Digital Scale

INSTRUCTION MANUAL

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INTRODUCTION

Thank you for purchasing a Doran Scales, Inc. Model 4300 Digital Checkweigher. This scale uses state of the art technology to provide the you with a low cost solution to the most demanding weighing applications. With ease of use and setup in mind, the Model 4300 is simple set up and ready to use.   The Model 4300 offers many features. A few of these features are listed below:

> •N.T.E.P. certification for Class III installations to 5000d (Applied for)
> •A 6 digit, 0.56" red LED display for easy reading
> •lb/kg/oz/g/lb-oz display units supported
> •Fully configurable duplex printer port with RS232 support.
> •Optional RS485 support.
> •EEPROM nonvolatile data storage of all calibration and setup
>   information.
> •Optional static RAM for a 150 reading (TYP.) print buffer
> •Microprocessor monitoring system to prevent indicator failure under
>   severe Fault conditions
> •Support for up to 4 350 ohm load cells
> •115/230 Vac 50/60 Hz (jumper selectable) operation
> •Field selectable digital filtering.
> •Software configurable remote push-button support (Optional)
> •Non N.T.E.P. parameters are user configurable.
>
> Please be sure to read the entire manual to ensure obtaining all the benefits that the Model 4300 can provide. If any questions arise, please feel free to contact the Doran Scales Technical Service Department at 1-800-262-6844.

Unpacking Your Scale

Before unpacking your Doran scale, please read the instructions in this section. Your new scale is a durable industrial product, but it is also a sensitive weighing instrument. Normal care should be taken when handling and using this product. <u>Improper handling or abuse can damage the scale and result in costly repairs that may not be covered by the warranty</u>. If you notice any shipping damage, notify the shipper immediately. Please observe the following precautions to insure years of trouble free service from your new scale.

> • DO NOT drop the scale indicator or scale platform.
> • DO NOT immerse the scale indicator or platform.
> • DO NOT drop objects on the platform.
> • DO NOT pick up the scale platform by the "spider."

Carefully remove the scale from the shipping carton. Be sure to retain all shipping materials in case the scale must be shipped elsewhere.
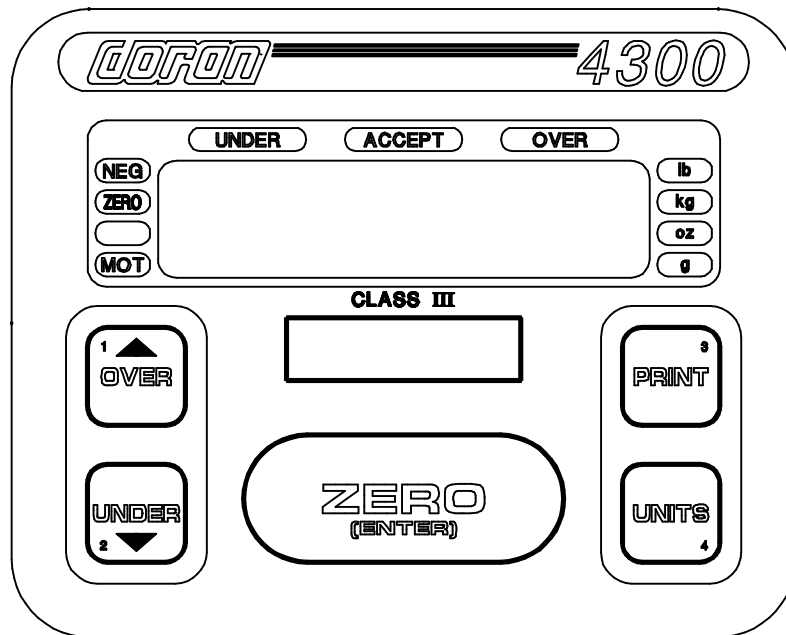
Quick Start User's Guide

Figure 1. 4300 Front Panel Layout

Basic Weighing Operations:

1) Remove all items from the scale platter.
2) Press ZERO to zero the scale. The weight display should now be zero.
3) Place an item on scale platter and wait for the motion (MOT) indicator to turn off, indicating a stable weight.
4) Read the weight on the scale display.

Model 4300:

The Doran 4300 has a main display and ten indicator lights. These indicators provide the operator with information about the scale and the current weighing operation. The main display shows the current weight or scale status. Units indicators, located on the right side of the display, show the current measurement units. Center of Zero (ZERO) and Motion (MOT) indicators, located on the left side of the display, inform the operator when the scale is at Zero and when the scale is in Motion. The NEG. (negative) indicator informs the operator whether the item being weighed is below or above Zero. Checkweigh information is provided by the OVER, ACCEPT and OVER lights above the main display.

Five pressure sensitive switches are located under the main display. These switches provide the operator with the ability to zero the scale, change the current units, print the weight, or enter the weight limits for checkweighing.

ZERO:

The ZERO push button is used to zero the scale prior to making a reading. 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.

To zero the scale, wait until the scale is stable and press the ZERO button. The scale will zero immediately. The 4300 will not "zero" if the scale is in motion. The 4300 equipped with an optional "Zero on Demand" feature which holds "zero" requests until motion stops. This option may be activated during the scale setup procedure. Refer to you dealer or service manual for details.

UNITS :

The UNITS button permits the operator to change the scale units by pressing a button. After pressing UNITS, the units indicator will immediately display the new units. The next display update will indicate the correct weight in the new units.

The UNITS button has several configuration parameters which can disable the UNITS button or limit the display units available. Refer to you authorized Doran Scales dealer for details.

PRINT:

The PRINT button permits operator to print the current weight by pressing a button. Like the ZERO button, the user must wait for motion to stop before pressing the PRINT button. The current weight will then be transmitted to the printer.

The 4300 has a "Print on Demand" feature which stores a PRINT request until the scale is stable. Once stable, the scale transmits the current weight to the printer. The 4300 also has several automatic print options which may be used to simplify printer operation. Refer to you authorized Doran Scales dealer for details.

OVER / UNDER:

The OVER and UNDER buttons are used to enter the weight values needed for checkweighing applications. In the simplest configuration, these buttons will enter the "check" weight by pressing either the OVER or UNDER button. When in this mode, the current weight is entered as the checkweighing limits.

The default entry mode uses the **OVER** and **UNDER** buttons to take the current weight and scroll it up or down (arrows on the button indicate the scroll direction) until the desired "check" weight is reached. Once the desired value is reached, pressing **ZERO (ENTER)** will enter the desired value in the scale.

The 4300 also offers five band check weighing and password protection of the checkweigh limits. Refer to you dealer or service manual for details.
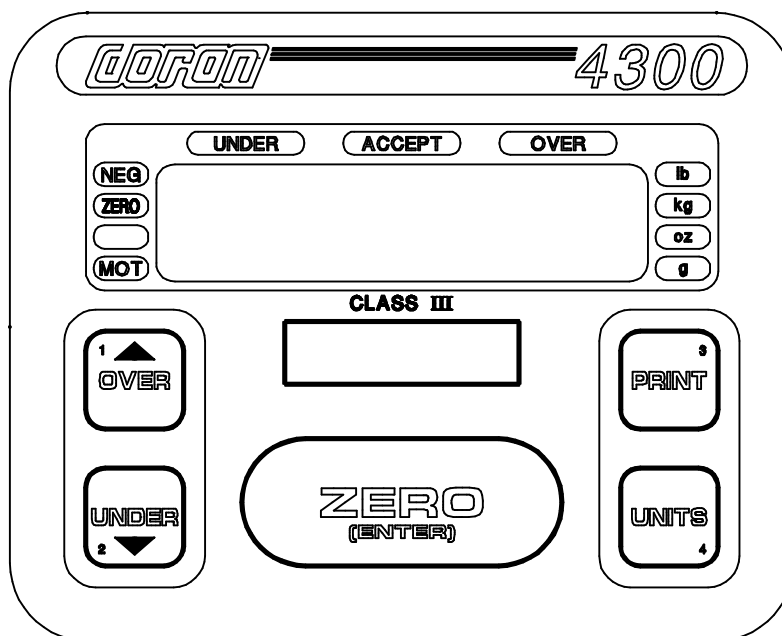
Basic Checkweighing Reference Guide

Figure 1. 4300 Front Panel Layout

Basic Over, Under and Accept Checkweighing Operation :

1) Remove all items from the scale platter. (If checkweighing to zero, place the target weight on the scale.)

2) Press ZERO to zero the scale. The weight indication should now be zero.

3) Place an item on scale platter and wait for the motion (MOT) indicator to turn off, indicating a stable weight.

4) If the item is heavier than the over limit, the OVER light will light, If the item is lighter than the under limit, the UNDER light will light. If the weight is between the limits, the ACCEPT light will light.

Digital Entry of OVER and UNDER Limits: (default configuration) [2]

1) Zero the scale.

2) If available, place an item with the desired weight on the scale.

3) Press and release the OVER button. The OVER and ACCEPT lights will light followed by the lights on each side of the display. If "Ent. Cd" appears, enter the password (Refer to the "Password Entry" section.) and press ZERO.

4) The scale is in the scroll mode. Press either the OVER or UNDER button to increase or decrease the limit value. Holding a button longer will cause the count to accelerate. Press UNITS or PRINT to cancel.

5) Once the desired limit is reached, press ZERO to save the limit. The display will read "donE."

6) To enter the "UNDER" limit, press and release the UNDER button. Then follow steps 4 and 5.

Push-button Entry of OVER and UNDER Limits: (optional configuration) [1,2,3]

1) Zero the scale.

2) Place an item with the desired "OVER" weight on the scale.

3) Press and release the OVER button. The OVER and ACCEPT lights will light followed by "donE." The limit has been saved.

4) Remove the "OVER" item and place an item with the desired "UNDER" weight on the scale.

5) Press and release the UNDER button. The UNDER and ACCEPT lights will light followed by "donE." The limit has been saved.

Five Band Checkweighing Operation: (optional configuration)   [1]

1) Remove all items from the scale platter. (If checkweighing to zero, place the target weight on the scale.)
2) Press ZERO to zero the scale. The weight display should now be zero.
3) Place an item on scale platter and wait for the motion (MOT) indicator to turn off, indicating a stable weight.
4) If the item is heavier than the "high" limit, the OVER light will flash. If the item is heavier than the "over" limit but lighter than the "high" limit, the OVER light will turn on. If the item is lighter than the "low" limit, the UNDER light will flash. , If the item is heavier than the "low" limit but lighter than the "under" limit, the UNDER light will turn on. If the weight heavier than the "under" limit but lighter than the "over" limit, the ACCEPT light will light.

Digital Entry of "HIGH" and "LOW" Limits: (optional configuration)   [1,2]:

1) Zero the scale.
2) If available, place an item with the desired weight on the scale.
3) Press and hold the OVER button until the lights on each side of the display turn on and the OVER and ACCEPT lights flash. If "Ent. Cd" appears, enter the password (Refer to the "Password Entry" section.) and press ZERO.
4) The scroll mode is now active. Press either the OVER or UNDER button to increase or decrease the limit value. Holding a button longer will cause the count to accelerate. Press UNITS or PRINT to cancel.
5) Once the desired limit is reached, press ZERO to save the limit. The display will read "donE."
6) To enter the "UNDER" limit, press and release the UNDER button. Then follow steps 4 and 5.

Push-button Entry of "HIGH" and "LOW" Limits: (optional configuration)   [2,3]

1) Zero the scale.
2) Place an item with the desired "HIGH" weight on the scale.
3) Press and hold the OVER button until the scale displays "donE." The limit has been saved.
4) Remove the "OVER" item and place an item with the desired "UNDER" weight on the scale.
5) Press and hold the UNDER button until the scale displays "donE." The limit has been saved.

Entering Passwords: (optional configuration)

1) The password on the 4300 consists of up to four digits with values from one to four.
> Note: The OVER, UNDER, PRINT and UNITS buttons are numbered from
> 1 to 4. pressing these buttons will enter the associated number.

2) Press the numbered keys in the correct sequence to enter the password (less than four digits are OK). The password will be displayed on the display as it is entered. If an incorrect number is pressed, start the number over and the incorrect numbers will shift off the display. The default password is ZERO (do not press any digits).
3) Press ZERO to accept the password displayed on the scale. If the password is incorrect, the scale cancels the operation and displays "Abort." Normal weighing then resumes. If the password is correct, the scale continues the requested activity.

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1. The 4300 is shipped from the factory as an "over-accept-under " Checkweigher. The 4300 may be configured for "low-under-accept-over-high" (5 band) operation . Consult your Doran Authorized Dealer for more details.

2. The 4300 is factory configured for digital limit entry. The 4300 may be configured for push-button limit entry.   Consult your Doran Authorized Dealer for more details.

3. Passwords do not work with push-button limit entry.

Table of Contents

Quick Setup Guide

Load Cell and Power Connections:

Load cell connections are made through a terminal block located at the bottom edge of the main PC. board. The power cord connects to a connector adjacent to the load cell terminal block. These connections are accessible by removing the rear cover screws and laying the rear cover and main board on the work surface.
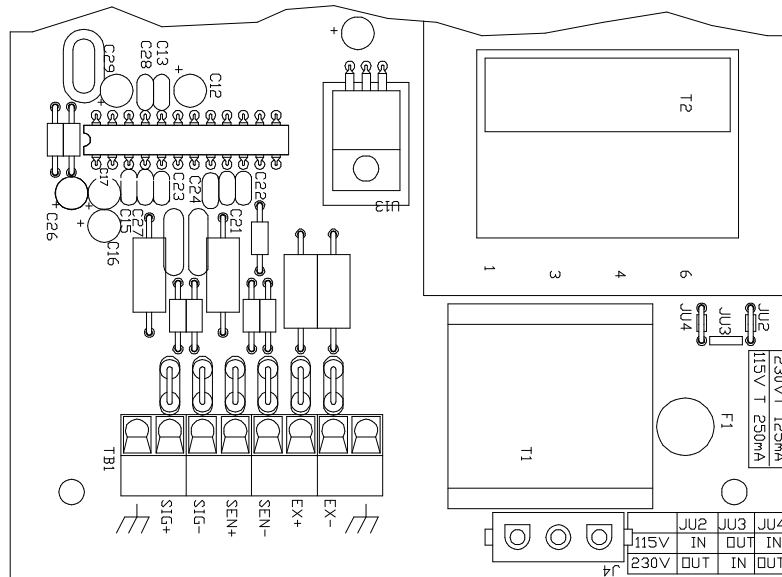
Fig. 1: 4300 Load Cell and Power Connections

The Calibration switch S1 is located behind the Calibration Access Cover. This cover is located near the top of the rear cover. There are no zero jumpers, span jumpers, switches or pots to adjust. The calibration switch can be accessed by removing the Calibration access cover.

Option Connections:

The Remote Switch and Serial Communications connector is found on the left side of the main PC. board. This connection is accessed by removing the rear cover. Connections are made by either crimping (or soldering) a connector contact onto each lead of the option cable. After crimping (or soldering), the contact is pressed into a connector housing. The completed option connector is then snapped onto the option connector found on the main board. Like the load cell cable and power cord, the option cables are passed through watertight fittings mounted on the bottom of the indicator.

CTS /RXD

TXD

REMOTE
SWITCH

DIGITAL GND.
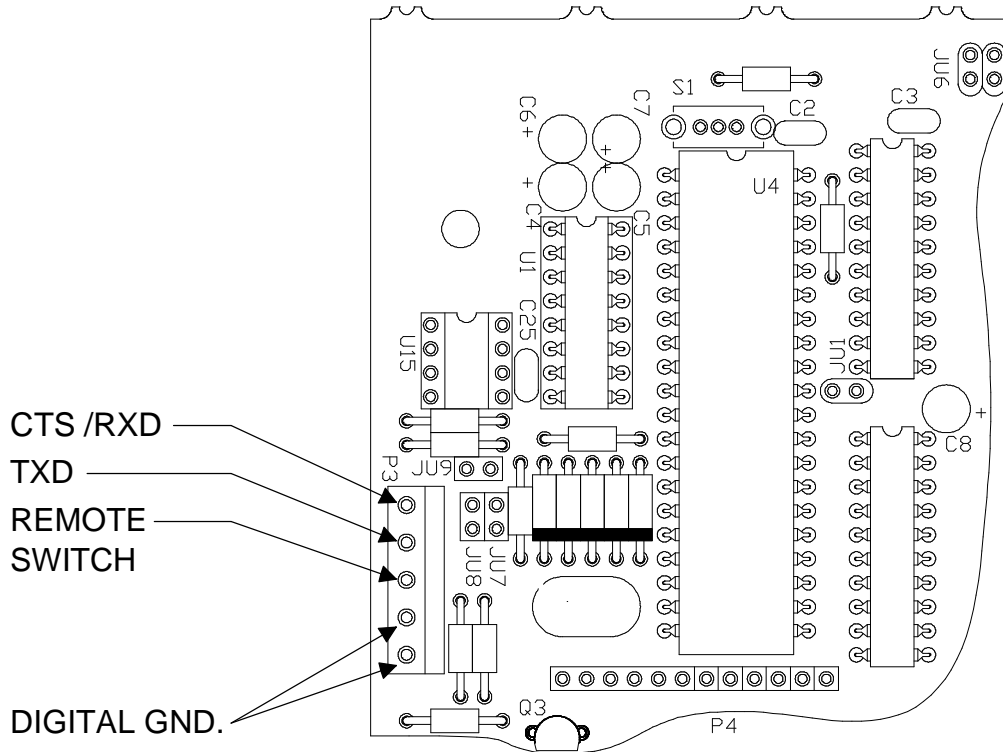
Fig. 2. Serial Communications and Remote Switch Connections

Capacity:

Capacity selection is performed by placing the Calibration switch S1 in the calibrate mode. Press and release **UNITS** until **"CAP 50"** appears on the display (where "50" can be any valid capacity). Once the **CAP** prompt appears, press and release **ZERO** until the desired capacity is displayed. When finished, return the Calibration switch S1 to the RUN position.

Once the desired capacity has been selected, place the correct capacity label behind the capacity window located on the of the front panel. Secure the label with tape.

NOTE: On scales with factory installed platforms, the capacity is set at
       the factory, It will not be necessary to set the scale capacity.

Calibration:

1) Place the RUN /CALIBRATE switch in the CALIBRATE position. Press and release the **UNITS** button until **"CAL 0"** appears on the display.

2) Remove any unnecessary weight from the scale platter and wait for about 10 seconds. Press **ZERO** and wait about 15 seconds. The display will return   .

NOTE: If "rg Err" appears on the display, the calibration zero is out of
        range. Press zero to clear error. Refer to the analog setup
        section for additional information.

3) Press and release the UNITS button to scroll through the calibration capacities. Select one of the following:

> **CAL FS**: Full load calibration.
>
> **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)

Place the correct weight on the platter and wait about 10 seconds. Press **ZERO**. After about 15 seconds, the display will display donE. Return the RUN / CALIBRATE switch to the RUN position.

NOTE: If "SPAn E" appears on the display, the calibration span is out of
        range. Press zero to clear error. Refer to the analog setup
        section for additional information.

NOTE: Calibration at 10% of capacity has been provided as a
        convenience to customers with high capacity scales in remote or
        inaccessible locations. Scales calibrated at 10% of capacity are
        more likely to have significant errors at full capacity than are
        scales calibrated at 25% or 50%. Doran Scales recommends
        that all scales be calibrated at full capacity whenever possible.
        10% calibration should not be used when calibrating scales for
        legal for trade applications.

Analog Setup:

NOTE: On scales with factory installed platforms, the zero and span will
        lie within permissible limits. Use this section only if you are
        curious about the load cell output.

1) Place the Calibration switch S1 in the CALIBRATE position. Press and release the UNITS button until CAL 0 (where 50 can be any valid capacity) appears on the display.   Follow the procedure to select the desired scale capacity.

2) Once the correct capacity has been selected, press and release UNITS until in the raw counts mode.

3) Return the scale platform to "No Load" by removing any unneeded items from the platform.

4) Record the "no load" 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   for the amount of dead load present.   If the readings, are outside of the limits specified, change dead load or span until you meet the requirements..

6) When using 50%, 25% or 10% of full load to calibrate, calculate the span for the calibration weight in use. Divide the resulting span by .5, .25 or .1 respectively before comparing the span to the table. The "Full Load" raw counts (span + dead load) should not exceed 70.0000 counts.

Dead Load	Minimum Span
2.0000 to 17.5000 counts	5.3000 counts
16.0000 to 28.0000 counts	11.5000 counts

Table 1. Minimum span requirements

Parameter Setup

The Model 4300 has twenty six setup and calibration parameters which can be accessed through the 4300's two setup modes. The Configuration mode allow the user to change the scale configuration without accessing the scale calibration prameters or breaking the Weights and Measure seal. This feature makes the 4300 a versatile weighing instruments capable of meeting almost all common weighing needs.

Entering and Exiting the Configuration Setup Menu:

To enter the configuration setup menu, unplug the scale. Press the **PRINT** button and plug in the scale. The scale will display several start up messages. Press the **UNITS** button to access the first menu item. If the password protection mode is on, the scale will prompt you to enter the password ("**Ent Cd**") before allowing parameter access.

To exit the configuration mode, scroll through the menu options, by pressing the **UNITS** button, until **"donE n"** appears. Press **ZERO** until **"donE y"** appears and then press the **UNITS** button. The indicator will return to the normal weighing mode. All menu selections will be saved at that time.

NOTE: No setup information is saved until the scale returns to the RUN
      mode. In the event of a power failure while in the Configuration
      Mode, any changes that have been made will be lost.

Entering and Exiting the Calibration Setup Menu:

To enter the calibration and setup menu, locate the Quick Access Cover on the back side of the indicator. Remove the two hex screws to open the cover. Once opened, locate the Calibration switch S1 just inside the opening. Place the switch in the CALIBRATE mode by sliding the switch lever to the left. The indicator will display the first menu item, **"CAL 50"** (Where 50 can be any valid capacity).

To exit the setup mode, simply slide the Calibration switch lever right into to the RUN position. The indicator will return to the normal weighing mode. All menu selections will be saved at that time.

NOTE: No setup information is saved until S1 is returned to the RUN
      position. In the event of a power failure while in the Setup Mode,
      any changes that have been made will be lost.

After all setup changes are finished, return to the RUN mode. Reinstall the access cover. Make sure all the screws are reinstalled in their original locations and the gasket is installed. Tighten the screws as needed.

Stepping through the menu functions:

Once a setup mode has been entered, you may step through the setup menu by pressing and releasing **UNITS**
appear for each item in the setup menu.

The parameter list on the following pages correspond to the parameters available in the calibration menu. Items available in both the configuration menu and the calibration menu will be indicated by a ‡ after the item description. Items available only in the configuration menu are indicated by ‡‡.

Some of the menu items, in the 4300, have settings that control the settings for other parameters. The 4300 will automatically set those parameters or adjust the selection list based on the controlling parameter.

Changing a Parameter:

After finding the desired menu item, the parameters 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 **UNITS** to go to the next menu item.

Reviewing Setup Parameters:

Setup parameters for the 4300 may be reviewed without opening the scale. Remove power and press the ZERO button. Apply power. Hold the button until the scale begins to scroll through the setup parameters. The button may be released anytime after the review has begun.

Legal for Trade Restrictions:

The Legal for Trade modes disable certain setup options and menus. The following pages list and describe the setup parameters and menus. Any Item marked by an asterisk will not be available in the Legal for Trade operating mode.

SETUP MENUS EXPLAINED (in order of occurrence)

Capacity Setup Menu

CAP	Capacity Select Menu Allows the selection of scale capacity.
5	5 pounds
6	6 pounds
10	10 pounds
15	15 pounds [2, 3]
20	20 pounds [3]
25	25 pounds [3]
30	30 pounds [3]
50	**50 pounds**
60	60 pounds
100	100 pounds
150	150 pounds [2, 3]
200	200 pounds [3]
250	250 pounds [3]
300	300 pounds [3, 4]
500	500 pounds [1, 2, 3, 4]
600	600 pounds [1, 2, 3, 4]
1.	1000 pounds [1, 2, 3, 4]
1.5	1500 pounds [1, 2, 3, 4]
2.	2000 pounds [1, 2, 3, 4]
2.5	2500 pounds [1, 2, 3, 4]
3.	3000 pounds [1, 2, 3, 4]
5.	5000 pounds [1, 2, 3, 4]
6.	6000 pounds [1, 2, 3, 4]
10.	10,000 pounds [5]
15.	15,000 pounds [5]
20.	20,000 pounds [5]
25	25,000 pounds [5]
30.	30,000 pounds [5]
50.	50,000 pounds [5]
60.	60,000 pounds [5]
100.	100,000 pounds [5]

1) No lb-oz display for this capacity in standard resolution.
2) No lb-oz display for this capacity in precision resolution.
3) No lb-oz display for this capacity in super precision resolution.
4) No grams display for this capacity.
5) Pound - kilogram display only at this capacity.

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Calibration Menu

CAL	**Zero Calibration Mode.**
0	**Calibration Zero** Press ZERO to perform calibration of the scale zero. Successful calibration is indicated by "donE"

NOTE: The scale will automatically adjust the offset and gain to compensate for dead load and span. When making these adjustments, the scale may ask you to repeat zero calibration immediately after performing a zero calibration or after span a calibration. Successful calibration is indicated by "donE"

CAL	**Span Calibration Mode.** (Does not appear if CAL 0 is not activated.)
FS	**Full load calibration.**
0.5	Half capacity calibration.
0.25	Quater capacity calibration.
0.1	1/10th of capacity calibration.

NOTE: For maximum accuracy, Doran Scales recommends that all scales be calibrated at full capacity. When location or installation make it difficult to bring full capacity weights to the scale, calibration with as little 10% of capacity is possible.

Digital Filter Setup Menu

Avg	Averaging mode Determines the number of samples to average
A0	Stabil-izer © auto averaging. All readings are averaged. Display updates 10 times a second.
A9	Stabil-izer © auto averaging. All readings are averaged. Display updates 9 times a second.
A7	Stabil-izer © auto averaging. All readings are averaged. Display updates 7 times a second.
A6	**Stabil-izer © auto averaging. All readings are averaged. Display updates 6 times a second.**
A5	Stabil-izer © auto averaging. All readings are averaged. Display updates 5 times a second.
A4	Stabil-izer © auto averaging. All readings are averaged. Display updates 4 times a second.
A3	Stabil-izer © auto averaging. All readings are averaged. Display updates 3 times a second.
2	Fixed averaging 2 readings are averaged. Display updates 20 times a second.
4	Fixed averaging 4 readings are averaged. Display updates 10 times a second.
8	Fixed averaging 8 readings are averaged. Display updates 5 times a second.
16	Fixed averaging 16 readings are averaged. Display updates 3 times a second.
32	Fixed averaging 32 readings are averaged. Display updates 1 ½ times a second.

Automatic Zero Tracking Setup Menu

AZt	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.**
3 *	Zero tracking to within 3.0 divisions.

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

Motion Aperture Setup Menu

m.A. *	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.
3	3 division change must be seen to enter motion.
5	5 division change must be seen to enter motion.

Start Up Zero Setup Menu

SU0 *	Start Up Zero Controls the start up zero status.
on	Zeros on the first stable reading on power up.
off	Loads the calibration zero for zero reference

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

Latching Zero Request Setup Menu

Zod	Zero on Demand Enables or disable zero latching.
on	If ZERO is pressed, it is saved until the scale becomes stable.
off	If the scale is in motion, the zero request is discarded.

Latching Print Request Setup Menu

Pod	Print on Demand Enables or disable print latching.
on	If PRINT is pressed, the print request is saved until the scale becomes stable.
off	If the scale is in motion, the print request is discarded.

Printer Data Output Setup Menu [‡]

d.o.	Data Output Mode Determines when serial data will be sent.
t.o.d.	**Transmit on demand. Print when the PRINT button is pressed.**
C.P.	Continuous print. Print when display is updated.
A.P.1	Auto Print 1. Print once only when scale goes stable.
A.P.2	Auto Print 2. Print once only when scale goes stable. Scale must return to zero to before it can print again.

Output Formats [‡]

For.	Data Output Format Defines the appearance of the serial data sent.
F0	**Basic output format. (See the Data Communication section for details)**
F1	Enhanced output includes checkweigh status.
d0	Basic Dual Print format. Includes Kilogram weight.
d1	Enhanced Dual Print format. Includes Kilogram weight and checkweigh status.
SS0	Basic Output for Doran Model SSP printer.
SS1	Enhanced output for Doran Model SSP printers
USr	User defined print string. Print string is entered through RS232 (RS485) port. Print buffer option is required.

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)

Print Buffer Activation Menu ‡

bUF	Buffer Status Enable or disable print buffer. (RS232 commands change when active.)
on	Buffer is on. Printer data is printed to memory. Buffer is dumped with the dump command.
off	**Buffer is off.**

Print Buffer Address Menu 1 ‡

Adr.**	Buffer Address Input Print Buffer / RS485 command address.
X	**ZERO** button scrolls through least significant digit of address**.**

Print Buffer Address Menu 2 ‡

Adr.**	Buffer Address Input Print B uffer / RS485 command address.
XX	**ZERO** button scrolls through most significant digit of address**.**

Serial Data Handshaking Setup Menu ‡

HS***	Serial Data Output Handshaking Selects the type of serial data handshaking used.
oFF	No handshaking is used. Data is sent when ready, receiving device (printer) must be fast enough to keep up with the data.
SF	**Software handshaking. Data is sent when ready. Transmission can be controlled by the receiving device. The software handshaking option activates Bi-directional RS232 communications. Refer to the communications section for details.**
CtS	CTS Handshaking. Data is sent only when CTS is active.

NOTE: Activating the print buffer causes some of the options in the 4300 calibration menu to disappear. These items have been indicated by **.   Other menu items appear when the buffer is activated. These items have been indicated by ***.

Units Conversion Setup Menu ‡

CSL	**Convert Select Modes** **Determines which units selections will be active.**
CA *	**Convert All. lb, kg, g, oz and lb-oz are active.**
Lgo	lb, kg, g and oz are active.
Lh	lb and kg are active.
Lo	lb and oz are active.
go	g and oz are active.

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

Start Up Units Selection Menu ‡

UnIts	**Start Up Units Select Mode** **Configures selection of start up units.**
	Press ZERO to scroll through the units activated in the CSL mode. The selected units will be displayed on the units indicators to the right of the display.

> NOTE: If an invalid start up unit is selected for a given capacity, the
> scale will automatically change the unit setting to a valid unit
> when exiting the setup menu.
> NOTE: Start up units may be set without using the setup menu. While in
> the weighing mode, select the desired start up units. Switch the
> scale into the setup/calibration mode by toggling S1. Switch S1
> back to the RUN mode. The scale will now power up in the
> desired units.

Push-button Function Setup Menu ‡

P.b.	**Push Buttons** **Configures the active push button functions.**
CPt	**UNITS, PRINT, OVER and UNDER enabled**
Pt	PRINT, OVER and UNDER enabled
oUC	UNITS, OVER and UNDER enabled
oU	OVER and UNDER enabled
CP	UNITS and PRINT enabled.
P	PRINT enabled only.
C	UNITS enabled only.
non	UNITS, PRINT, OVER and UNDER disabled.

Remote Push-button Configuration Menu ‡

r.P.b.	**Remote Push Button** **Configures the remote switch to perform one of the three front panel functions.**
off	**The remote switch is disabled.**
P	The remote switch functions as a PRINT button.
C	The remote switch functions as a UNITS button.
0	The remote switch functions as a ZERO button.

Password Protection Activation Menu

P.uu.	**Password** **Enable or disable password protection for limit entry and configuration menu.**
on	Password is on. Password must be entered before data entry is permitted.
off	**Password is off.**

NOTE: Activating password protection causes some of the options in
the 4300 calibration menu to disappear. These items have been
indicated by [†]. Other menu items appear when the buffer is
activated. These items have been indicated by [††].

Checklimit Entry Mode Menu ‡

C.E.	**Checklimit Entry** **Selects the limit entry mode for check limits.**
Pb	Push to enter.
SCr	**Use OVER and UNDER buttons scroll current weigh up or down to desired value.**

Checkweighing Operation Menu ‡

C.o.	**Check Weighing Operation** **Configures the check weighing operating mode.**
5 b	High, over, accept, under and low check weighing.
oUA	**Over, under and accept check weighing.**
off	Check weighing is off.

Legal For Trade Setup Menu

oP	Operating mode Activates the Legal for Trade mode.
Std	**Standard operation**
44	Legal for Trade Handbook 44 compliant.
Can	Legal for Trade Canadian W&M compliant.

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

Scale Resolution Setup Menu

CtS	Counts select
3	Standard precision mode (3000d typ.)
P	**Precision mode (5000d typ.)**
SP	Super precision mode (10,000d typ.)

> NOTE: For maximum accuracy, Doran Scales recommends that all
> scales be calibrated at full capacity. When location or installation
> make it difficult to bring full capacity weights to the scale,
> calibration with as little 10% of capacity is possible.

Password Entry Menu

E.P[†]	Enter new password.
no	**Password entry is not activated when UNITS is pressed.**
YES	When the UNITS button is pressed, the Ent. Cd. prompt appears. Enter the password and press ZERO to accept. Pressing ZERO without pressing any numbers clears the code. The factory default password is ZERO.

Raw Counts Display Mode

Raw Counts	Displays the raw Analog to Digital converter **data.**
	Press ZERO or UNITS to exit Raw Counts. The raw counts utilizes the filter selected in the Avg. set up menu.

Configuration Menu Exit

donE	**Exit Configuration Menu .**
n	**Do not exit menu. Start over at the top of the parameter list.**
Y	Exit Configuration menu. Save all parameter changes. The 4300 will return to normal weighing when UNITS is pressed.

Data Communications

Introduction to data communications:

In the 4300, 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 4300.

The 4300 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 4300 to represent letters, 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 4300, 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 4300 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 4300 is controlled by the data bits, parity and stop bit configuration. The 4300 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 its self before the next data byte is sent. No parity bits are sent.

In many cases, the receiving unit is a slow printer with limited memory. In these cases, more data may be sent than the printer (or computer) can use. Again, data may become lost or scrambled. To prevent this from happening, "Handshaking" is used. When the receiving unit is busy or incapable of receiving further data, it activates the handshaking; telling the sending unit to stop transmission. Then, whenever the receiving unit is ready for more data, it deactivates the handshaking and data transmission continues.

The 4300 offers hardware and software handshaking. Hardware handshaking makes use of the CTS (clear to send) input on the 4300. When this signal is active, the scale is permitted to send data. When the receiving unit is busy, the CTS line is deactivated and the 4300 stops sending data. When the receiving unit is ready for more data, the CTS is reactivated and the 4300 will finish sending the data string it was sending when transmission was interrupted. All readings created while transmission is halted are discarded.

Software handshaking relies on bi-directional communications to send the XON (Ctrl-S) and XOFF (Ctrl-Q) flow control characters. The 4300 has limited bi-directional serial communications to support software handshaking. When a "Ctrl-Q" is received, the transmission of data is halted until a "Ctrl-S" is received. To use this mode, the RTX line of the 4300 is tied to the TXD line of the receiving unit.

RS485

The 4300 offers an RS485 data communications option. RS485 communications are similar to RS232 except that RS485 provides better noise immunity and it will allow multiple scales to be attached to the same serial cable.

RS485 achieves it's performance advantage over RS232 by utilizing a differential input and output. In other words, the RS485 device sends two copies of it's data; one in positive logic and in negative logic. The receiving device looks at the two outputs and takes the difference between them. If the difference is positive the bit is a "1' if it is negative, it is a "0."

The ability of RS485 to have multiple devices attached to the same line complicates the serial communication solution. Because of the multiple device capability, each device must have a unique dedicated address. Also, no device is permitted to talk unless it has been specifically requested to talk by the master serial bus controller.

Since a 4300 with RS485 may not speak unless spoken to, a print buffer is needed to store scale data until it is requested. This buffer is included as part of the RS485 option. When in the RS485 operation mode, all print requests are redirected to the print buffer rather than the printer port. All scale readings accumulate in this buffer until

a buffer print command is received from the serial port. Once the print command is received, the scale takes control of the serial bus and transmits the stored scale readings. When the buffer is empty, the scale releases the bus and becomes a listener again.

To activate the RS485 option in the 4300, the scale must have the optional RS485 bus driver and optional Print Buffer RAM installed. Once these are installed, activate the print buffer from the setup menu and then assign a bus address to the scale.

> NOTE: When installing a 4300 on a RS485 system, it may be necessary to use termination resistors. The 4300 has these termination resistors built in to the main board. Consult your authorized Doran Scales dealer or the factory for more details.

Printer Modes:

The 4300 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, the remote 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 scale leaves motion. 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 following the scale leaving motion. In Auto Print 2, no further readings will be sent until the scale returns to displayed 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 4300 to be useful, the data must be organized so that it is easy to read. To accomplish this, the 4300 arranges the displayed data with additional text to indicate the active units and to indicate the presence of motion during the reading.

"F0" Format: The basic data format sent by the 4300 is illustrated in Fig. 1 through Fig. 3. Each line of data begins with an STX character (start of text) followed by a polarity sign which indicates the reading 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. When motion is present, another space is inserted followed by "MOT." The string is then finished by adding a carriage return and a line feed.
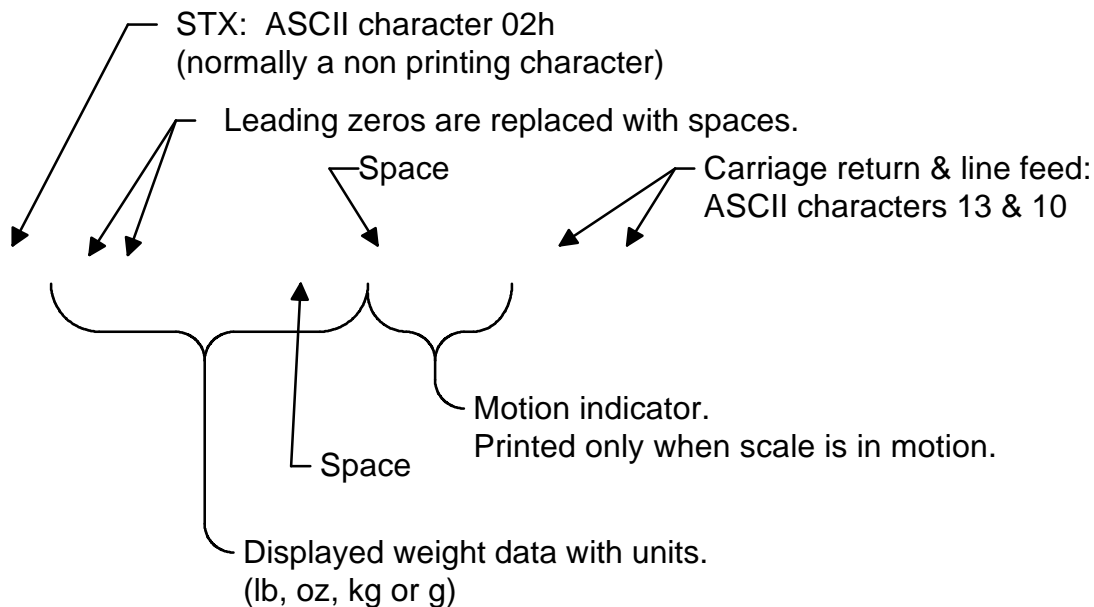
Fig. 1 Format "F0" standard form.
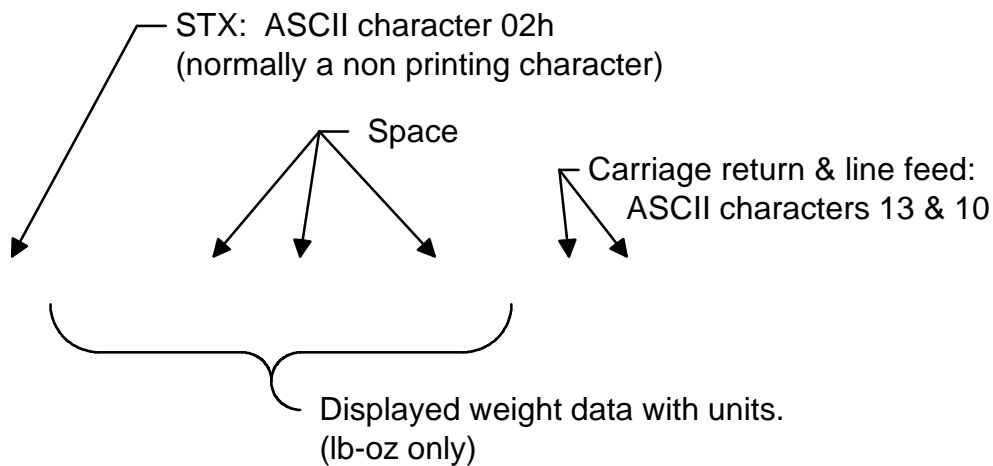
Fig. 2 Format "F0" lb-oz form

In the case of lb-oz data, the pounds value is placed after the polarity sign. A space followed by "lb" and another space follows the pounds data. Ounce data is then sent with a decimal point inserted where needed. Once again a space is inserted after the weight data followed by "oz." Only six digits are sent in the lb-oz mode so the allocation of these digits depend on the ounces resolution. Refer to Fig. 2 for details.

"F1" Format: The F1 format is a more complicated version of the "F0" format. In this format, the OVER, UNDER or accept status is included.

Dual print format: The dual print modes provide the 4300 with the ability to print the current scale reading followed by the equivalent value in Kilograms.

STX: ASCII character 02h
(normally a non printing character)

Displayed weight data with units.
See fig. 1 and fig.2 for structure.

Carriage return & line feed:
ASCII characters 13 & 10

Carriage return & line feed:
Ascii characters 13 & 10

Space

Kilogram weight data in parentheses.

STX: ASCII character 02h
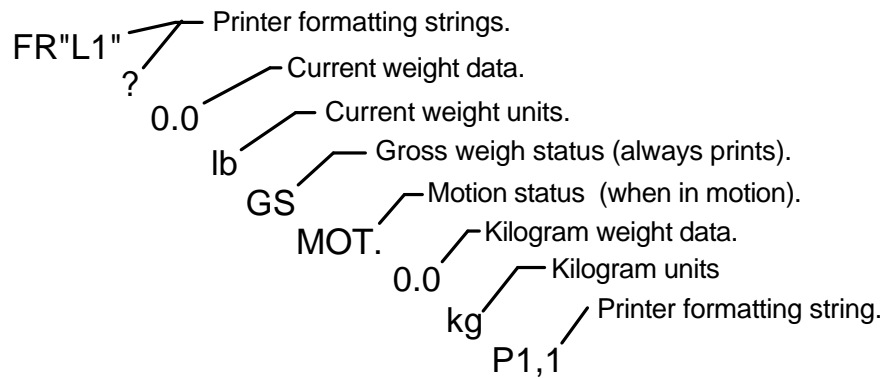(normally a non printing character)
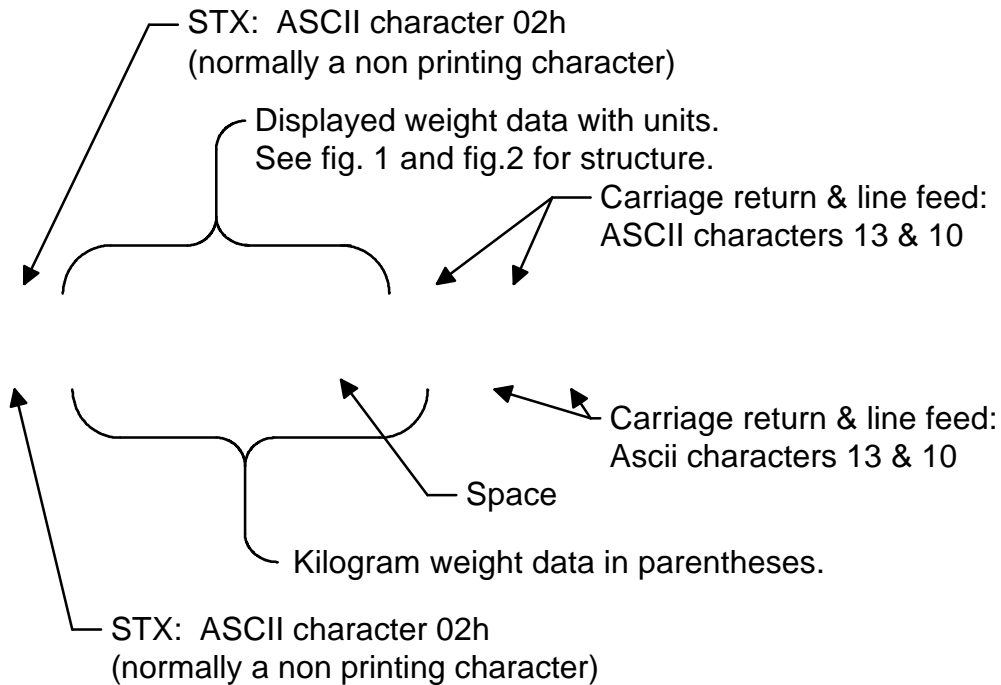
Fig. 3 Format "D0" form.

"D0" Format: In the "DUAL PRINT" format, the weight is first printed using the "F0" format. Then the weight is recalculated in kilograms and is sent as a second line of text. The kilogram data follows the "F0" data format except where parentheses are placed after the STX character and before the carriage return, line feed. Refer to Fig. 3.

"S0" format: The data string produced by the SSP format allows the 4300 to communicate with the Doran Model SSP Label Printer. This printer allows the creation of custom labels containing weight information, bar codes and graphics. Refer to your. Authorized Doran Scales Dealer for more information. As with the F0 and D0 formats, the SSP format has two variations. The first variation contains the information included in the "F1" format while the second is the equivalent of the "D1" format.

User Defined Formats : The 4300 offers the option of custom user defined printer formats. These formats may be downloaded to the scale through the RS232 (RS485) port. To take advantage of this option, it is necessary to install the Static RAM option in your scale. Contact your Authorized Doran Scales dealer or the factory for more details.

FR"L1" — Printer formatting strings.

? — Current weight data.

0.0 — Current weight units.

lb — Gross weigh status (always prints).

GS — Motion status (when in motion).

MOT. — Kilogram weight data.

0.0 — Kilogram units

kg — Printer formatting string.

P1,1

(NOTE: Each line is terminated
with a line feed.)

Fig 4. Sample SS0 Format printer output.

Specifications and Interconnect Data

Specifications:

	Model 4300
Resolution:	10,000d
Sensitivity:	0.5 µV min.
Load Cell Capacity:	0.5 mV/V to 3.5 mV/V
Power Supply:	115/230 Vac 50/60 Hz
Display:	6 digit LED. 0.56" high
Displayed units:	lb, kg, oz and g
Indicator Capacities:	5lb to 100,000 lb
Printer Interface:	Bi-directional RS-232 standard RS485 optional
Calibration	Unit may be calibrated with 10%, 25%, 50% and 100% of capacity.
Controls:	Rugged Polycarbonate touch panel with built in ZERO, PRINT, UNITS, OVER and UNDER switches.
Construction:	Rugged stainless steel NEMA 4/4x construction.
Options:	Dual Print permits weight printing in current units and Kilograms.
	User configurable remote switch.
	Optional print buffer.

Interconnect Data:

PIN #	TITLE
1	Chassis Ground
2	+ Load Cell Signal
3	- Load Cell Signal
4	+ Sense Signal
5	+ Sense Signal
6	+ Load Cell Excitation
7	- Load Cell Excitation
8	Chassis Ground

Table 1: TB1 Load Cell Connections

NOTE: When connecting the load cell, be sure to install the ESD and EMI protection inductor. Refer to Fig. 3 for details.

PIN #	TITLE
1	CTS for Hardware Handshaking RTX for Software Handshaking
2	TXD
3	Remote Switch High
4	Remote Switch Ground
5	RS232 Signal Ground

Table 2: P2 Options Connections

PIN #	TITLE
1	Hot
2	Ground
3	Neutral

Table 3: J1 Power Connections

P3 PIN #	TITLE
1	Zero Switch Ground
2	Zero Switch High
3	Units Switch
4	Print Switch
5	Over Switch
6	Keyboard Scan
7	Under Switch

Table 4: P3 Keyboard Connections

Fig. 1: Connector J2; Remote switch cable assembly

32
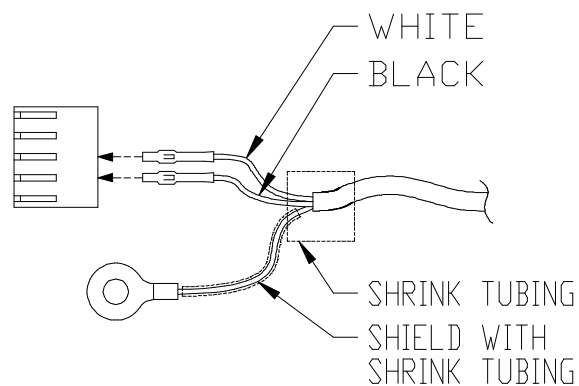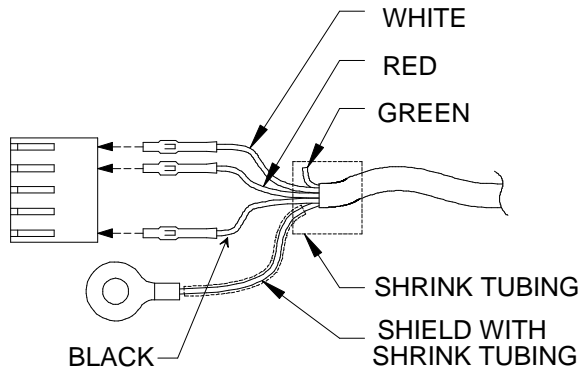
Fig. 2: Connector J2; Serial cable assembl y

Serial Cable Assembly		
DB25 Female connector w/ hardware handshaking		
Function	**Pin**	**Wire Color**
RXD	2	White
Signal Gnd	7	Black
RTS	4	Red Jumper 4 to 5
CTS	5	
DSR	6	Jumper 6 to 8 to 20
DCD	8	
DTR	20	
DB9 Female Connector w/ Hardware Handshaking		
RXD	3	White
Signal Gnd	5	Black
DCD	1	Jumper 1 to 4 to 6
DTR	4	
DSR	6	
RTS	7	RED Jumper 7 to 8
CTS	8	

Table 5: Serial Cable assembly with Hardware Handshaking

Serial Cable Assembly		
DB25 Female connector w/ Software Handshaking		
Function	**Pin**	**Wire Color**
TXD	3	Red
RXD	2	White
Signal Gnd	7	Black
RTS	4	Jumper 4 to 5
CTS	5	
DSR	6	Jumper 6 to 8 to 20
DCD	8	
DTR	20	
DB9 Female Connector w/ Software Handshaking		
TXD	2	Red
RXD	3	White
Signal Gnd	5	Black
DCD	1	Jumper 1 to 4 to 6
DTR	4	
DSR	6	
RTS	7	Jumper 7 to 8
CTS	8	

Table 6: Serial Cable assembly with Software Handshaking

Load Cell Cable

Power Cord

Install Serial Data Cable
here. Ground cable and
shield with bead as shown
for the Load Cell Cable
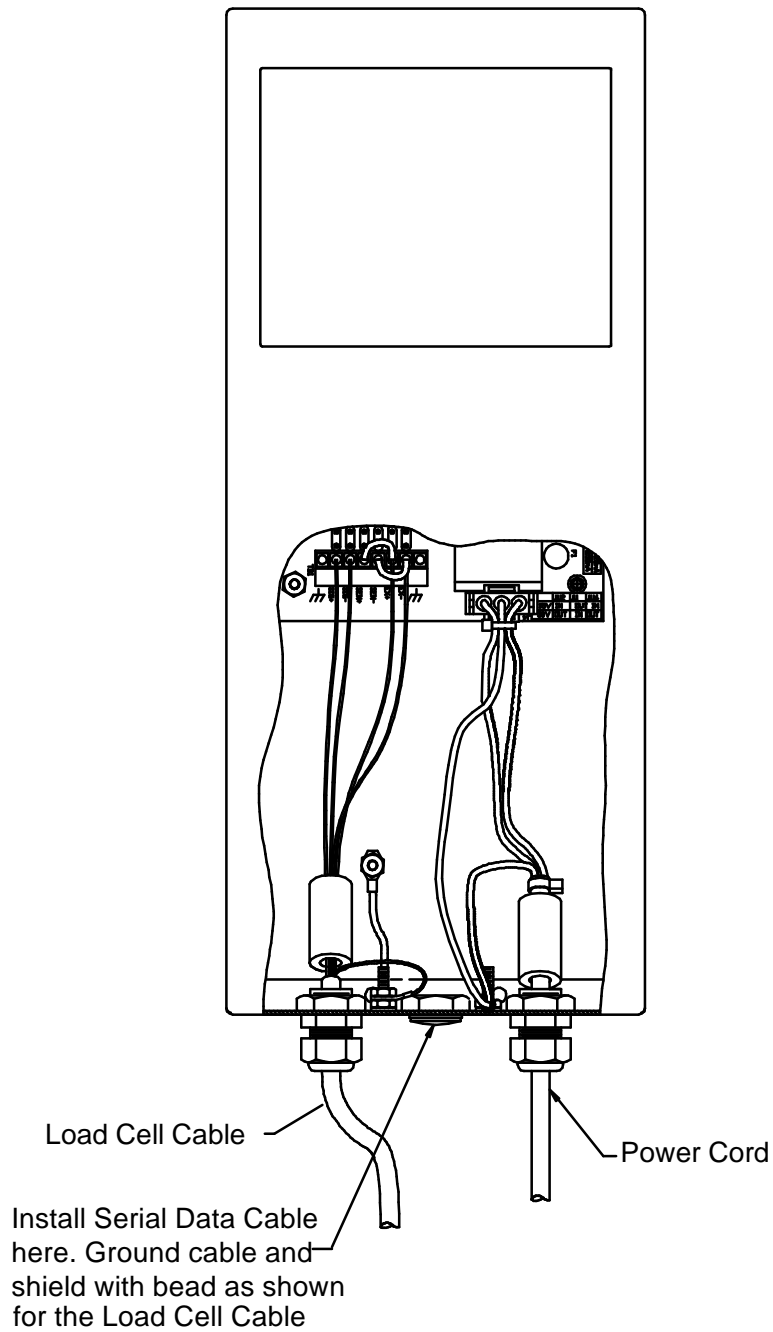
Fig. 3: Installation of EMI / RFI / ESD protection devices.

NOTE: Fig. 3 illustrates a 4300 connected with a 4 wire load cell.
When installing a 4-wire cell, Sense + should be jumpered to
Excitation + and Sense- should be jumpered to Excitation-.

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 that there is nothing caught in the platform under or around the load cell or spider interfering with its movement.
Scale overloads early.		Make sure all four overload stops are properly set. Take the platter off the platform, invert it and place it back on the spider. With 1/2 of the scale's capacity in test weights concentrated over a corner of the platform, there should be approximately 1/32" of clearance between the stop and the bottom of the spider. Check all four corners then recalibrate the scale. If the problem persists, it is possible that the scale is being shock-loaded causing the load cell to be shifted. Review the cautions in section 1.
Scale will not indicate full capacity or go into overload.		Make sure that there is nothing caught in the platform under or around the load cell or spider which would interfere with their movement. If not, check the overload stops using the above procedure.
Scale will not come to zero when the ZERO button is pressed.		Make sure that the scale is stable ("MOT" annunciator is off) when ZERO is pressed. If excessive motion is a problem, then it may be necessary to activate the latching print feature (POd) or lengthen the filter time (Av A1). If the scale is stable, the scale may be set to the Canadian Legal for Trade (4% zero bandwidth). An attempt is being made to zero more than 4% of capacity (see Section 4). There may be a problem with the touch-panel or main board,

Weight readings don't seem to be correct.		Check the scale's accuracy with a test weight. Recalibrate if necessary.
Scale drifts off of 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 Section 4).
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 Section 4).

If you are still experiencing a problem with your 4300, or if the problem you are having is not covered in the above list, please contact your Doran Scales authorized dealer.

Resetting the scale parameters:
- If at some point the Model 4300, user wishes to return the setup parameters to factory default, follow these steps.
- Remove power.
- Place scale in the calibration mode and hold the ZERO push button while power is restored.
- The indicator will display "InIt" until the ZERO button is released. After ZERO is released, the scale will perform its normal power up routine and then enter the Calibration mode. At this time, all the parameters will have been reset to their factory default settings. See Section 4 for details on setting up the individual scale parameters.
- Return the switch to the normal weighing position. The scale will save the revised parameters and will enter the normal weighing mode.

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.
"Ent Cd" Enter Passwore Code		The scale is waiting for the password to be entered before proceeding.

Error messages:

Error Message		What to Do or Check:
"ovr-Ld" Scale overload		The scale is in overload. The load on the scale platform exceeds the scale capacity by more than 103%. Remove excess weight from scale platform.
"grs-oL" Gross overload		The scale is in gross overload. The load exceeds the scale ratings and might result in damage to the scale. Remove excess weight immediately. Ignore this message for the first five seconds after power up.
"SU 0 E" Startup zero error		The scale was not stable. <u>This error will only occur in Legal for Trade applications.</u> The scale will zero once it becomes stable.
"Err EP" EEPROM error		The setup parameters loaded in nonvolatile memory have become corrupted. The scale requires reinitialization by a qualified scale technician.
"Err cAL" Calibration error		The calibration values loaded in nonvolatile memory have become corrupted. The scale requires recalibration by a qualified scale technician.
"Err EP" EEPROM error		The check limit valuesstored in nonvollatile memory has become corrupted. Reload limit values for checkweighing..
"Err 1" Program ROM error		The program memory in the scale has become corrupted. Have scale serviced by a qualified scale repair technician.
"Err 2" Buffer memory error.		The memory used for the print buffer has failed self check. Have scale serviced by a qualified scale repair technician.
"Ldg 0" Loading zero.		The the scale is attempting to load power up zero. This message will remain until scale is stable.