameters.
2. To print the values shown on the screen, select any menu, followed by the **Print** key. A printout of all the screens results (Figure 57). Item 6 also prints all stored errors.
3. When finished viewing the screens, select the **Previous Page** key to return to the **Tests** menu.

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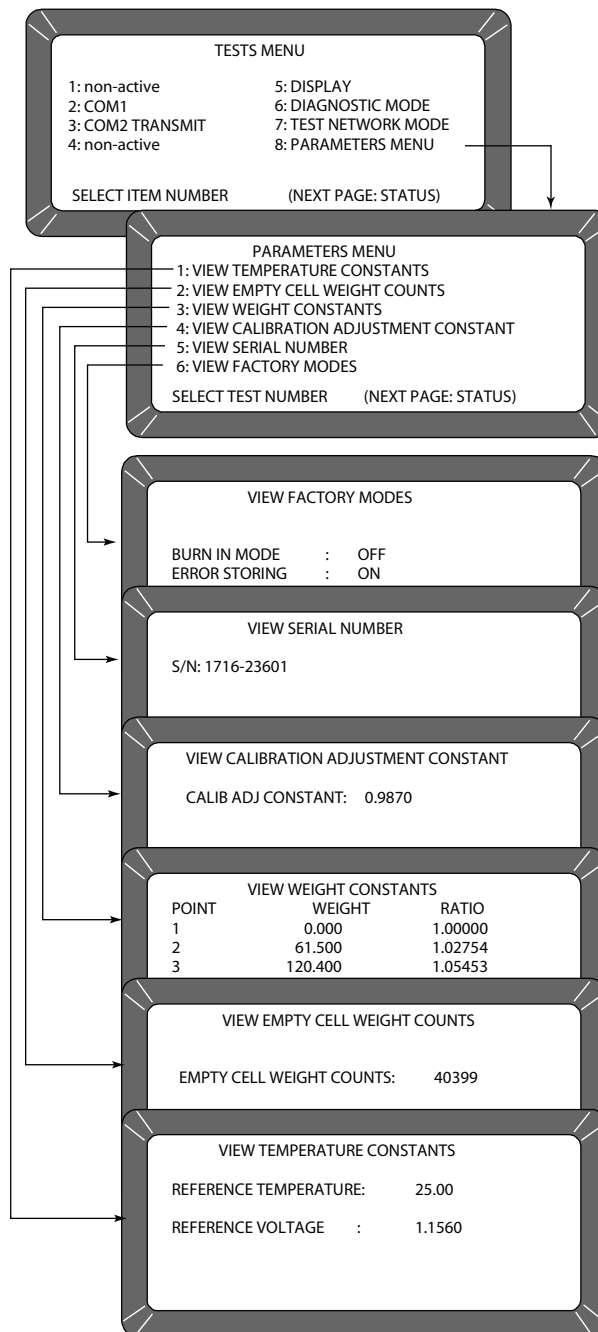CORPORATION

Figure 56

Viewing Parameters Menu

```
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)
```

```
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 TEST NUMBER      (NEXT PAGE: STATUS)
```

```
VIEW FACTORY MODES


BURN IN MODE      :    OFF
ERROR STORING     :    ON
```

```
VIEW SERIAL NUMBER

S/N: 1716-23601
```

```
VIEW CALIBRATION ADJUSTMENT CONSTANT

CALIB ADJ CONSTANT:   0.9870
```

```
VIEW WEIGHT CONSTANTS
POINT        WEIGHT         RATIO
1            0.000          1.00000
2            61.500         1.02754
3            120.400        1.05453
```

```
VIEW EMPTY CELL WEIGHT COUNTS


EMPTY CELL WEIGHT COUNTS:      40399
```

```
VIEW TEMPERATURE CONSTANTS

REFERENCE TEMPERATURE:        25.00


REFERENCE VOLTAGE    :        1.1560
```

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Figure 57

Parameters Value Printout

```
05/18/96            09:59:59

S/N:       1716-23601

REF TEMP:         25,00
REF VOLT:         1,1560

EC COUNT:         40399

WEIGHT TABLE:
1     0,000        1,00000
2    61,500        1,02754
3   120,400        1,05453
4   181,800        1,08340
5   240,600        1,11179
6   300,300        1,14108

CAC:       1,0000

IC:        1122

BURN IN MODE:     OFF

ERROR STORING:    ON

CURRENT ERRORS
==================
ERROR 2
05/04/96  18:42:2
05/17/96  16:50:4
   5
50134

SELECT TEST NUMBER
```

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![Load Key icon]

Load Key

![Unload Key icon]

Unload Key

![Previous Page Key icon]

Previous Page Key

OPERATOR MAINTENANCE

CELL CLEANING - DAILY

1. From the **Main** menu, select the 5-key to display the **Tests** menu. Then select the 6-key to display the **Diagnostics** menu.
2. When the **Diagnostics** menu displays select the **Load** key. The hopper doors will open and remain open until the **Unload** key is selected.
3. Use the brush supplied in the accessory kit to clean the inside of the grain cell.
4. Slide the GAC 2100 to the front of the worktable and remove the grain drawer. Reach inside and very carefully clean the strike-off arm spring.

⚠**CAUTION**

Before performing step 5 ensure that all fingers or other foreign objects are not in cell area.

5. Select the **Unload** key. The cell will rotate 180 degrees to dump the residue from the cell cleaning procedure. The hopper doors will close. Selecting the **Previous Page** key twice will return the display to the **Main** menu.

FUSE REPLACEMENT

1. Disconnect the line cord from the rear of the unit. Using a small-bladed screwdriver or similar tool, remove the cover and fuse block assembly.
2. Replace the blown fuse with a 1 Amp Slo-Blo fuse (Fuse Size = 5mm (0.197") dia. x 20 mm (0.787") long.
3. Reinstall fuse block assembly and cover.

Figure 58

Fuse Block Assembly

Fuses
Fuse Block
Jumper Bar
Cover

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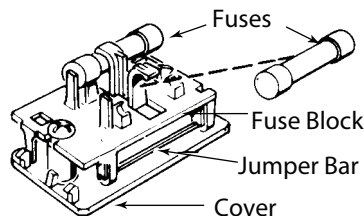
ERROR CODES

The GAC 2100 contains a microprocessor to control the grain sample measurements and self-checks to determine the integrity of the internal electronics. If any limit is exceeded or malfunctions occur, an error code displays.

ERROR 1

Probable Cause:

1. The empty cell self-check reading is out of limits.

Corrective Action:

1. Dump the cell and ensure it is empty.

ERROR 2

Probable Cause:

1. The empty cell weight reading is out of limits.

Corrective Action:

1. Dump the cell and ensure it is empty.

ERROR 3

Probable Cause:

1. The unload mechanism has malfunctioned.

Corrective Action:

1. Check the cell position and ensure it is free to operate.

ERROR 4

Probable Cause:

1. The strike-off mechanism has malfunctioned.

Corrective Action:

1. Ensure the cell and strike-off arm are free to operate.

ERROR 5

Probable Cause:

1. An invalid calibration is referenced.

Corrective Action:

1. Reselect the same grain or select a new grain and retry. If the condition continues to occur, contact DICKEY-john Service Department.

ERROR 6

Probable Cause:

1. The moisture reading exceeds the upper limit.

Corrective Action:

1. Select a new grain and retry.

ERROR 7

Probable Cause:

1. The moisture reading exceeds the lower limit.

Corrective Action:

1. Select a new grain and retry.

ERROR 8

Probable Cause:

1. The empty cell ambient temperature has exceeded its limit.

Corrective Action:

1. Allow the GAC 2100 to reach normal operating temperature.

ERROR 9

Probable Cause:

1. The sample temperature has exceeded its limit.

Corrective Action:

1. Allow the sample to either cool down or warm up, then retry.

ERROR 10

Probable Cause:

1. The difference in temperature between empty cell ambient and full cell condition exceeds its limits.

Corrective Action:

1. Change the appropriate conditions and retry.

ERROR 11

Probable Cause:

1. Test weight exceeds stored average bulk density value by more than +20 percent or -30 percent.

Corrective Action:

1. Use a more representative sample.

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ERROR 12

Probable Cause:

1. A system memory error occurs.

Corrective Action:

1. Turn the power OFF for at least 5 seconds, and then power system back ON. If the condition continues, contact DICKEY-john Service Department.

ERROR 13

Probable Cause:

1. An on-board RAM memory error has occurred.

Corrective Action:

1. Turn the power OFF for at least 5 seconds and then power system back ON. If the condition continues, contact DICKEY-john Service Department.

ERROR 14

Not used.

ERROR 15

Probable Cause:

1. The real time clock battery is faulty.

Corrective Action:

1. Contact DICKEY-john Service Department.

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APPENDIX A: COMMUNICATION PORTS

COM1 PORT OPTIONS

The COM1 Port (refer to Table 2) is a serial port conforming to the EIA/TIA RS-232-E standard and configured as Data Communication Equipment (DCE). Data out is RS-232-E levels and parity with adjustable Format, Data Setup and Control.

Table 2. COM1 Programmable Options		
Function	Option	Hex
Output Format	PRN 20 PRN 80 TST 20 PRN 81 CSV 01 PRN 21	
Line Terminator	LF (Line Feed) CR (Carriage Return) LF + CR CR + LF	0A 0D 0A, 0D 0D, 0A
Data Setup Baud Rate	300 600 1200 2400 4800 9600 19200	
Control Busy	Ignore Active (+) Active (Ð)	
Control DTR	Ignore Active	

COM1 PIN ASSIGNMENT DETAILS

COM1 (refer to Table 3) is configured as Data Communication Equipment (DCE).

Protective Ground (pin 1) – Electrically connected to frame.

Received Data (pin 3) – Transmitted data from the GAC 2100.

Data Set Ready (pin 6) – ON (positive voltage) whenever the GAC 2100 is powered.

Signal Ground (pin 7) – Common reference for all other COM1 signals.

Received Line Signal Detector (pin 8) – ON (positive voltage) whenever the GAC 2100 is powered.

Busy (pin 11) – Gates the transmission of data from the GAC 2100. The **COM1 Control Lead Setup** screen may be configured ACTIVE (+), ACTIVE (–) or IGNORE. When the line is inactive, up to 2048 characters are buffered. If not connected, configure this line as IGNORE.

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Data Terminal Ready (pin 20) – Indicates the connected device is not available. The **COM1 Control Lead Setup** screen configures this line as ACTIVE or IGNORE. If configured ACTIVE, an OFF condition (negative or zero voltage) inhibits the transmission of data from the GAC 2100. Results display but are not buffered for output on COM1. If not connected, this line should be configured as IGNORE.

Table 3. COM1 Connector Pins Identification

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	To Device
11		Signal Detector Busy	To GAC 2100
20	CD (DTR)	Data Terminal Ready	To GAC 2100

Table 4. COM2 Programmable Options

Function	Option	Hex
Output Format	PRN 20 PRN 80 TST 20 PRN 81 CSV 01 PRN 21	
Line Terminator	LF (Line Feed) CR (Carriage Return LF + CR CR + LF	0A 0D 0A, 0D 0D, 0A
Data Setup Baud Rate	300 600 1200 2400 4800 9600 19200	
Data Bits	7 or 8	
Parity	None, Even or Odd	
Stop Bits	1 or 2	
Control MODE	Transmit Only Auto Answer	
Control RTS	On (+) Auto	
Control DSR	Ignore Active	

COM2 PIN ASSIGNMENT DETAILS

COM2 (refer to Table 5) is configured as Data Terminal Equipment (DTE).

Protective Ground (pin 1) – Electrically connected to frame.

Transmitted Data (pin 2) – Data is transmitted from this pin.

Received Data (pin 3) – Data is received on this pin.

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Request To Send (pin 4) – Configured ON (positive voltage) whenever unit is powered or to be ON (positive voltage) only when there is data in the COM2 buffer to be transmitted. Use the **COM2 Control Lead Setup** screen to configure this line.

Clear To Send (pin 5) – Gates transmission of data from the GAC 2100. This line must be ON (positive voltage) to obtain data on COM2. If an appropriate signal is not available from the connected device, connect this pin directly to REQUEST TO SEND (pin 4). When the line is inactive, up to 2048 characters are buffered.

Data Set Ready (pin 6) – Notifies the GAC 2100 that the connected device is not available. The **COM2 Control Lead Setup** screen configures this line as active or ignored. If configured as ACTIVE, an OFF condition (negative or zero voltage) inhibits the transmission of data from the GAC 2100. Results display but are not buffered for output on COM2. If not connected, this line should be configured as IGNORED.

Signal Ground (pin 7) – Common ground reference for all other COM2 signals.

Received Line Signal Detector (pin 8) – Currently not used.

Data Terminal Ready (pin 20) – ON (positive voltage) whenever the GAC 2100 is powered.

Ring Indicator (pin 22) – Currently not used.

Table 5. COM2 Connector Pins Identification			
Pin Number	Designation	Signal Name	Direction
1	AA	Protective Ground	NA
2	BA (TxD)	Transmitted Data	To Device
3	BB (RxD)	Received Data	To GAC 2100
4	CA (RTS)	Request To Send	To Device
5	CB (CTS)	Clear To Send	To GAC 2100
6	CC (DSR)	Data Set Ready	To GAC 2100
7	AB	Signal Ground	NA
8	CF (RLSD)	Received Line to Signal Detector	To GAC 2100
20	CD (DTR)	Data Terminal Ready	To Device
22	CE (RI)	Ring Indicator	To GAC 2100

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APPENDIX B: AUTOMATIC UNIT HOPPER SENSING

The GAC 2100a Grain Analysis Computer model uses an elevated hopper sensor (refer to Figure 57) to automatically detect when an adequate amount of grain is present for moisture testing. When the hopper is full, a sense signal instructs a remotely located computer to proceed with testing. The automatic feature is only useful when the GAC 2100a interfaces with a computer via a direct connection or through modems.

The hopper full sensor is a raised extension above the surface of the standard hopper with a light beam sensor across the center to detect the presence of grain. When the hopper becomes full, the light beam is broken and signals the computer that a moisture test is ready to begin.

Complete operating instructions for the automatic feature are described in a separate COMMUNICATIONS SOFTWARE manual.

Figure 59

GAC 2100a Hopper Sensing Unit

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Figure 60

GAC 2100a Unit Outline Dimensions

41.3 cm (16.25 in.)

40.6 cm (16.00 in.)
Front View

38.7 cm (15.25 in.)
Side View

Top View
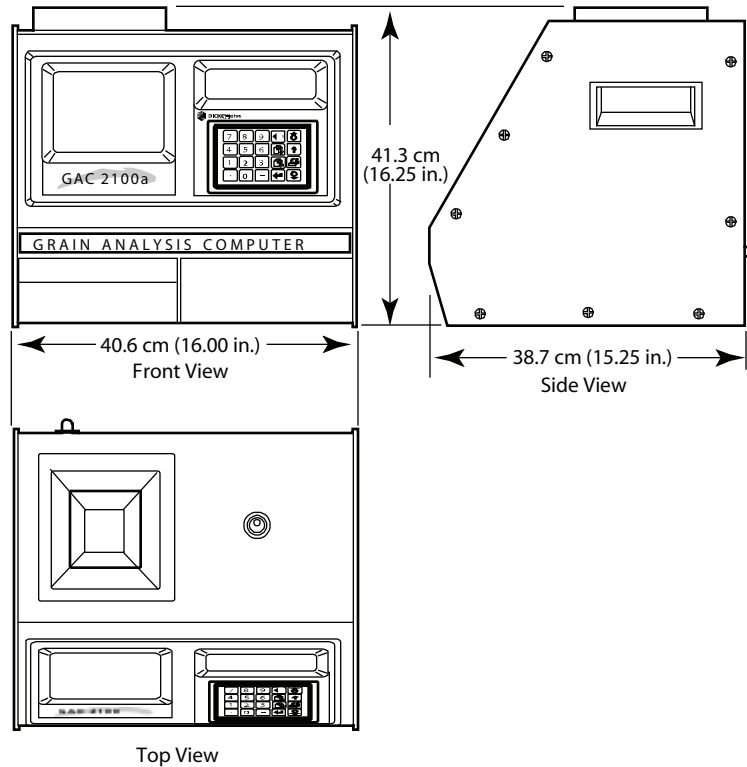
GAC 2100A SPECIFICATIONS

- **Supply Voltage And Frequency Limits:** 100 Vac to 240 Vac 50/60 Hz at 1 Amp Max.
- **Operating Temperature Range:** 2°C (35.6°F) to 45°C (113°F). If the unit temperature range is exceeded, an ERROR message will be displayed.
- **Grain Temperature Range:** 0°C (32°F) to 45°C (113°F). If the grain temperature range is exceeded, an ERROR message will be displayed.
- **Unit Temperature and Grain Temperature Difference Limit:** The maximum allowable temperature differential between empty cell and grain under test is 20°C (36°F). If exceeded, an ERROR message will be displayed.
- **Class/types Of Grain Or Seed:** Refer to the latest calibration bulletin.
- **Weight:** 12.2 kg (27 lbs) - **Shipping Weight:** 15.4 kg (34 lbs).

**For DICKEY- john Service Department, call
1-800-637-3302 in either the U.S.A. or Canada**

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