DS5250

Eye Level Digital Physician Scale

Technical Manual

doran®

Section 1. Unpacking and Care

Thank you for purchasing a Doran scale. This product has been designed with the highest level of technology. We are dedicated to delivering a superior product that will provide many years of trouble free service.

As an ISO9001 registered company, Doran Scales is dedicated to delivering products built with strict compliance to our high quality standards. If you have any questions regarding your scale, please contact Doran Scales, Inc.

Unpacking
> Carefully remove the scale from the shipping carton. If you notice any shipping damage, notify the shipper immediately. Be sure to retain all shipping materials in case the scale must be shipped elsewhere.

Cautions and Warnings
> Normal care should be taken when handling and using this product. Improper handling or abuse can damage the scale and result in costly repairs that may not be covered by the warranty. Please observe the following precautions to ensure years of trouble free service from your new scale.
> - Do not use sharp objects to press any of the buttons.
> - Do not pick up the scale by the indicator or cables.
> - Do not use the scale if it is damaged in any way.
> - Do not leave patients unattended on the scale.
> - Do not exceed the scale capacity.
> - Do not drop the scale.
> - Do not drop objects on the scale.
> - When transporting, do not hit other objects, walls or doorframes with the scale.

Care & Cleaning
> With reasonable care, this product will last for many years. Here are some tips to care for your scale. Failure to comply with these guidelines may void the warranty.
> - This scale will withstand typical cleaning methods and chemicals that are used in healthcare environments. This includes but not limited to cleaners that contain sodium hypochlorite (bleach), hydrogen peroxide and alcohol.
> - Do not get water inside the indicator or platform.
> - Do not immerse in water or any liquid.
> - Do not use strong solvents or abrasive cleaners as this can damage the touch panel or other plastic parts.

Preventive Maintenance
> - Examine the scale periodically for damage and wear and tear before use.
> - If the scale is damaged, check calibration of the scale and safety before use.
> - Check calibration annually and calibrate if necessary.
> - Remove batteries during long periods of non-use.

Section 2. Scale Assembly

Remove the base and indicator column from the packaging and set aside. Locate the three tower mounting screws and have them available along with a Phillips #2 head screwdriver.

A connector at the base of the column is secured with a yellow tab. **DO NOT remove this tab** until the connector has been secured to the base connector. Push into place until you hear a click when completely inserted. Only after fully connected, remove the yellow tab from connector at the bottom of the column and discard. Keep the column and platform nearby and slide the column into place. Be sure that the connector and cable retracted into the column while sliding into place.
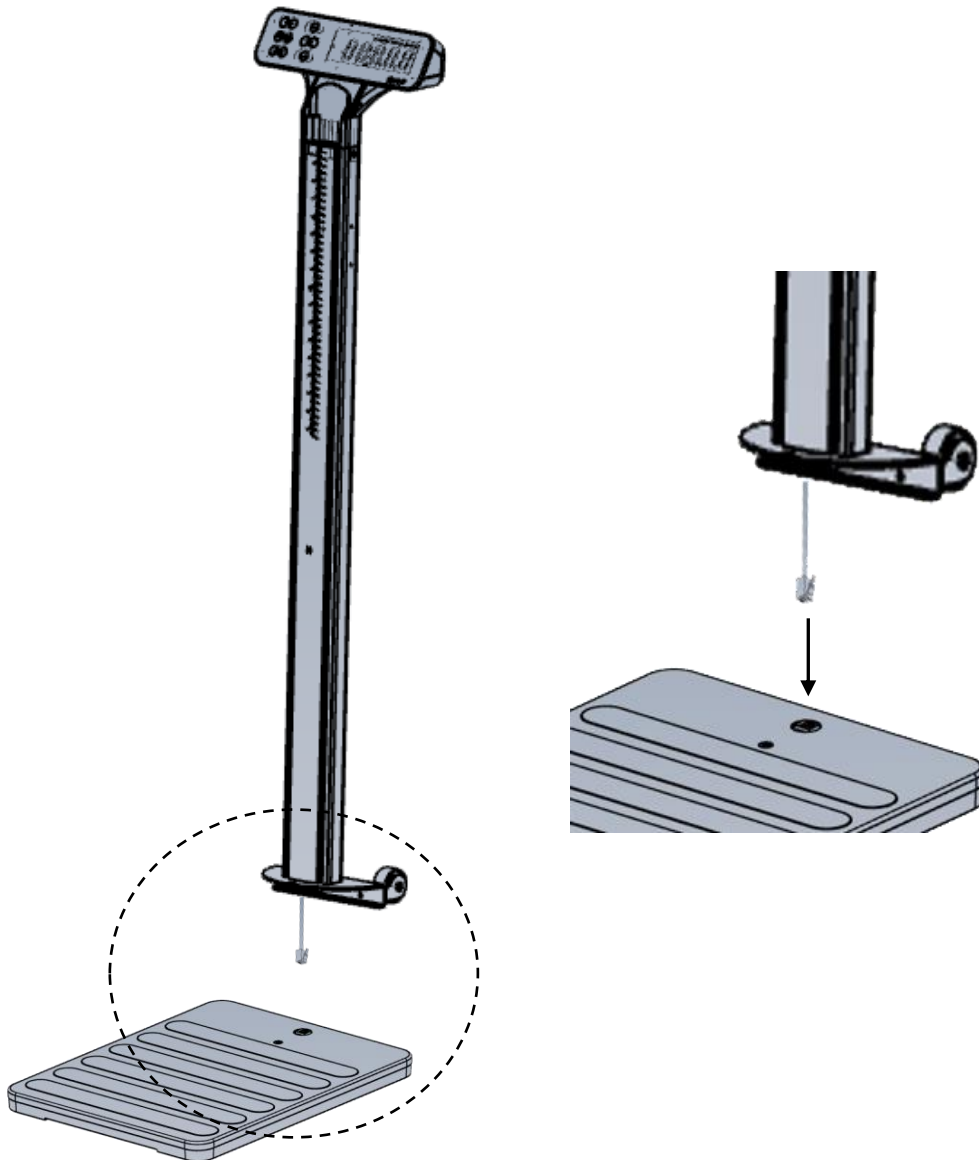
Insert and lightly hand tighten all three screws – two at the rear base of the column between the wheels and one at the front base of the column. Once all three screws are installed, first firmly tighten the two screws at the rear of the column. Finally, tighten the final screw at the front of the column. Before tightening the final screw, if there is a bulge in the rubber mat gently push it towards the rear of the scale to eliminate and then fully tighten the last screw.

During shipping, the scale is placed in a transport mode to inhibit the scale from turning on during transit. Once fully assembled, press and hold the ZERO button for 5 seconds. After pressing ZERO, the scale will beep several times and then display HELLO followed by 0.0. Until you perform this procedure the scale will be disabled.
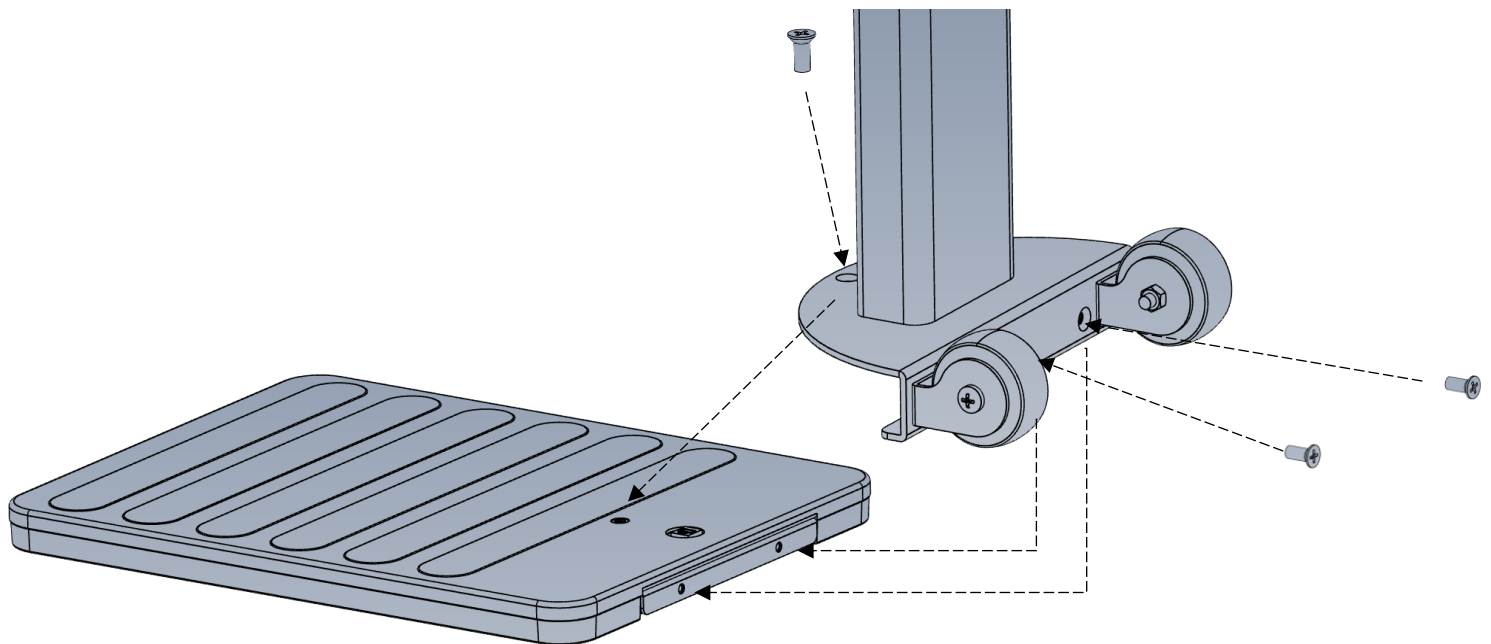
Section 3. Battery Operation

Battery Transport Mode

During shipping, the scale is placed in a transport mode to inhibit the scale from turning on during transit. Once fully assembled, press and hold the ZERO button for 5 seconds. After pressing ZERO, the scale will beep several times and then display HELLO followed by 0.0. Until you perform this procedure the scale will be disabled.

The DS5250 physician scale has an internal rechargeable LiFePO4 battery that offers over 5500 weighments between charges. When the scale arrives from the factory the battery is 50% charged and can be fully charged at this time.

Charging Battery

To charge the DS5250, use the included USB A to USB C charging cable. Use any readily available USB wall mount adapter that produces 5V and 1A or higher. Any typical cell phone charger will fully charge the scale in 9 hours when the battery is low. An adapter can be purchased from Doran Scales if desired. The red/green battery indicator will show the current state of the battery charge.

During charging, the RED indicator at the center of the display will be on while the battery is charging.

When charging is complete, a GREEN indicator at the center of the screen will be displayed. The battery is now fully charged and will operate for over 5500 weighments.

Battery Low Indication

The lowbatt annunciator above the weight display will flash when the battery is running low and can be charged at your convenience.

The scale must be charged when the lowbatt annunciator and LbAtt flashes on the display. The scale will operate while charging.

Section 4. Scale Operation

ZERO   ∧

REWEIGH   BMI

UNITS   ∨

lowbatt hold lb kg cm in

Front Panel

RESET

USB
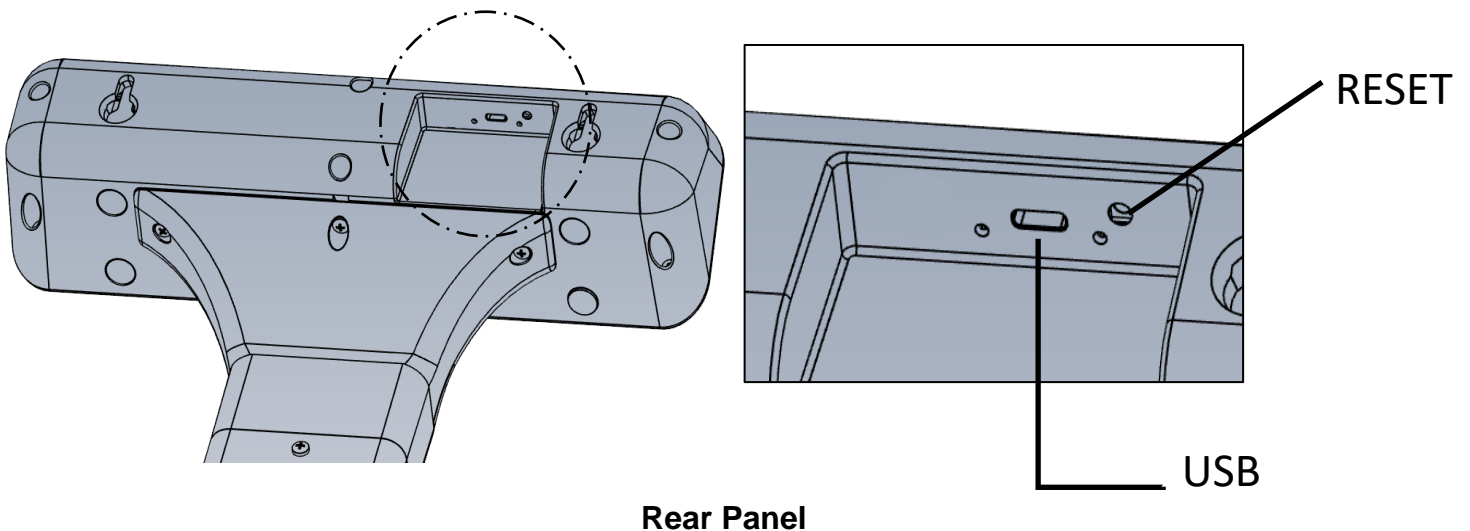
Rear Panel

Display Pushbuttons

The Model DS5250 controls consist of UNITS, ZERO, REWEIGH, ▲, ▼, and BMI. The display is used to provide weight indications and operator messages indicating scale operation.

Display Annunciators

The display annunciators lowbatt, hold, lb, kg, cm, in, and ft will indicate the scale status.

Power On/Off

When the patient stands on the scale, it will automatically turn on and provide the patient's weight once a stable weight is achieved. The scale will maintain an accurate zero between patient weighments.

Alternatively, press ZERO to turn on the indicator. The display will turn on and display 0 weight. The indicator has an adjustable Automatic Shutoff Timer that will turn off the indicator when not in use.

NOTE: If the scale does not turn on when a patient steps onto the scale or by pressing the ZERO button, the scale is still in battery transport mode. See Battery Operation for instructions as to how to turn this mode off.

Zero

When the ZERO button is pressed, the scale will reset to zero weight. This feature can be used to zero out any weight not desired to be part of the patient weight. Pressing ZERO while in BMI mode will return to the current held weight.

Units

Press the UNITS button to toggle between lb and kg weighing units. The current unit will be displayed above weight digits.

NOTE: Both kg and lb are enabled by default. The Units Lock feature can disable any unit in parameter setup.

Reweigh

To reinitiate the weighing process, press REWEIGH. This will allow a new measurement to be taken without the patient having to leave the platform.

BMI

Enables height entry for BMI calculation.

Reset Button (Rear of scale)

Press the reset button in case the scale needs to be reset. This will reset the scale internally and will not change any parameter settings or affect calibration.

Software Revision

To find the scales software revision, you can enter the parameter menu and scroll to $\mathcal{E}u$ setting or press the reset button located on the indicators rear panel.

Weighing a Patient
1. Patient stands on the platform
2. The indicator will display dashes, "‐‐‐‐‐" until the patient's weight is captured.
3. The patient's weight is then displayed and beep (if enabled).
4. The weight will be held on the display until the scale turns off.

NOTE: If the patient is not stable the scale will show $Ernn$ and then turn off. If you have unstable patients on a regular basis Ao and AA parameters can be adjusted to assist capturing weights for unstable patients.

Mother Baby Operation
1. Once the patient's weight is captured press ZERO.
2. The scale will display a zero weight.
3. Safely transfer the infant to the patient.
4. The scale will display the infant's weight and beep (if enabled).
5. When the patient steps off the scale with the infant, the infant's weight will be held.

BMI Operation
1. With the held weight displayed, press the BMI button to enter the height value. Height entry starts at $5{:}06.0$ inches or 168 cm. Pressing UNITS will change the measurement unit. If enabled, the Units Lock feature will inhibit the corresponding measurement unit (i.e. when kg is disabled, cm will also be disabled).

2. Press the ▲ button to increase or the ▼ button to decrease the value. When the correct value is displayed, press the BMI button to enter the value and the BMI value will be displayed and held.

Reweigh Operation
1. With the patient standing on the scale platform, press REWEIGH to reinitiate the weighing process.
2. The indicator will display dashes, "‐‐‐‐‐" until the patient's weight is captured.
3. The patient's weight is then displayed and beep (if enabled).
4. The weight will be held on the display until the scale turns off.

Height Measurement

When moving the height rod arm, lift the arm upwards. **Grasp the arm at the point closest to the hinge of the height rod arm.** Improper use of the height rod arm may void the warranty.

Do not lift from here

Lift from here
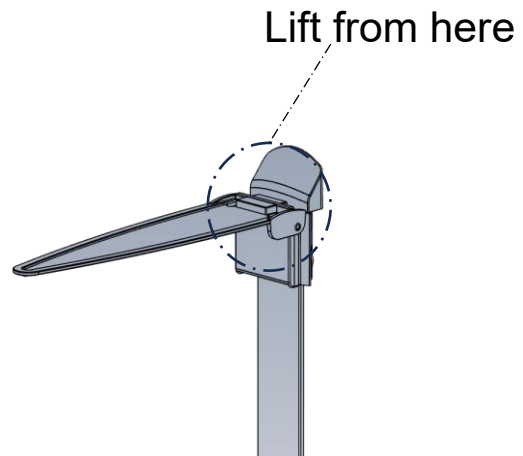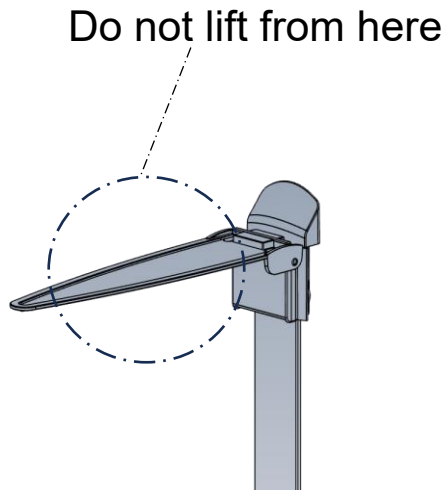
Height Measurement When Lowering and Raising Measurement Arm
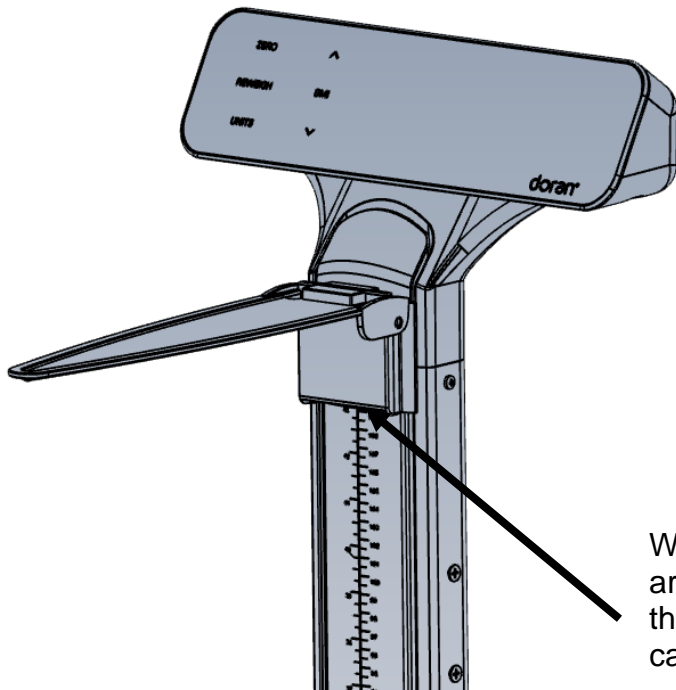
When lowering the measurement arm, patient height is measured at the bottom of the plastic arm carrier.
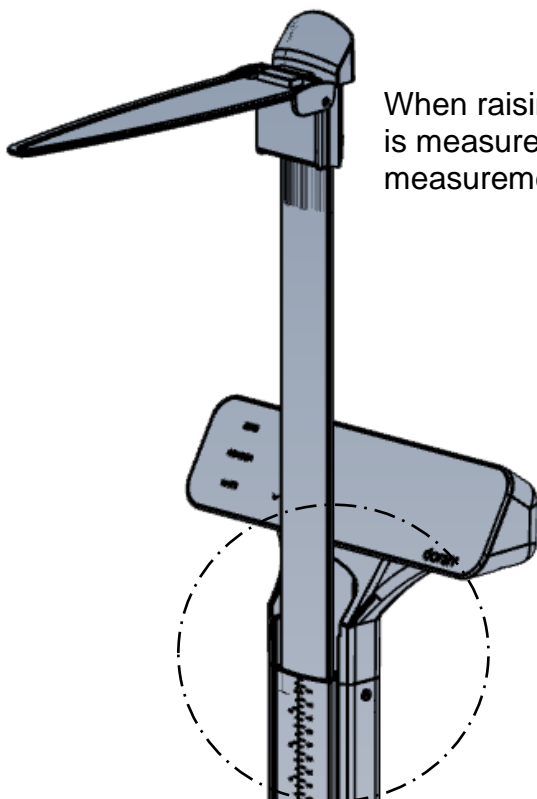
When raising the measurement arm, patient height is measured at the intersection of the two measurement scales.
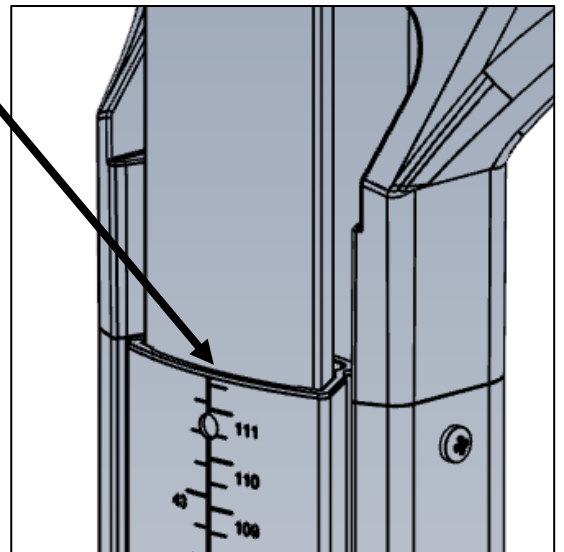
Section 5. Scale Calibration

Entering and Exiting Setup Mode

To enter setup mode from the front panel
1. Press ZERO to turn the scale on.
2. Press and hold ZERO and UNITS simultaneously for 5 seconds until the display reads *PrSEt*.
3. Press REWEIGH 3 times and the display will read *CAL n*.

If calibration needs to be aborted when in process, press REWEIGH to exit and not save changes. Once calibration is completed, the scale will automatically display *SAVEd* return to normal weighing operation to verify calibration.

Two calibration procedures are offered.
- The Two Point calibration will calibrate the scale using only one weight that can be user defined. This calibration procedure is effective and can be used in the field with a test weight, or by using your own body weight.
- The Multiple Point calibration procedure requires four separate test weights. This procedure offers the greatest accuracy and is intended for factory or field calibration by a scale technician.

Two Point Calibration Procedure
1. When the setup mode is entered the display reads *CAL n*.
2. Press the ▲ button to change the display to *CAL Y*.
3. Press BMI.
4. The display will now show *CAL 0*. If necessary, press UNITS to calibrate in kilograms.
5. Remove all weight from the scale platform.
   NOTE: During calibration be sure vibration and air currents are not present. Calibrated test weights result in the most accurate scaling.
6. Press BMI to perform a zero point calibration. The display will count down to zero. The counter will reset if too much motion (*Er nn*) is detected.
7. The scale will display *500.0* (*226.8* kg). Representing a 500 lb (226.8kg) span point calibration.
8. If desired, change the calibration weight by using the up or down arrow button to scroll the weight value.
   NOTE: If not calibrating with full capacity, the recommended minimum span weight is 200 lb (100 kg).
9. After the span weight has been entered, place the calibration weight on the platform.
10. Press BMI to accept the span weight value. The display will count down to zero.
11. The display reads *SAVEd* and exits to the weigh mode. Verify calibration accuracy with your test weights.

Multiple Point Calibration Procedure

1. *When the setup mode is entered the display reads* CAL n.
2. Press BMI to navigate to CAL nn
3. Press the ▲arrow button to change the display to CAL Y.
4. Press BMI.
5. The display reads CAL 0. If necessary, press UNITS to calibrate in kilograms.
6. Remove all weight from the scale platform.
   NOTE: During calibration be sure vibration and air currents are not present.
   Always use calibrated test weights.
7. Press BMI to perform a zero point calibration. The display will count down to zero. The counter will reset if too much motion (Er nn) is detected.
8. The scale will display 100 lb (50 kg)
9. Place 100 lb (50 kg) onto the scale.
10. Press BMI. The display will count down to zero.
11. The scale will display 200 lb (100 kg)
12. Place 200 lb (100 kg) onto the scale.
13. Press BMI. The display will count down to zero.
14. The scale will display 300 lb (150 kg)
15. Place 300 lb (150 kg) onto the scale.
16. Press BMI. The display will count down to zero.
17. The scale will display 400 lb (200 kg)
18. Place 400 lb (200 kg) onto the scale.
19. Press BMI. The display will count down to zero.
20. The scale will display 500 lb (250 kg)
21. Place 500 lb (250 kg) onto the scale.
22. Press BMI. The display will count down to zero.
23. The display reads SAVEd and exits to the weigh mode. Verify calibration accuracy with your test weights.

Calibration Troubleshooting

If Ɡrᴜᴸ or Ɡrᴏᴸ appears on the display, the calibration zero is out of range. Check connections between the indicator and base. Press BMI to perform the zero calibration again. If this error persists, consult the raw counts table.

If ᴇrᴿ appears on the display, the span calibration is out of range. Place the proper weight on the platform and press BMI to perform the span calibration again. If this error persists, consult the raw counts table.

If ᴇrᴨꞬ appears on the display, the span calibration has detected a negative range. If this error persists, consult the raw counts table.

The following table shows the acceptable Raw Counts for no load and full load. Raw Counts can be viewed through the last setup parameter. Refer to Parameter Setup, for more information regarding parameter viewing.

If ᴇrᴨᴨ appears on the display, there is excessive motion on the scale platform.

If the scale's raw counts are not within the ranges specified in the following table, contact Doran's Technical Assistance department at tech@doranscales.com.

Calibration Requirements in Raw Counts		
	Minimum	Maximum
Zero Calibration Point	15000	45000
Required Calibration Span Two Point (100% of Capacity Scale Cal Point – Zero Cal Point)	Zero Calibration Point Counts + 42000	Zero Calibration Point Counts + 180000
Required Calibration Span Two Point (5% of Capacity Cal Point – Zero Cal Point)	KG: Zero Calibration Point Counts + (140 x span calibration kg weight) LB: Zero Calibration Point Counts + (70 x span calibration lb weight)	KG: Zero Calibration Point Counts + (450 x span calibration kg weight) LB: Zero Calibration Point Counts + (300 x span calibration kg weight)
Required Calibration Span Multipoint (each calibration point min and max span counts)	4000	20000

Section 6. Parameter Setup

The indicator has many adjustable parameters which control the scale's operation. The parameter settings shown in bold are the default settings.

Entering and Exiting Setup Mode

> To enter setup mode from the front panel
> 1. Press ZERO to turn on the scale.
> 2. Press and hold ZERO and UNITS simultaneously for 5 seconds until the display reads `PrSEt`.
> 3. Quickly press REWEIGH 3 times and the display will read `CAL n`.

> To exit the setup mode and save changes, press REWEIGH or BMI to scroll to the end of parameter menu. The display will read `SAVEd` to confirm changes are saved. If no settings were changed, `SAVEd` will not be displayed.

> To exit the setup mode and abort all changes, wait 120 seconds after any key press and the scale will exit setup mode and not save any changes.

Setup Mode Navigation

> 1. Press BMI to scroll forward to the next parameter.
> 2. Press ▲ or ▼ buttons to change the current parameter setting.
> 3. Press Reweigh to save any changes and exit setup mode.

Calibration Mode Entry

`CAL`	**Enter Single point Calibration**
n	Do not enter calibration
y	Enter Calibration (see Scale Calibration section)

`CALnn`	**Enter Multi Point Calibration**
n	Do not enter calibration
y	Enter Calibration (see Scale Calibration section)

Reset All Parameters to Default Settings

`rSt`	**Default parameters**
n	No. Parameters are not defaulted.
y	Yes. Set all parameters to the factory default values when BMI is pressed. Calibration data is preserved.

Automatic Shutoff Timer

Ao	**Automatic shutoff timer. The timer controls the period of time the scale stays on after non-use. Extending timeout will reduce battery life.**
10	**10 seconds (Default)**
30	30 Seconds
60	1 minute
120	2 minutes
300	5 minutes
600	10 minutes
900	15 minutes
oF	Automatic shutoff timer disabled. Recommended to plug scale in continuously.

Average Aperture

AA	Determines the amount of motion allowed to hold a stable weight. A slower setting will result in more accurate weights but will require a longer time to achieve a stable weight. A faster setting will achieve a stable weight faster but may be less accurate.
4	Fastest Setting
8	Default Setting
16	Slowest Setting

Data Output

d.o.	**Controls when information is transmitted from the scale though the RS232 serial port and or USB port.**
t.d	EMR is transmitted when a request command is received through the RS-232 or USB port.
A.S	**Transmits an EMR string after the STABLE HOLD or AVERAGE HOLD weight is displayed. (default)**
A.b	Transmits an EMR string after the Height has been entered
C.P	Continuously transmits an EMR string 3.75 times a second.

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EMR Format

For.	Format Protocol of transmitted and received data from the serial port
F1	**Doran data format. F1 (9600, 8N1)**
IU	IQvitals format. (9600, 7O2)
UU	Welch Allyn Spot format. (2400, 7E1)
F0	Doran data format. F0 (9600, 8N1)

LB Units Enable / Disable

	lb units Enable/Disable
On	**lb weighing units active (default)**
oF	lb weighing units disabled

KG Units Enable / Disable

	kg units Enable/Disable
On	**kg weighing units active (default)**
oF	kg weighing units disabled

Inches Units Enable / Disable

	Inches Height units Enable/Disable
0.1	0.1" increment for BMI entry
0.5	**0.5" increment for BMI entry (default)**
1.0	1.0" increment for BMI entry
oF	inches height units disabled

Centimeters Units Enable / Disable

	Centimeters Height units Enable/Disable
0.1	0.1 cm increment for BMI entry
0.5	0.5 cm increment for BMI entry
1.0	**1.0 cm increment for BMI entry (default)**
oF	cm height units disabled

Button Press Beep

bb	Enables/Disables indicator beep when buttons are pressed
Y	**Beep enabled (default)**
n	Beep disabled

Weight Hold Weight Beep

bH	Enables/Disables beep when a stable or average hold weight is achieved
n	Beep disabled.
y	**Beep enabled. (default)**

Battery Voltage Level

dC	Displays current battery voltage (V DC)
	Green Light on when charging: > 3.35 V Full Battery: 3.35 V 50% Battery: 3.15 V Low Battery: 3.05 V Charge Battery: < 2.80 V

Raw Counts

xxxxx	Raw counts from A/D converter
	View these numbers if calibration is unsuccessful. Refer to Calibration Troubleshooting for interpretation of these numbers.

Software Revision

Eu	Displays Software revision

Battery Transport Mode

	Disables Scale When in Transport
On	**Normal Power Mode**
oF	Enter Power Control Mode – when in weighing mode, press and hold ZERO for 5 seconds to exit this mode. This mode is to be enabled when shipping the scale.

Section 7. Data Communications

USB Communications Port Option

The indicator is equipped with a USB C communications and charging port. The USB C connection is located on the back of the indicator. Connect the EMR Communication Module to the scale by plugging into the scale's USB C port.

Double sided foam tape is provided to adhere the module to a convenient location. It is recommended to adhere the module to the rear and top of the column if available. If a remote indicator, mount to the rear or bottom of the indicator. Be sure that the cable connection is not tight which could pull the USB C connector from the rear of the indicator.

EMR Communication Option Module
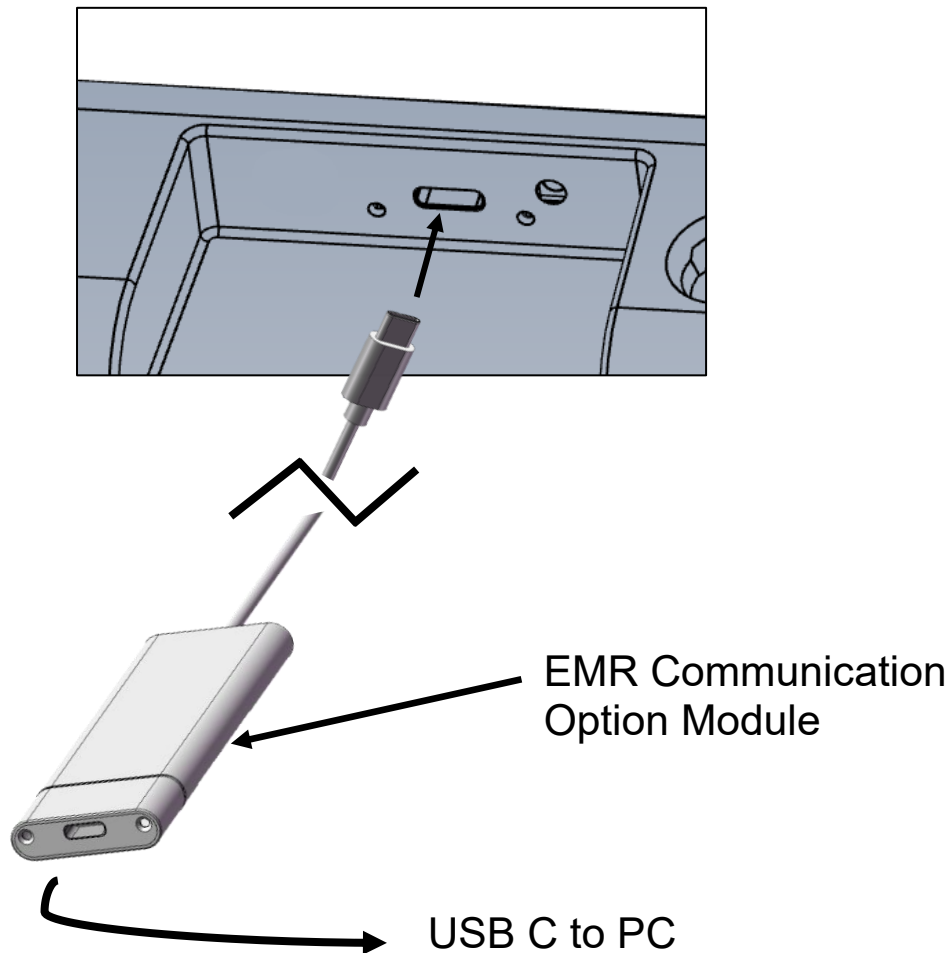
USB C to PC

Use the USB C to USB A cable provided with the scale to connect to the PC. If customer supplied cables and or converters are used be sure these support data transmission.

Once plugged into the PC, the scale will charge from the PC USB power supply so the scale will display the corresponding charging light when connected to the PC.

This device requires Windows 10 or higher. The USB driver may need to be installed to support this module. Open Device Manager and expand Ports (COM & LPT) then plug the USB A connector into the PC. If the driver has been installed, USB-SERIAL CH341A (COMX) will appear once plugged in.

If you do not see the device in the Ports (COM & LPT) after connecting to the PC, you will need to install it. Download the driver it from www.doranscales.com/USB. Run the downloaded CH341SER.exe to launch the installer. Open Device Manager and expand Ports (COM & LPT) then plug the USB A connector into the PC. If the driver has been successfully installed, USB-SERIAL CH341A (COMX) will appear once the USB cable is plugged in.

If you are not sure that the driver was installed properly, search the C drive for oem129.inf. If installed, this file will be present in the C:\Windows\INF directory.

Doran F1 protocol (F1)

(9600, 8N1)

Command (RXD) Computer to Scale	Scale Output Responds (TXD) Scale to Computer	Description
Z or z		Zero the scale (if in motion, scale will wait until stable, then zero)
<cr> or W	<stx><pol><weight>#<uu>#GRS#<height>#<hh>#<bmi>#BMI<cr><lf>	<stx> (☻) = ASCII 02h, Start of Text <pol> = 1 character "-" =negative, " "=ASCII 20h <weight> = 6 character field and decimal point <uu> = 2 character field "lb" or "kg" <height> = 5 character field and decimal point <hh> = 2 characters Height Unit "in" or "cm" <bmi> = BMI value 3 character field and decimal point <cr> (♪) = ASCII 0dh, Carriage Return <lf> (◉) = ASCII 0ah, Linefeed
U		Scale scrolls through available weight units.
R or r		Scale performs a Reweigh operation (same as pressing the Reweigh button)

Doran F0 protocol (F0)

(9600, 8N1)

Command (RXD) Computer to Scale	Scale Output Responds (TXD) Scale to Computer	Description
Z or z		Zero the scale (if in motion, scale will wait until stable, then zero)
<cr> or W	<stx><weight><sp><uu><sp><cr><lf>	<stx> (☻) = ASCII 02h, Start of Text <weight> = 6 character field and decimal point <sp> ( ) = ASCII 20h, Space <uu> = 2 character field "lb" or "kg" <cr> (♪) = ASCII 0dh, Carriage Return <lf> (◉) = ASCII 0ah, Linefeed
U		Scale scrolls through available weight units
H	<height><sp><hh><sp>GR<sp><cr><lf>	Current Height value in inches or centimeters <height> = 5 character field and decimal point <sp> ( ) = ASCII 20h, Space <hh> = 2 characters Height Unit "in" or "cm" <cr> (♪) = ASCII 0dh, Carriage Return <lf> (◉) = ASCII 0ah, Linefeed
R or r		Scale performs a Reweigh operation

IQ Vitals protocol (🔲)
Fairbanks TeleWeigh (9600, 7O2)

Command (RXD) Computer to Scale	Scale Output Responds (TXD) Scale to Computer	Description
Z or z		Zero the scale (if in motion, scale will wait until stable, then zero)
<cr> or W	<weight><sp><uu><sp><mot><sp><sp><cr><lf><eot>	<weight> = 6 character field with decimal point <sp> ( ) = ASCII 20h, Space <uu> = 2 character field "lb" or "kg" <mot> = 2 character field "GR" = stable, "gr" = motion <cr> (♪) = ASCII 0dh, Carriage Return <lf> (◉) = ASCII 0ah, Linefeed <eot> (♦) = ASCII 04h, End of Transmit
U		Scale scrolls through available weight units.
H	<height><sp><hh><sp>GR<sp><sp><cr><lf>	<height> = 5 character field and decimal point <hh> = 2 characters Height Unit "in" or "cm"
R or r		Scale performs a Reweigh operation

Welch Allyn Spot protocol (🔲)
(2400, 7E1)

Command (RXD) Computer to Scale	Scale Output Responds (TXD) Scale to Computer	Description
DR<cr><lf>	<mot><sp><sp><weight><uu><cr><lf>	<mot> "SD"=stable, "S_" = motion <sp> ( ) = ASCII 20h, Space <weight> = 6 character field with decimal point <uu> = 2 character field "lb" or "kg" <cr> (♪) = ASCII 0dh, Carriage Return <lf> (◉) = ASCII 0ah, Linefeed

Section 8. Specifications

Scale Platform Dimensions	14.0" W x 20.5" D x 1.35" H
Overall Dimensions	14.0" W x 20.5" D x 49.75" H Dimensions with Optional Arms 23.8" W x 20.5" D x 49.75" H
Power	Internal rechargeable LiFePO4 battery USB A to USB C Charging cable (included) USB 5V, 1A wall adapter for charging (optional).
Displayed Units	lb, kg
Capacity	600 x 0.2 lb or 270 x 0.1 kg
Options	EMR Ready USB Communication option Wall Mount Adapter
Warranty	3 year Limited Warranty

Section 9. 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.	Person or object other than that being weighed is touching the scale. Verify that there is nothing caught in or interfering with the platform.
Scale overloads before scale capacity is reached.	Verify scale calibration is correct. If problem persists, recalibrate the scale.
Scale will not come to zero when the ZERO button is pressed.	Make sure that the scale is stabilizing (No motion indicated). After pressing the ZERO button, the scale should zero as soon as it becomes stable.
Weight readings are not correct.	Verify the scale calibration with an accurate set of test weights. If the readings are not correct, recalibrate. Be sure the platform is on a flat surface and all four feet are touching the floor.
Scale drifts off zero.	Check for air currents and/or vibration around the scale.
Scale shuts itself off or will not turn on.	If using for the first time, press and hold ZERO for 5 seconds to exit battery transport mode. Press the ZERO button to turn on the indicator. Check that the battery is charged. If using an AC adapter, confirm that it is outputting 5V, 1A and is firmly plugged into a functioning wall outlet.

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