



GrainGrader

Computer Grain Scale

Instruction Manual



Doran Scales, Inc.
1315 Paramount Parkway
Batavia, IL 60510
www.graingrader.com

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Quick Start User's Guide

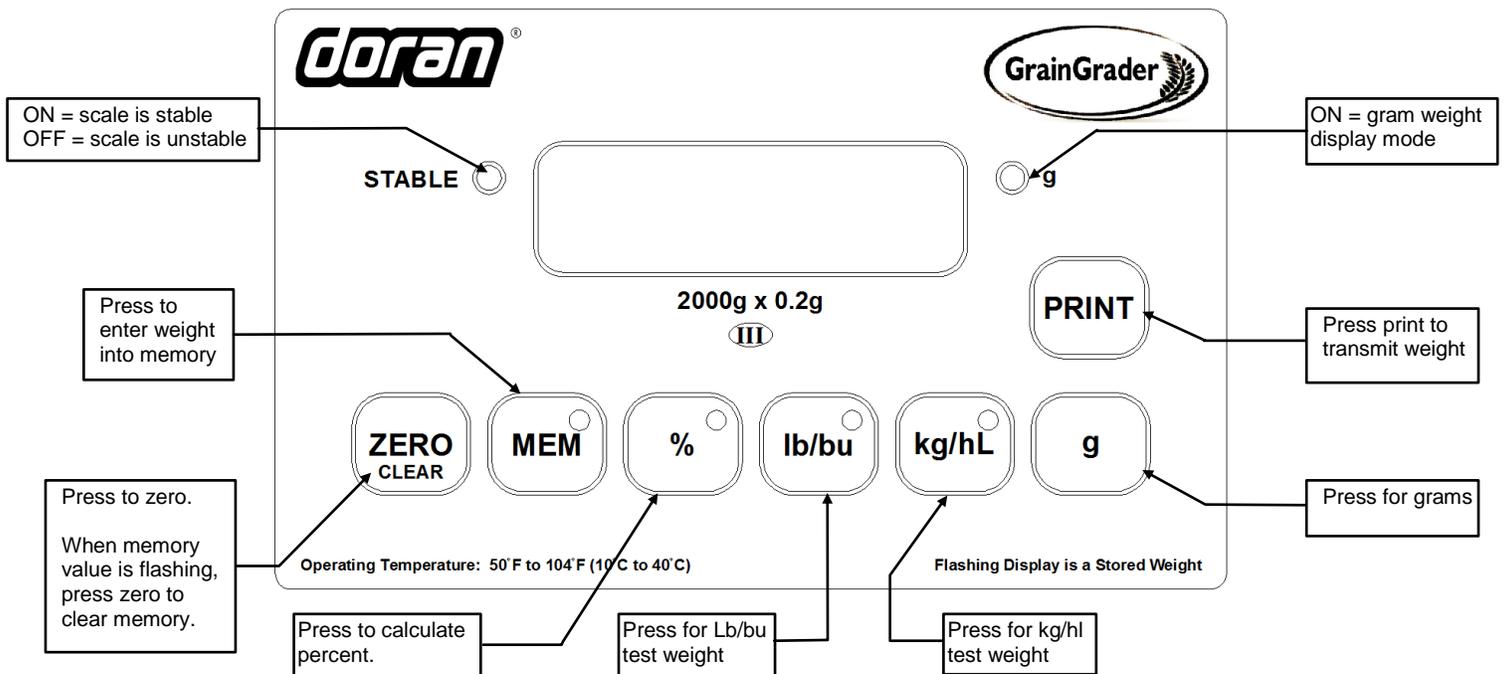


Fig. 1: GrainGrader Front Panel Layout

Basic Operation:

Weighing:

1. Press **ZERO** to zero the scale and tare sample container.
2. Place item to be weighed in sample container.
3. Read the weight when 'STABLE' turns on.

Dockage Percent: Standard Percent Mode:

1. Place container on platter and Press **ZERO** when 'STABLE' turns on.
2. Fill container to desired weight.
3. When 'STABLE' turns on press **MEMORY** to store weight in memory.
4. Screen or filter foreign material and place on the platter.
5. Press **%** to display percent.
6. Press **g** to return to grams weight display.

Clear Memory:

1. Press **MEM**, display will flash value.
2. Press **ZERO**, display will momentarily show **CLEAR**, then return to grams weight display.

Grain Test Weight: Quart, Pint, or Liter cup:

1. Place cup on scale and press **ZERO** when 'STABLE' turns on.
2. Fill cup with grain.
3. When 'STABLE' turns on press, **LB/bu** for pounds per bushel calculation or **kg/hl** for kilograms per hectoliter calculation.
4. Press **g** to return to grams weight display.

Introduction

Congratulations on your purchase of the Doran GrainGrader Computer Grain Scale. The GrainGrader is a state-of-the-art Grain Test Scale that has passed the stringent National Type Evaluation Program (NTEP) that the National Conference on Weights and Measures (NCWM) requires for scales used in legal-for-trade applications. Some of the major features and advances incorporated into the GrainGrader are:

- Push Button 2-Point Calibration
- Test Weight in LB/bu and kg/hL
- Dockage Calculation (% Foreign Material)
- All Active Display Modes for Better Accuracy
- Push Button Parameter Programming
- Passed Stringent NTEP Testing for Accuracy
- Front Panel Calibration Access Feature

The Doran GrainGrader is manufactured to the same high standards as all of the tried and proven Doran family of Industrial scales. Use your GrainGrader with confidence; it is backed by a warranty against defects in material or workmanship.

Please read this entire manual to ensure that you obtain all the benefits the Model GrainGrader can provide.

UNPACKING AND SET UP

Before proceeding to unpack your GrainGrader, please note that although it is a durable industrial scale, it is also a highly sensitive weighing instrument. Normal care should be taken when handling or using the scale. Please observe the following precautions to insure years of trouble free service from your GrainGrader.

DON'T drop the scale or drop objects onto the scale platter

DON'T install the platter so that excessive force or twisting is applied. Pull straight up when removing.

DON'T use abrasive cleaners to clean scale - use a mild soap and be careful not to use too much water. A damp cloth is sufficient.

DO check calibration at least semi-annually. Use calibrated test weights and follow the calibration procedure outlined in section 4 of this manual.

DO train all personnel in proper scale use - remember that the GrainGrader is a precision instrument and should be treated as such.

DON'T return any equipment without first obtaining a return authorization number (RMA).

Improper handling of the scale could be damaging and result in costly repairs to your unit.

Carefully remove the scale and platter from the shipping carton. Retain the shipping carton and all packing material in case re-shipment is required.

The GrainGrader requires 120 VAC, 50/60 Hz power (220 VAC optional). Be sure that the AC power is not too noisy. Noise can occur if large inductive loads, such as solenoids or motors are on the same power line. The GrainGrader has a filtered power supply to reduce the effect of normal line noise, but it cannot limit severe fluctuations. If problems occur, noise producing devices may be suppressed to minimize their effect.

When choosing a location for the scale, keep in mind that the spot should be on a sturdy table free from vibration and air currents. Vibration from heavy equipment or appliances and air currents from fans, heating ducts, etc... can cause bounce on the scale display.

Place the scale in its desired location. Level the scale by adjusting the four corner feet until the bubble level, located under platter, indicates. After a level condition is achieved, test for a stable condition by trying to rock the platform backward and forward and side to side. Adjust the feet for final levelness and stability.

SCALE OPERATION

Plug the GrainGrader into a three prong grounded receptacle. Do not remove the ground pin from the scale's plug - this may cause an electrical shock hazard. When the GrainGrader is initially plugged in the display will show a display test **0.0.0.0.0.0.**, software part number **500186**, revision **rEv 0.0**, loading zero **LDn9 0** and then **0.0** in the gram weighing mode.

The GrainGrader has four active display modes. Any of the four active display modes may be selected by pressing its corresponding push button on the front panel of the scale. The functions of the push buttons are as follows:

- g** - Gram weight displayed 0-2000 x 0.2g
- lb/bu** - Test Weight in Pounds per Bushel. Displayed to the nearest 0.01 LB/bu. Based on the selected commodity holder. This unit can be disabled with the **LDn9** parameter.
- kg/hL** - Test Weight in Kilograms per Hectoliter. Displayed to the nearest 0.01 kg/hL. Based on the selected commodity holder. This unit can be disabled with the **h3hL** parameter.
- %** - Dockage Percentage displayed to the nearest 0.01%, based on the weight sample stored in Memory. This unit can be disabled with the **PrcL** parameter.

Formula for Dockage:

$$\text{Dockage \%} = \frac{\text{Foreign Material Weight (on scale)}}{\text{Total Sample Weight (stored in memory)}} \times 100\%$$

If the scale goes to a 0 or negative weight while in the % mode, the display will indicate an invalid percentage with a -- on the display. The display will return to normal as soon as a positive weight is reached. An error message, flashing 999999 will appear when % is pressed with no weight in memory. After 3 seconds, the scale will then return to the gram weighing mode.

The remaining three front panel push buttons are:

ZERO

The **ZERO** push button allows the displayed weight to be zeroed and clears stored samples from Memory. To zero a commodity holder or scoop, place it on the scale, wait for stability, and press **ZERO**. The display will read 0.0. After zeroing the holder, any weight added to the holder will be indicated as net weight - no need to subtract the container weight; the scale does it for you automatically. The **ZERO** button can function over the full range of the scale or it can be limited to a zero band equal to 4% of scale capacity for Canadian Legal for Trade applications. The scale will not "zero" if the scale is in motion.

MEMORY

Stores a sample weight for a percent calculation. When **MEMORY** is held for 2 seconds, the stored value will flash on the display. Pressing the **ZERO** button, while the stored value is displayed, will clear the memory. The display will momentarily show $\frac{L}{r}$, then return to the grams weight display. Zero and negative weights cannot be entered into memory. This function can be disabled with the $\frac{P}{rct}$ parameter.

PRINT

The **PRINT** button permits the operator to send data to a printer or other external devices. Like the **ZERO** and **MEMORY** button, the user must wait for motion to stop before pressing the **PRINT** button. The current weight will then be transmitted to the printer. These models also have several automatic print options, which may be used to simplify printer operation.

The GrainGrader incorporates motion detection to eliminate errors in zeroing, printing and storing sample values into Memory. The **ZERO**, **PRINT** and **MEMORY** are inhibited when the scale is in motion, i.e. the weight display is changing. Motion is indicated by the "STABLE" LED (upper left of display) being extinguished. Both functions work normally when the "STABLE" LED is lit.

Entering Calibrations and Parameter Setup Mode:

The Calibration and Parameter Setup Mode can be entered by two different ways.

- 1) To enter the **Front Panel CAL Access Feature**, press and hold both the Doran logo and the PRINT button. After 2 seconds, the display will show the audit counters followed by the first menu parameter **CAL 0**. Note that the FCAL parameter must be set to $\frac{1}{2}$ in order to access this feature.
- 2) The **CAL switch** SW1 is a momentary push button located in the center of main PCB. The calibration switch can be accessed by removing the scale's top cover. After the push button has been pressed, the display will show the audit counters followed by the first menu parameter, **CAL 0**.

Calibrating the GrainGrader:

To calibrate your Doran GrainGrader, you will need a set of precision test weights, Class "Q" or better. This set consists of 2-1000g weights. Do not use test weights of lower accuracy than Class "Q" - Scale calibration will not be correct, as it is dependent upon the accuracy of the test weights used.

Before proceeding with calibration, be sure that the scale is level, stable, and away from wind currents and vibration.

Note: Excessive vibration or wind currents can cause the count down cycle to restart. This can cause errors in calibration. It is imperative that calibration be done in an area free from vibration and wind currents.

- 1) Enter Calibration mode and wait until **CAL 0** appears on the display.
- 2) Remove the commodity holder or any weight from the scale's platter. Press **ZERO** and wait for the display to count down to **0**. If the calibration zero was in range, the display will return with **CAL FS**.

NOTE: If **r9 Err** appears on the display, the calibration zero is out of range. Press **ZERO** to clear error. Refer to the A/D Ranging section for additional information.

- 3) The scale can be calibrated using a full capacity weight, three quarter capacity, half capacity, quarter capacity or one tenth capacity.

To select the weight to calibrate the scale, press the **g** button and select one of the following five capacities.

CAL FS: Full load calibration.

CAL .75: Three Quarter load calibration. (75% of full load)

CAL .50: Half load calibration. (50% of full load)

CAL .25: Quarter load calibration. (25% of full load)

CAL .10: 1/10th load calibration. (10% of full load)

- 4) To complete the calibration process, place the correct weight on the platter and press **ZERO** and wait for the display to count down to 0. If the span calibration was in range, the scale will exit calibration and return to the normal weighing mode.

NOTE: If **SPAN E** appears on the display, the calibration span is out of range. Press **ZERO** to clear error. Refer to the A/D Ranging section for additional information.

NOTE: Scales calibrated at 10% of capacity are more likely to have errors at full capacity than are scales calibrated at 25%, 50% or 75%. Doran recommends that all scales be calibrated near full capacity whenever possible. 10% calibration should not be used when calibrating scales for legal for trade applications. It is the responsibility of the installer/user to ensure that NTEP accuracy is achieved after any calibration.

A/D Ranging:

(Refer to this section only if you encounter a calibration problem.)

NOTE: The zero and span will lie within permissible limits from the factory.

- 1) Enter Calibration mode by using Front Panel CAL Access feature or by pressing the CAL switch (SW1).
- 2) Press and release the g push button until in the raw counts mode.
- 3) Return the scale platform to "No Load" by removing all items from the platform.
- 4) Record the "No Load" counts. The "No Load" or dead load raw counts must be between -10,000 and +200,000 counts.
- 5) Place "Full Load" on the platform and record the "Full Load" counts. Subtract the "No Load" counts from the "Full Load" counts to calculate "span". Refer to Table 1 and verify that the span falls within the limits specified range. The "Full Load" raw counts (span + dead load) should not exceed 600,000 counts. When using 75%, 50%, 25%, 20%, or 10% of full load to calibrate, refer to Table 1 span ranges.

Calibration requirements in raw counts		
Platform load	Minimum span	Maximum span
Full	60,000	400,000
75%	45,000	300,000
50%	30,000	200,000
25%	15,000	100,000
20%	12,000	80,000
10%	6,000	40,000

Table 1: Calibration requirements in raw counts

Metrological Seal (Legal for Trade)

For weighing applications requiring a physical seal to the Calibration and Parameter settings, a lead-wire seal can be added to the rear of the scale enclosure (see Fig. 2). Replace the two standard case screws with two cross-drilled screws (part # FST0065) supplied by Doran. Pass the metal wire through the two cross-drilled screws and seal wire and lead assembly together. Disable access to the front panel calibration feature by setting the **FcRL** parameter to **n**.

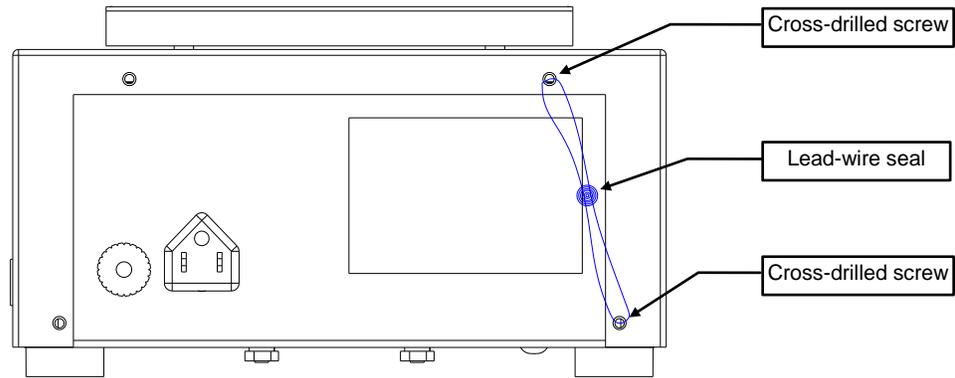


Fig. 2: Metrological Seal

Parameter Setup

The GrainGrader has 14 calibration and parameters setup menu items, which can be accessed by two different methods, **CAL switch** (S1) and the Front Panel CAL Access Feature. The Front Panel CAL Access Feature allows the user to change the scale's calibration and parameter settings by way of entering a password code.

Entering and Exiting the Calibration and Parameter Setup Mode:

The Calibration and Parameter Setup Mode can be entered by two different methods.

- 1) To enter the **Front Panel CAL Access Feature**, press and hold both the Doran logo and the PRINT button for 2 seconds.
- 2) Momentarily press the **CAL switch** S1, located in the center of main PC Board. The calibration switch can be accessed by removing the meter's top cover.

The scale will Momentarily display the Parameter and Calibration audit counters. The indicator will then display the first menu item, **CAL 0**. Press the **g** button to access the next menu item.

To exit the Calibration and Parameter Setup Menu, scroll through the menu options by pressing the **g** button, until **SAVE n** appears. Press the **ZERO** button so **SAVE 4** appears and then press the **g** button. The indicator will return to the normal weighing mode. If any menu selections were changed, the new values will be saved. Pressing the Doran logo, at any time, will exit the setup menu without saving any changes.

NOTE: No new setup information is saved until the scale displays **SAVEd** and returns to the RUN mode. In case of a power failure while in the Calibration and Parameter Mode, any changes that have been made will be lost.

Stepping through the menu parameters:

Once the Calibration and Parameter Setup Mode has been entered, you may step through the menu by pressing and releasing the **g** button or the PRINT button. A different display prompt will appear for each parameter in the menu.

The parameter list on the following pages corresponds to the parameters available in the Calibration Setup Menu.

Changing a Parameter:

After finding the desired menu item, the setting for that item may be changed. Press and release **ZERO** to step through the parameter list for that item. The list of choices will repeat if you keep pressing and releasing **ZERO**. When you have found the desired setting, press **g** to go to the next menu item.

Legal for Trade Restrictions:

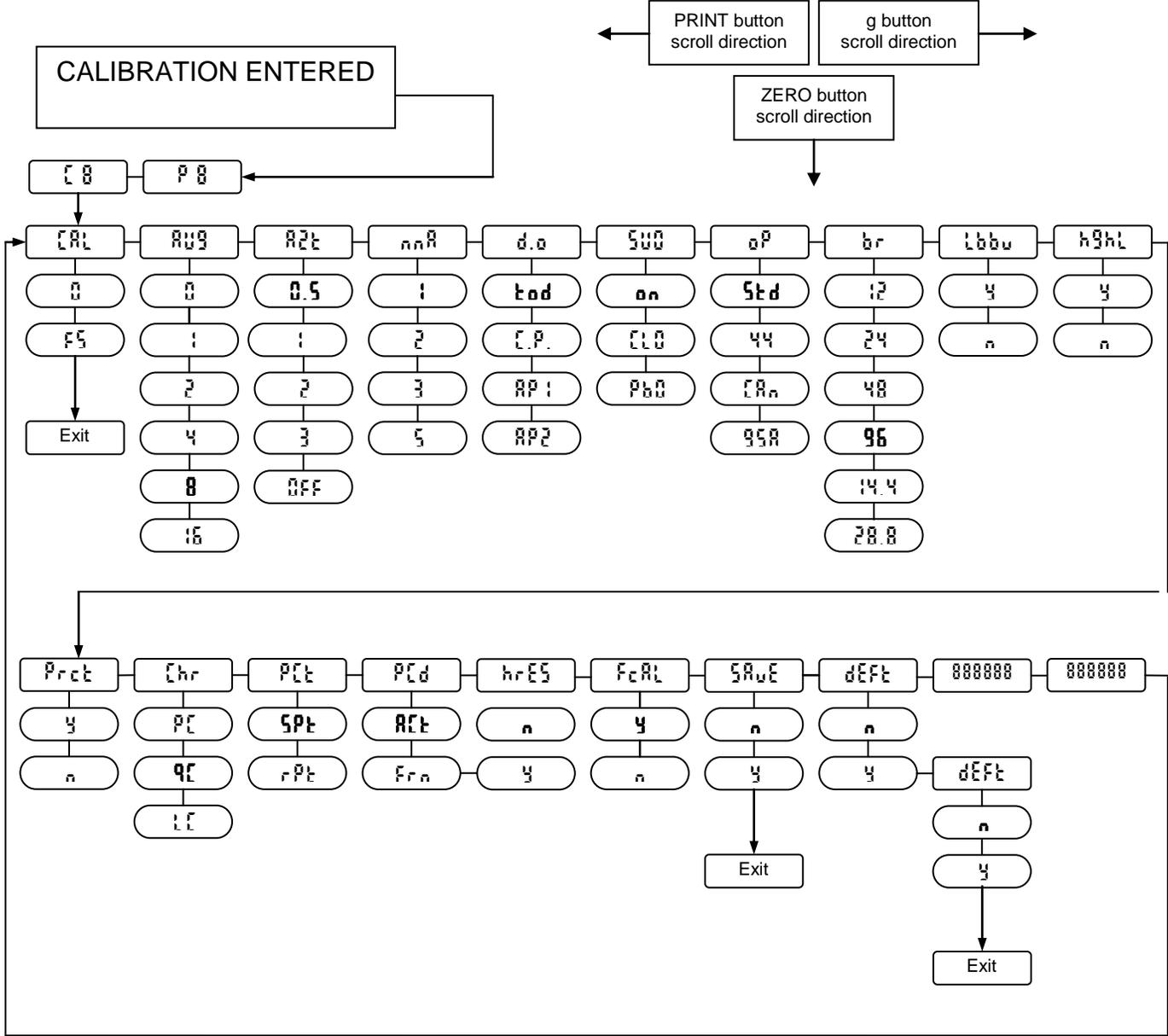
When the Legal for Trade mode is enabled (OP 44, OP CRn or OP 95A), it automatically limits some menus and parameter options. This is done to comply with NTEP and Measurement Canada requirements. The menus and parameter sections are shown on the following pages. Those parameters not available when in the Legal for Trade mode are marked by an asterisk.*.

Audit Counters:

When entering calibration mode, the Parameter audit counter and the Calibration audit counter will momentarily be displayed. The Parameter **P** audit counter only increments when legal for trade, values are changed. The Calibration **C** audit counter only increments when a calibration is performed.

Setup Menus Explained

(In order of occurrence)



Calibration Menu

CAL	Zero Calibration Mode.
0	Calibration Zero Press ZERO to perform a zero calibration.

CAL	Span Calibration Mode. (Does not appear if CAL 0 is not activated.)
F5	Full load calibration. 2000 grams test weight
.75	Quarter capacity calibration. 1500 grams test weight
.50	Half capacity calibration. 1000 grams test weight
.25	Quarter capacity calibration. 500 grams test weight
.20	1/5th capacity calibration. 400 grams test weight
.10	1/10th of capacity calibration. 200 grams test weight

Note: For maximum accuracy, Doran recommends that the Grain scale be calibrated near full capacity.

Digital Filter Setup Menu

R₀₉	Averaging mode Determines the number of samples to average
0	1 reading, no averaging. Display updates 10 times a second.
1	Circular auto averaging. Display updates 10 times a second.
2	Circular auto averaging, 2 readings are averaged. Display updates 10 times a second.
4	Circular auto averaging, 4 readings are averaged. Display updates 10 times a second.
8	Circular auto averaging, 8 readings are averaged. Display updates 10 times a second.
16	Circular auto averaging, 16 readings are averaged. Display updates 10 times a second.

NOTE: The circular auto averaging filter, when stable, X4 readings are averaged.

Automatic Zero Tracking Setup Menu

R_{2t}	Automatic Zero Tracking Range Small weights within the specified number of divisions are automatically zeroed.
OFF	Zero tracking is off. No automatic zeroing.
0.5	Zero tracking to within 0.5 division.
1*	Zero tracking to within 1.0 division.
2*	Zero tracking to within 2.0 division.
3*	Zero tracking to within 3.0 divisions.

* **NOTE:** The Legal for Trade mode disables some options and selections listed above. These items have been indicated by an asterisk.

Motion Aperture Setup Menu

n.n.R.*	Motion aperture * Determines how many divisions consecutive readings must change before the scale is considered in motion.
1	1 division change must be seen to enter motion.
2*	2 division change must be seen to enter motion.
3*	3 division change must be seen to enter motion.
5*	5 division change must be seen to enter motion.

Serial Data Output Setup Menu

d.o.	Data Output Mode (see page 20) Determines when serial data will be sent.
t.o.d.	Transmit on demand. Print when the PRINT button is pressed.
C.P.	Continuous Print, 10 times per second.
R.P.1	Auto Print 1. Print once when weight becomes stable.
R.P.2	Auto Print 2. Print once when the weight becomes stable. Weight must return to zero before it can print again.

Start Up Zero Setup Menu

500*	Start Up Zero Controls the start up zero status.
on	Zeros on the first stable reading on power up.
CLO*	Loads the calibration zero for zero reference
Pb0*	Loads the last pushbutton zero. (Disabled in LFT mode)

Operating Mode Menu (Legal for Trade Setup)

oP	Operating Mode Activates the Legal for Trade mode.
5td	100% Zero Range (Standard operation)
44	100% Zero Range (Legal for Trade, Handbook 44 compliant.)
CRn	±1.9% Zero Range (Legal for Trade, Canadian W&M compliant.)
95R	GIPSA. Limits use of %, lb/bu and kg/hL to loads over 500g.

* **NOTE:** The Legal for Trade mode disables some options and selections listed above. These items have been indicated by an asterisk.

Baud Rate Setup Menu

br.	Baud Rate Setup Determines baud rate for serial data.
12	1200 baud (bits per second)
24	2400 baud (bits per second)
48	4800 baud (bits per second)
96	9600 baud (bits per second)
14.4	14,400 baud (bits per second)
28.8	28,800 baud (bits per second)

lb/bu Enable/Disable

lb bu	Enables or disables the use of the lb/bu button.
y	lb/bu enabled
n	lb/bu disabled

kg/hL Enable/Disable

kg hL	Enables or disables the use of the kg/hL button.
y	kg/hL enabled
n	kg/hL disabled

Percent Enable/Disable

Prcnt	Enables or disables the use of the % and MEM buttons.
y	% and MEM enabled
n	% and MEM disabled

Commodity Holder

Chr	Type of Commodity holder Defines the size of the cup used for test weight.
QC	Quart Cup
LC	Liter Cup
PC	Pint Cup

Percent Type

Pct	Percent Type Defines how Percent is calculated
SPt	Standard. Displays a percent value based on the current weight and memory values.
rPt	Reciprocal. Displays a percent value based on (memory weight - current weight) / memory weight.

Percent Display

Pcd	Percent Display Defines Percent (%) display operation
Act	Active. Continuously updates the display when in % display mode
Frn	Frozen. Calculates the current percentage when the % button is pressed. The value is shown until the display mode is changed.

High Resolution

hrES	Display the weight in a high resolution mode when the Doran logo is pressed: 2000g x 0.02g.
n	Do not allow entry into the high resolution mode.
y	Allows entry into the high resolution mode.

Front Panel Calibration

FcAL	Allow entry into setup/calibration by pressing, and holding, the PRINT button and Doran logo.
n	Do not allow entry into the high resolution mode.
y	Allows entry into the high resolution mode.

Calibration and Parameter Menu Exit

SAVE	Exit Calibration and Parameter Menu.
n	Do not exit and save.
y	Exit Calibration and Parameter menu and save all parameter changes. The scale will return to normal weighing when the g button is pressed.

Default all Scale Parameter settings

dFt	Default Calibration and Parameter settings.	
n	Do not default settings.	
y	1 st yes answer, Default all Calibration and Parameter settings	
	n	Do not default settings
	y	Verify 2 nd yes answer, Default all Calibration and Parameter settings

WARNING: Defaulting the scale will require recalibration.

Note: When Defaulting Scale parameters, both audit counters will increment by one.

Raw Counts

#####	Displays the raw counts from the scale's A/D converter. Used for troubleshooting.
	Displays a number from -999999 to +999999

Load cell mV output

#####	Displays the approximate mV output from the load cell. Used for troubleshooting.
	Displays a number from -10.0 to +10.0

Data Communications

Introduction to data communications:

In the GrainGrader, data is sent to a printer or computer by using "asynchronous serial data communications." Data is broken up and sent one piece at a time to the printer or computer. In spite of this apparent simplicity, a basic understanding of serial data communications is needed when setting up the scale.

The scale transmits letters and numbers to a printer or computer by replacing the letter (or number) with an eight bit ASCII code. This code is then transmitted, one bit at a time, to a printer or a computer. A bit is the smallest unit of data and can have a value of "1" or "0." By combining eight bits into a byte, it is possible to get 256 unique bit patterns. These patterns are used to create the ASCII codes used by the scale to represent letters and numbers.

When setting up a serial communications system, there are several concerns which affect the configuration of that system. These are:

- transmission rate
- knowing when data starts and stops
- the ability of the receiving equipment to digest the data sent

The transmission rate determines how fast the data is sent from the scale to the printer (or computer) and is measured in Baud or bits per second. (For applications such as the GrainGrader, Baud and bits per second are interchangeable.) The transmission rate controls how many bits can be sent in a given time. It is important that the sending and receiving units are set to the same Baud settings. Typical values are 1200, 2400, 4800 and 9600 baud.

The term "asynchronous serial data communications" implies that the sending unit has no way of telling the receiving unit when a data bit has been sent or when to expect the next bit. To correct this problem, both the sending and receiving units use the baud rate setting to determine how fast data should be sent. If the baud rates at the sending and receiving units differ, the receiving unit will expect data to arrive at a different time than when the transmitting unit sent it. When this happens, data will be lost. When the baud rates match, the receiving unit has no problem with the data arriving early or late. The only problem is knowing when the data transmission started.

The scale and the equipment connected to it resolve this dilemma by sending a "start bit" at the beginning of each data byte. This bit tells the printer or computer that a new data byte is on the way. When the start bit is received, the bit timer starts running and runs until it has received the correct number of bits.

The number of bits sent by the scale is controlled by the data bits, parity and stop bit configuration. The scale is factory set for eight bits, no parity and one stop bit. This means that the eight bits following the start bit will be data, followed by a stop bit. The stop bit signals the end of the data and permits the bit timer a chance to reset itself before the next data byte is sent. No parity bits are sent.

Printer Modes:

The GrainGrader offers four different print control modes. These modes dictate when printer data is sent.

Transmit on demand (TOD):

In this mode, scale data is transmitted whenever the **PRINT** button is pressed, or a print request is received from the serial port. The scale must be stable and the scale value must be valid before the data is printed.

Continuous print (CP):

In continuous print, data is transmitted each time the scale has a reading ready. Readings which occur when the scale is in motion are called out by the abbreviation "MOT." following the data.

Auto Print 1 (AP1):

Auto Print 1 transmits the first scale reading after the weight stabilizes. The reading must be stable and must be a valid reading before it can be sent.

Auto Print 2 (AP2):

Like Auto Print 1, Auto Print 2 transmits the first scale reading when the weight stabilizes. In Auto Print 2, no further readings will be sent until the scale returns to zero. The reading must be stable and must be a valid reading before it can be sent.

Data output format:

In order for the serial data sent from the scale to be useful, the data must be organized so that it is easy to read. To accomplish this, the scale arranges the displayed data with additional text to indicate the active units and to indicate the presence of motion during the reading.

The basic data format sent by the scale is illustrated in Table 2. Each line of data begins with a Start of Text (STX, 0x02) character, followed by polarity. Next, the displayed data is sent. Six digits are used with a decimal point inserted in the correct position. After the weight data is sent, a space, followed by the units, are added to the string. The string is then finished by adding a carriage return and a line feed.

Scale output Response (TXD)	Description
<STX><p><xxxxx.x><SP><uu><CR><LF>	Prints current display weight and units. <xxxx.xx> weight data (fixed field of 6 digits plus decimal or "-----" for overload, underload, gross underload, or gross overload) <p> polarity "-" or "" <uu> current units <SP> line space (hex 20) <CR> carriage return (hex 0D) (control-M) <LF> line feed (hex 0A) (control-J)

Table 2: serial protocol

Specifications and Interconnect Data

Specifications:

Model:	GrainGrader
Resolution:	10,000d (100,000d in expanded resolution)
Sensitivity:	0.5 uV min.
Load Cell Output:	0.112 mV/V to 7 mV/V
Power Supply:	115/230VAC 50/60Hz
Display:	6 digit LED. 0.56" high
Displayed units:	g, kg/hL, lb/bu, %
Capacities:	0 to 2,000 grams
Printer Interface:	Bi-directional RS-232
Calibration:	Unit may be calibrated with 10%, 20%, 25%, 50%, 75% or 100% of capacity.
Controls:	Touch panel with built in ZERO, MEM, %, g, kg/hL, lb/bu, PRINT.
Construction:	Rugged Stainless Steel construction.
Options:	DB9 RS232

Table 3: Scale Specifications

DB9 Serial Connector	
PIN #	TITLE
1	n/c
2	TXD
3	RXD
4	n/c
5	GND
6	n/c
7	n/c
8	n/c
9	n/c

Table 4: DB9 Connections

P4 Power Connections		
PCB PIN #	TITLE	WIRE COLOR CODE
N	Neutral	Blue
G	Ground	Green/Yellow
L	Hot	Red

Table 5: Power Connections

Troubleshooting

General problem resolution:

Problem:	What to Do or Check:
Weight reading will not repeat or scale does not return to zero when weight is removed.	Make sure the platter is mounted correctly and nothing is caught between the platter and the scale enclosure.
Scale will not indicate full capacity or goes into overload.	Check calibration and recalibrate if necessary.
Scale will not display zero when the ZERO button is pressed.	<p>Make sure that the scale is stable ("STABLE" annunciator is on) when ZERO is pressed. If excessive motion is a problem, then it may be necessary to lengthen the filter time (Ru9 15).</p> <p>If the scale is stable, the scale may be set to the Canadian Legal for Trade ($\pm 1.9\%$ zero bandwidth). An attempt is being made to zero more than 1.9% of capacity (see Parameter Setup section).</p> <p>There may be a problem with the touch-panel or main board.</p>
Weight readings don't seem to be correct.	Check the scale's accuracy with a test weight. Recalibrate if necessary.
Scale drifts off zero.	Check for air currents and/or vibration around the scale. If that is the cause, it may be necessary to set the AZT aperture to a wider setting to compensate (see Parameter Setup section).
Scale reading is bouncing or "flighty".	Check for air currents and/or vibration around the scale. If that is the cause, it may be necessary to set the Digital Averaging to a higher setting to stabilize the reading (see Parameter Setup section).

Resetting the scale parameters:

- If the setup parameters need to be reset to factory default values, follow these steps.
WARNING: Defaulting the scale will require recalibration.
- Enter Cal mode by using the front access feature or by pressing the **CAL** button.
- Once in the CAL menu, use the **g** button to scroll to the menu item **ሰፊት ስ**. Press the **ZERO** button to select yes, **ሰፊት ስ**. Press the **g** button. The display will show **ሰፊት ስ**, Press the **ZERO** button to select yes **ሰፊት ስ** and then press **g** button to default all parameters.
- The scale will then show **ክፍለ**. After the **ክፍለ** message is displayed, the scale will then perform its normal power up routine. At this time, all the parameters will have been reset to their factory default settings. See Setup Menus Explained section for details on setting up the individual scale parameters.

Resetting the scale:

In the event that a power problem has disabled the scale, remove power, wait 15 seconds and restore power. The scale should restart and function properly.

Scale Messages:

Message	Meaning
done Function complete.	The scale has successfully completed the requested action.
Abort Aborted function.	The requested action has been canceled prior to completion.
SAVED Parameter value saved.	The scale has successfully store and verified parameter value in nonvolatile memory.
REL Pb Release push button.	The scale has detected that a button has been depressed for more than 3 seconds.

Error messages:

Error Message	What to Do or Check:
over Ld Scale overload	The scale is in overload. The load on the scale exceeds the capacity by more than 103%. Remove excess weight from scale.
under Ld Scale underload	The scale is in underload. The load on the scale is less then the minimum scale capacity by more than -20%. Recalibrate scale or add additional dead load.
0 over Startup zero error	Over 200 grams is on the scale as it is powered on. Remove Excess weight from the scale.
0 under Startup zero error	Weight on scale is 100 grams, or more, below the calibration zero point. Check that the platter is correctly attached to the scale.
Er Ad A/D failure	The scale has detected a failure in the A/D circuit. Have scale serviced by a qualified scale repair technician.
Err EP EEPROM error	The setup parameters loaded in nonvolatile memory have become corrupted. The scale requires recalibration by a qualified scale technician.
Ld n 0 Loading zero.	The scale is attempting to load power up zero. This message will remain until scale is stable.
Calibration Range Error	Calibration zero is out of range (too low or too high), refer to A/D Ranging section for additional information.
Calibration Span Error	Calibration Span is out of range (too low or too high), refer to A/D Ranging section for additional information.

If this list does not solve the problem with your scale, please contact your Scale's authorized dealer.