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RL101

Below-the-Hook Scale

Operation Manual



RICE LAKE®
WEIGHING SYSTEMS

October 13, 2023

PN 220243 Rev A

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www.ricelake.com

Revision History

This section tracks and describes manual revisions for awareness of major updates.

Revision	Date	Description
A	October 13, 2023	Initial manual release with product launch

Table i. Revision Letter History

Technical training seminars are available through Rice Lake Weighing Systems. Course descriptions and dates can be viewed at www.ricelake.com/training or obtained by calling 715-234-9171 and asking for the training department.

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1.0 Introduction

This manual is intended for operators using and managing the RL101 scale. It provides information about the hardware, machinery use, safety information, maintenance and troubleshooting.

Manuals are available from Rice Lake Weighing Systems at www.ricelake.com/manuals

Warranty information is available at www.ricelake.com/warranties

1.1 Safety

Safety Definitions:

DANGER: Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. Includes hazards that are exposed when guards are removed.

WARNING: Indicates a potentially hazardous situation that, if not avoided, could result in serious injury or death. Includes hazards that are exposed when guards are removed.

CAUTION: Indicates a potentially hazardous situation that, if not avoided, could result in minor or moderate injury.

IMPORTANT: Indicates information about procedures that, if not observed, could result in damage to equipment or corruption to and loss of data.

General Safety

Do not operate or work on this equipment unless this manual has been read and all instructions are understood. Failure to follow the instructions or heed the warnings could result in injury or death. Contact any Rice Lake Weighing Systems dealer for replacement manuals.

WARNING

Failure to heed could result in serious injury or death.

Read this manual carefully before carrying out any handling operations or lifting any loads.
Only use lifting equipment with a capacity suitable for the weight to be lifted.
Keep hands, feet and loose clothing away from moving parts.
Before using the RL101 scale, ensure it is in proper working order.
Apply the load to the hook only when the load is resting on the ground.
To achieve a correct weighing result, the load must be raised by at least 2 to 5 in from the ground.
Use the RL101 scale in non-condensing environments with moderate temperature and humidity levels.
Use the RL101 scale where there are no vibrations.
Never exceed the rated load limit of the unit.
Never use the scale in environments where there is the danger of fire or explosion.
Never make alterations or modifications to the unit.
Never use the RL101 scale when it no longer fulfills the safety criteria.
Never clean the RL101 scale with solvents, aggressive substances or flammable products.
Never wash the RL101 scale with direct water jets.
Never pour liquids on the indicator.
Never expose the RL101 scale to atmospheric agents (sun, rain, etc.).
Never allow minors (children) or inexperienced persons to operate this unit.
Never use for purposes other than weight measurement.
Never place fingers into slots or possible pinch points.
Never use any load-bearing component that is worn beyond 5% of the original dimension.
Never use this product if any components are cracked.
Never remove or obscure warning labels.
Never remove or replace supplied shackles and hooks.
Never move the sample (load) with scale inline. The RL101 scale is a lift and weigh device designed to capture static weighments.

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1.1.1 Adhere to Laws and Regulations

Follow all local laws and regulations when using the RL101 scale.

1.1.2 Operator Obligations and Prohibitions

Operators must:

- Always perform maintenance operations with the RL101 scale powered off.
- Tie up long hair to prevent it from getting caught.
- Use personal protective equipment and devices in an appropriate manner.
- Report safety concerns immediately.

Operators must never:

- Use the RL101 scale improperly.
- Perform actions that may compromise safety.
- Remove or modify safety/warning devices.
- Wear bracelets, rings or chains that can dangle and can be caught by moving parts.
- Use the RL101 scale if it has not been installed according to regulations and laws.
- Use the RL101 scale outside of the permitted environmental conditions.

WARNING: Rice Lake Weighing Systems is not liable for damage to property or people if the RL101 scale has been used in a non-permitted environment.

1.1.3 Safety Measures

- Adhere to safety warnings established by Rice Lake Weighing Systems, the manufacturer of the lifting equipment, regulations and laws.
- Entrust the use of the RL101 scale to expert/trained personnel.
- Ensure only trained personnel install, put into service, maintain and repair the RL101 scale.
- Ensure that the Operator manual is always available where the RL101 scale is used.
- The nominal capacity of the scale must be equal to or greater than the crane.
- Only use Rice lake Weighing Systems replacement parts.
- The RL101 scale must be submitted to regular maintenance and repair.
- When faults or irregularities are observed, immediately stop all operations and do not reuse the RL101 scale until it has been evaluated by trained/authorized personnel.

1.1.4 RL101 Scale Warnings

Warning	Description
	The RL101 scale is considered a lift and weigh device, therefore, use must be limited only to weighing needs. The RL101 scale is not designed for cargo handling and transportation. Once load handling is done, move away, and ensure that the load is well balanced by lifting it up only a few inches from the ground and then lower the load down to the ground. Remove the RL101 scale at the end of the weighing operations.
	Use the scale exclusively for the lifting and the weighing of suspended loads and for tension measurements. Suspended loads may cause applied torsion stresses and should be hung with flexible or swiveling bindings.

Table 1-1. RL101 Scale Warning Symbols

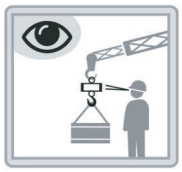
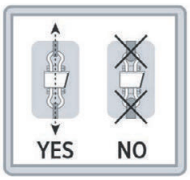
Warning	Description
	Monitor load lifting. While lifting, observe the movement of the load. The RL101 scale is a lift and weigh device and not designed for cargo handling and transportation.
	Lift the load at low speeds to mitigate load swiveling, knocking or tilting.
	Use fasteners that allow correct alignment of the scale.
	Perform maintenance, repairs or cleaning with the RL101 scale powered off.
	Use PPE assigned by the manufacturer of the lifting system and listed in this manual.
	The nominal capacity of the RL101 scale must not be lower than the maximum capacity of the lifting equipment.
	Never stand or pass under a suspended load.
	Never exceed the nominal capacity of the RL101 scale. The illustration refers to the 3000 lb model. Refer to the maximum capacity of the purchased RL101 scale.

Table 1-1. RL101 Scale Warning Symbols (Continued)

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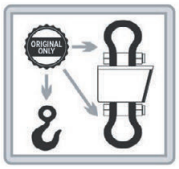
Warning	Description
	Do not allow the RL101 scale to come into contact with liquid. Adhere to IP rating of the RL101 scale. Do not use solvents or industrial chemicals for cleaning the RL101 scale.
	Only use the RL101 scale with the included shackles.
	Never move the load diagonally or rotate the load. Do not swing the load by pushing it or putting it beyond the operating area of the lifting equipment.
	Never exceed the weight capacity of any lifting equipment.
	Never use multiple attachment points.
	Never make any mechanical changes to the scale.

Table 1-1. RL101 Scale Warning Symbols (Continued)

1.1.5 Environmental Conditions

Symbol	Description
	Never install the RL101 scale in an environment at risk of explosions.
	Never expose the RL101 scale to sources of heat of direct sunlight.
	Never expose the RL101 scale to strong magnetic or electrical fields. Never use the device to weigh radioactive materials or melted masses.
	Never install the RL101 scale in an environment at risk of corrosion.
	Never use the device beyond the temperature range of -14°F to 104°F (10°C to +40°C).

Table 1-2. Environmental Condition Warnings

1.1.6 Risks

Safety has been integrated into the design and construction of the RL101 scale as much as possible; however, risks remain that operators must be protected against.

For each risk, a description of the risk and of the zone or part of the RL101 scale subject to the risk is provided (unless it is a risk valid for the entire RL101 scale). Procedural information on how to avoid the risk and on the correct use of the personal protection devices is provided.

Risk	Description
Risk of crushing	The risk of crushing lower limbs under the load during its descent remains.
Risk of load falling	The risk of the load falling and crushing during lifting operations remains.

Table 1-3. Risks

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1.1.7 Personal Protective Equipment

When working near the RL101 scale, both for assembly operations and for maintenance/adjustment, it is required to comply with the general accident-prevention regulations. It is important to use personal protective equipment (PPE) required for each operation. PPE for those operating or maintaining the equipment must comply with local laws and regulations.

A list of personal PPE that may be required is provided below:

Symbol	Description
	Indicates a requirement for personnel to use safety or insulating gloves.
	Indicates a requirement for personnel to use safety goggles.
	Indicates a requirement for personnel to use safety footwear.
	Indicates a requirement for personnel to use ear protection (earplugs or earmuffs).
	Indicates a requirement for personnel to wear the specific safety clothing.

Table 1-4. Personal Protection Equipment Warnings

1.2 Identification labels

The RL101 scale is equipped with a identification labels positioned on the right side.

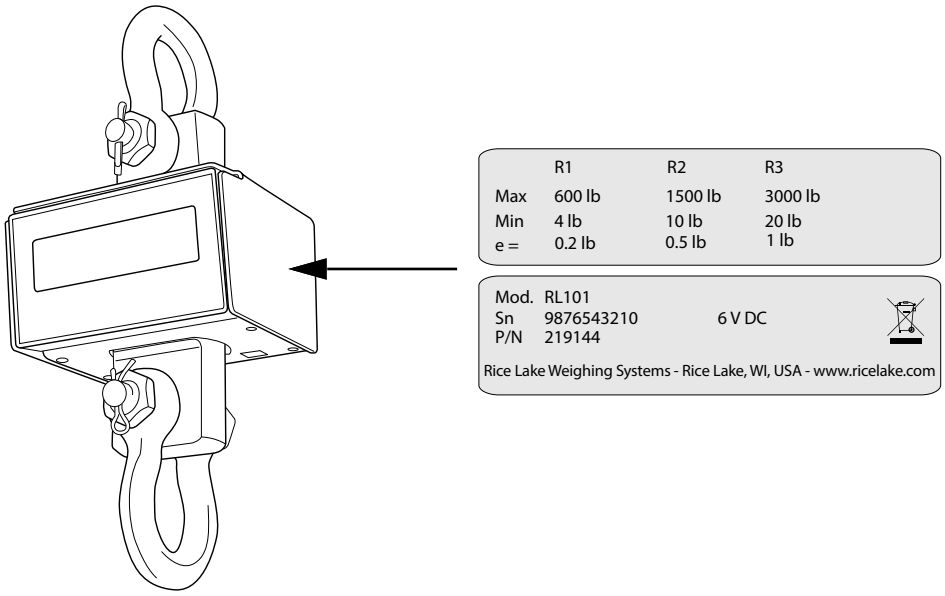


Figure 1-1. Identification Labels

WARNING: Do not remove identification labels.

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1.3 Specifications

<table>
<tr><th>Specification</th><th>Description</th></tr>
<tr><td>Material</td><td>Painted ABS and steel</td></tr>
<tr><td>Case dimensions</td><td>6.89 x 18.9 x 15.35 in (175 x 480 x 390 mm)</td></tr>
<tr><td>Weight</td><td>
<table>
<tr><td>Model</td><td>Without Packaging</td><td>With Packaging</td></tr>
<tr><td>RL101-3k</td><td>17.64 lb (8 kg)</td><td>24.25 lb (11 kg)</td></tr>
<tr><td>RL101-6k</td><td>22.05 lb (10 kg)</td><td>30.87 lb (14 kg)</td></tr>
<tr><td>RL101-12k</td><td>24.25 lb (11 kg)</td><td>33.07 lb (15 kg)</td></tr>
</table>
</td></tr>
<tr><td>Max capacity</td><td>
<table>
<tr><td>Model</td><td>Capacity</td></tr>
<tr><td>RL101-3k</td><td>3306 lb (1500 kg)</td></tr>
<tr><td>RL101-6k</td><td>6613 lb (3000 kg)</td></tr>
<tr><td>RL101-12k</td><td>13227 lb (6000 kg)</td></tr>
</table>
</td></tr>
<tr><td>Power supply</td><td>Four AA Batteries</td></tr>
<tr><td>Operating life</td><td>40 hours</td></tr>
<tr><td>Keyboard</td><td>Five Keys</td></tr>
<tr><td>Remote control</td><td>Infrared with 19 buttons</td></tr>
<tr><td>IR Rating</td><td>IP54</td></tr>
</table>

Table 1-5. RL101 Specifications

1.3.1 Permitted Environmental Conditions

The facility where the RL101 scale must be used is an indoor environment protected from weather such as rain, hail, snow, fog, dust, combustible dust and aggressive agents (such as corrosive vapor or excessive heat sources).

The RL101 scale has been designed and built to operate safely in the following environmental conditions:

Environmental Condition	Description
Room temperature	14°F to 104°F (-10°C to 40°C)
Maximum relative humidity	85% non-condensing
Room lighting	minimum of 50 lux - non-glare light

Table 1-6. Environmental Conditions

WARNING: Environmental conditions other than those specified may cause serious damage to the RL101 scale and void the warranty.

IMPORTANT: The work surface must be sufficiently illuminated. In the event of dark areas in the workplace, it is the user's responsibility to provide suitable lighting devices.

2.0 Hardware Components

2.1 Main components

The RL101 scale is made up of the following main components:

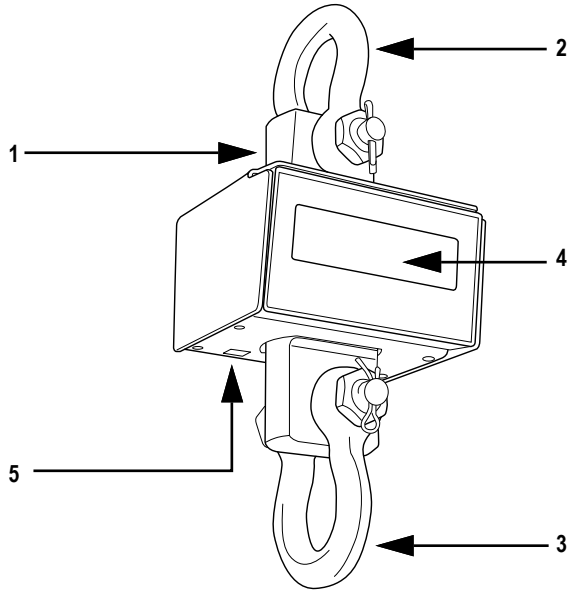


Figure 2-1. Main Components

Item	Component
1	Load cell body
2	Shackle connecting the load cell to the lifting equipment
3	Shackle connecting the load cell to a load
4	Electronic equipment that provides a display, system controls/adjustments and converts signals from load cells into a unit of measure
5	RJ11 connector for RS-232 serial connection to external devices

Table 2-1. RL101 Scale Main Components

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2.2 Packaging and Handling

2.2.1 Packaging

Use the included case to transport the RL101 scale. It is designed to protect the RL101 scale from potential impacts or falls during transport. The case must not be compressed from above or from the sides by external forces. It is important the case and RL101 scale are stored in enclosed places that adhere to the environmental conditions (Section 1.1.5 on page 11 and Section 1.3.1 on page 14).

Upon receiving the RL101 scale, the customer must verify there is no damage caused by transportion. Immediately after unpacking, visually inspect the RL101 scale to ensure all included components are undamaged. If parts were damaged in shipment, notify Rice Lake Weighing Systems and the shipper immediately.

MODEL	Without Packaging	With Packaging
RL101-3k	17.64 lb (8 kg)	24.25 lb (11 kg)
RL101-6k	22.05 lb (10 kg)	30.87 lb (14 kg)
RL101-12k	24.25 lb (11 kg)	33.07 lb (15 kg)

Table 2-2. Packaging Weights



Figure 2-2. RL101 Scale in Transport Case

2.3 Annunciators

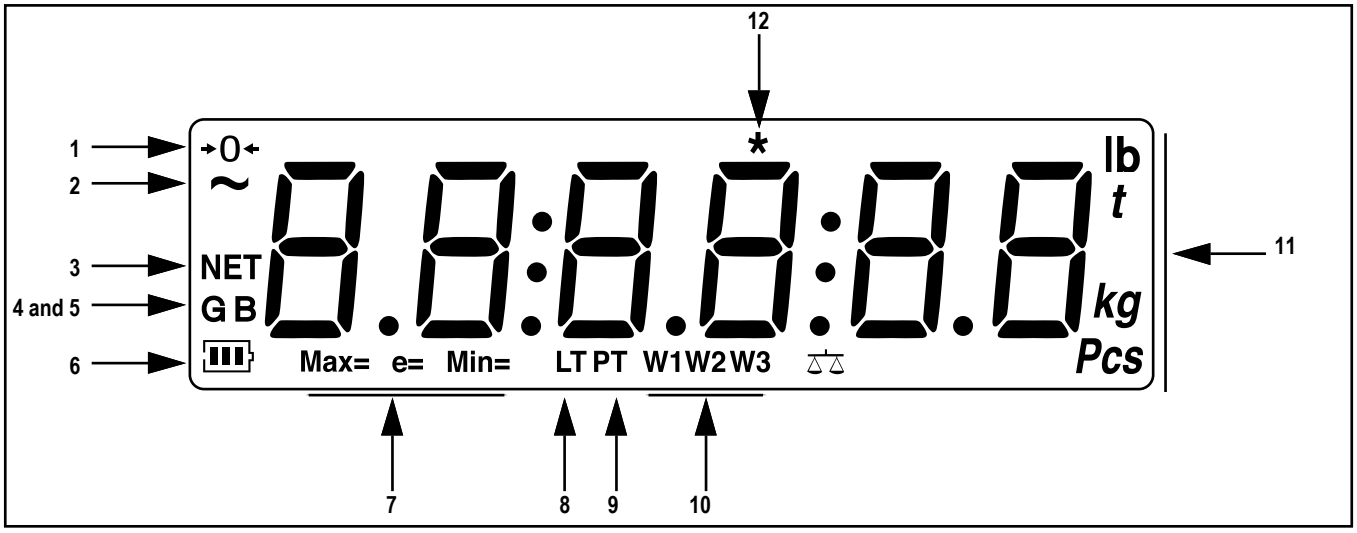


Figure 2-3.

Item	Icon	Description
1	→0←	Indicates the scale is unloaded and at zero (gross).
2	~	Indicates the weight is unstable.
3	**NET**	The net weight is displayed. ***Note: When this annunciator displays, there is a saved tare.***
4 / 5	**G B**	The gross weight is displayed.
6		Indicates the battery level:
7	**Max= MIN= e=**	Metrics are displayed.
8	**LT**	A locked tare is enabled.
9	**PT**	A manual tare is enabled.
10	**W1 W2 W3**	Indicates the range of active weighing.
11	**lb ... g**	Indicates the units of measurement: pounds (lb), tonnes (t), kilograms (kg) or grams (g).
12	*	Indicates a key is pressed. In some operating modes, it means that a specific function is enabled.

Table 2-3. Annunciator Descriptions

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2.4 Keyboard

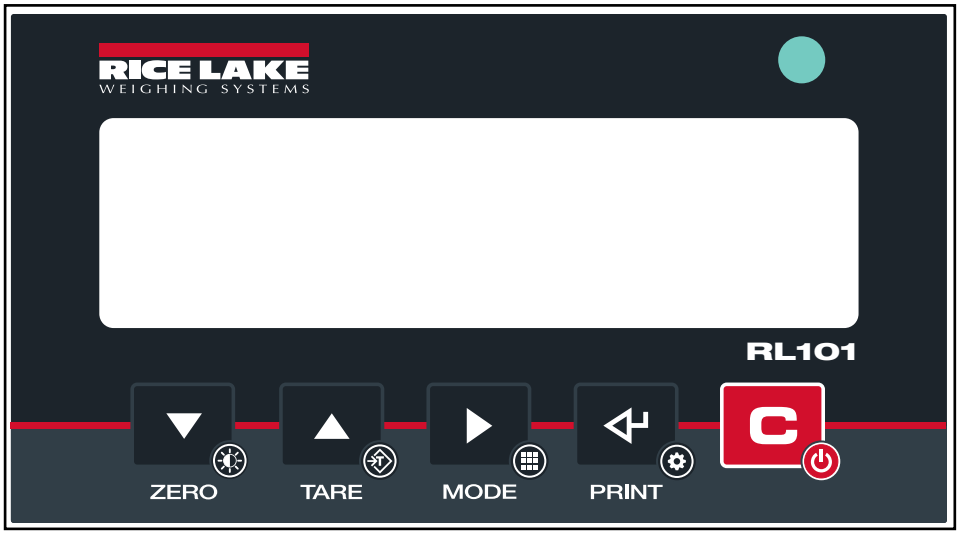


Figure 2-4. Keyboard Keys

Key	Description
	Short Press: Resets the weight on the scale. Long Press: Press for 2 seconds to adjust the screen brightness. Parameter/Menu: Navigates up in menus, parameters or parameter values.
	Short Press: Tares the scale. Long Press: Press for 2 seconds to enter a preset tare. Parameter/Menu: Navigates down in menus, parameters or parameter values.
	Short Press: Retrieves the specific function of the operating mode. Long Press: Press for 5 seconds to change operating mode. Parameter/Menu: Navigates right in menus.
	Short Press: Activates print function (typically not applicable). Long Press: Press for 5 seconds to enter the configuration menu. Parameter/Menu: Confirms the selected menu/parameter.
	Short Press: Clears tare Long Press: • If pressed for 2 seconds, the RL101 powers off or on. • If pressed for 5 seconds, metrological information displays. Parameter/Menu: • Returns to previous menu without saving. • At save prompt, cancels without saving.

Table 2-4. RL101 Button Descriptions

2.5 Remote control

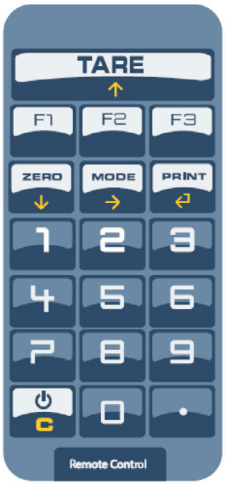


Figure 2-5. Remote Control

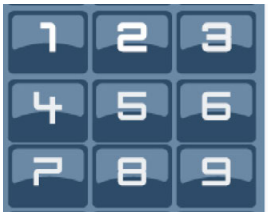
Button	Description
	Selects the desired function. If held down, the brightness of the display changes.
	Short Press: Clears tare. Long Press: • If pressed for 2 seconds, the RL101 powers off. Parameter/Menu: • Returns to previous menu without saving. • At save prompt, cancels without saving. ***NOTE: This button does not power the RL101 scale on.***
	Enters the corresponding digit
	Short Press: Tares the scale. Long Press: Press for 2 seconds to enter a preset tare. Parameter/Menu: Navigates down in menus, parameters or parameter values.
	Short Press: Resets the weight on the scale. Long Press: Press for 2 seconds to adjust the screen brightness. Parameter/Menu: Navigates up in menus, parameters or parameter values.
	Short Press: Retrieves the specific function of the operating mode. Long Press: Press for 5 seconds to change operating mode. Parameter/Menu: Navigates right in menus.
	Short Press: Activates print function (typically not applicable). Long Press: Press for 5 seconds to enter the configuration menu. Parameter/Menu: Confirms the selected menu/parameter.
	Not used.

Table 2-5. Remote Control Button Descriptions

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2.6 Batteries

2.6.1 RL101 Scale Batteries

The RL101 scale requires four AA batteries to operate. Batteries are installed in a detachable tray located in the back of the scale.

WARNING: Before replacing the RL101 scale batteries, ensure loads are removed and it is lowered to floor height.

To replace batteries:

1. Hold C to until the RL101 scale powers off.
2. Remove the battery tray by pressing in the two retention tabs while pulling the tray away from the RL101 scale.
3. Replace batteries while adhering to polarity illustrated in battery tray.
4. Reinsert battery tray into scale ensuring it securely locks into place.

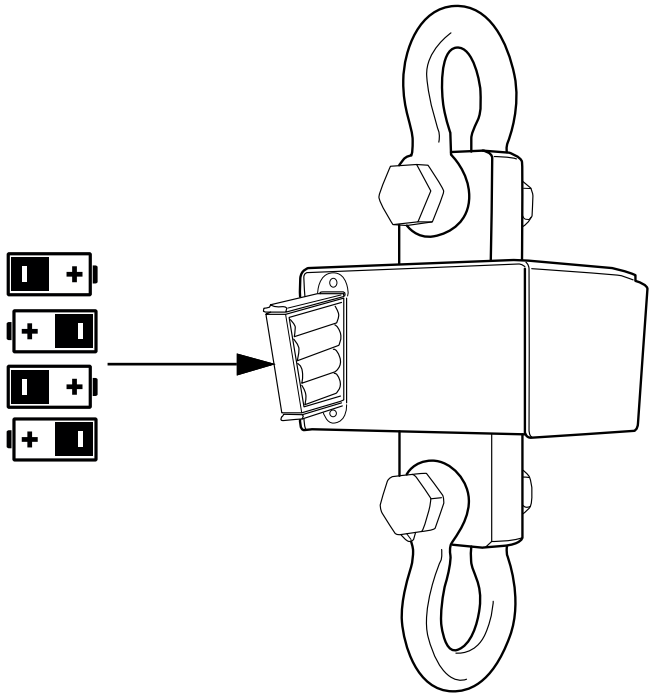


Figure 2-6. Battery Tray

2.6.2 Remote Control Battery

The remote control uses one CR2025 battery installed in a detachable battery tray.

To replace the battery:

1. Position the remote control with back facing up.
2. Squeeze the retention tab toward the remote control center while pulling the tray away from the remote.
3. Replace the battery with new CR2025 battery ensuring to adhere to polarity illustrated on remote control.
4. Reinsert battery tray into remote control ensuring it locks into place.



Figure 2-7. Remote Control Battery Tray

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3.0 Operation

3.1 RL101 Scale Status

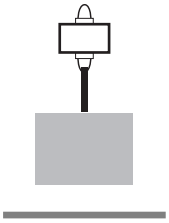
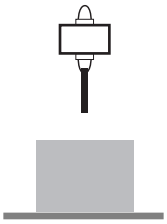
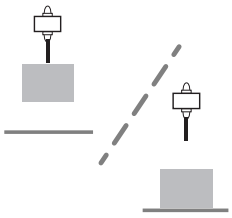
Status	Description
	The RL101 scale is powered on and the load is raised from the ground.
	The RL101 scale is powered on and unloaded.
	The RL101 scale is loaded or unloaded.

Table 3-1. RL101 Scale Status

3.1.1 Checks Before Operation

Before using the RL101 scale:

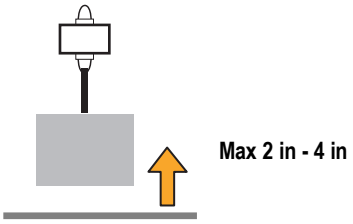
- Install remote control battery
- Remove battery discharge protection from the battery compartment
- Verify the RL101 scale is complete with all parts and does not have damage
- Verify the area is clear of obstacles
- Verify the labels installed on the RL101 scale are in place and legible
- Verify the following components are good operation condition:
  - Shackles
  - Lifting equipment (for example, crane)
  - Nuts
  - Cotter pins
- Verify the hook is suitable for the RL101 scale

IMPORTANT: If faults are detected, report them immediately a supervisor.

WARNING: If the hook and/or shackle need to be replaced, contact an authorized dealer or technical support

3.2 Load Lifting and Weight Reading

1. Turn on the RL101 scale and wait for the display to load.
2. Lift the load, as shown below:



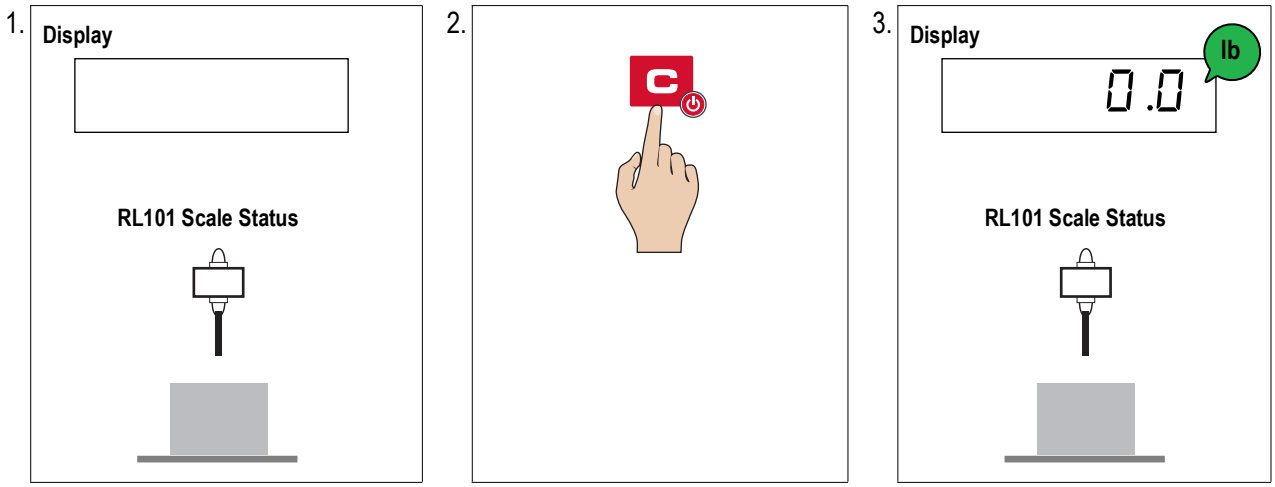
3. Read the weight on the display.

IMPORTANT: Weighing accuracy is achieved when the RL101 scale is fully stationary.

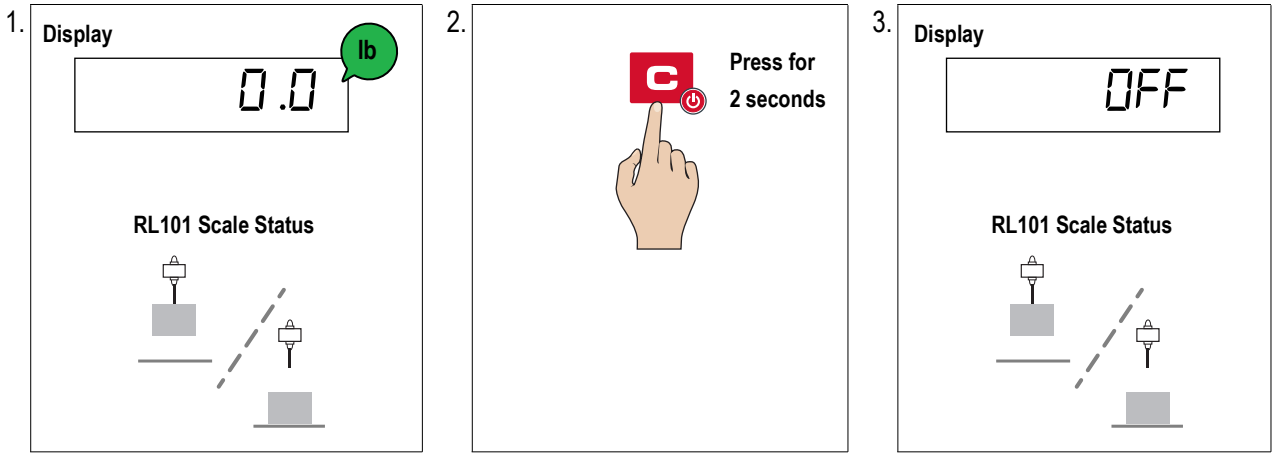
WARNING: Ensure the load is fully raised from the ground.

3.3 Basic Scale Functions

3.3.1 Power On



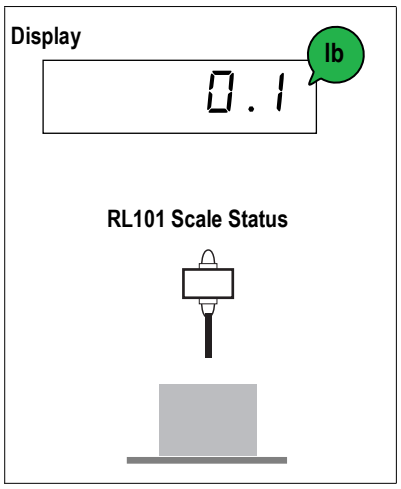
3.3.2 Shutdown



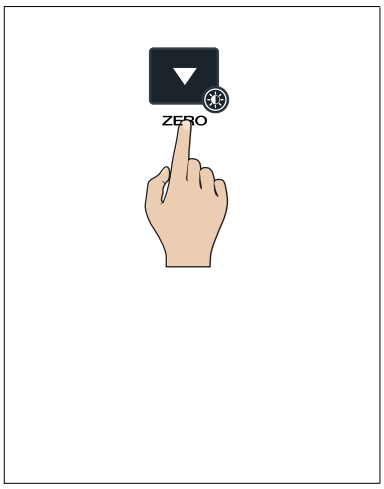
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3.3.3 Zero

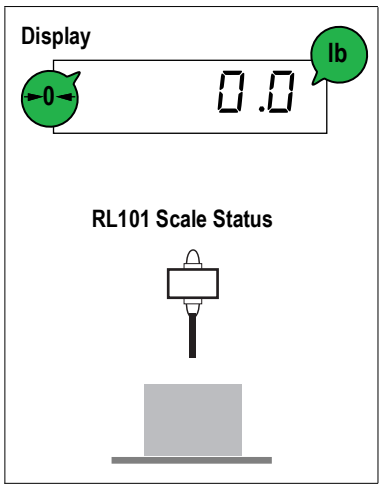
1. Display



2.

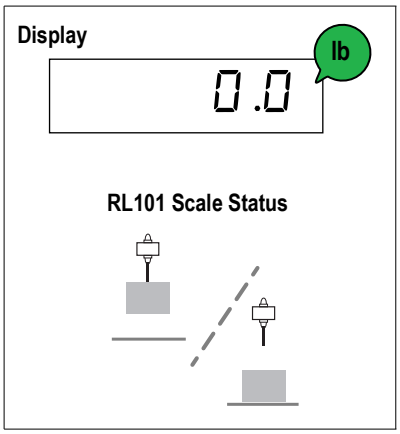


3. Display

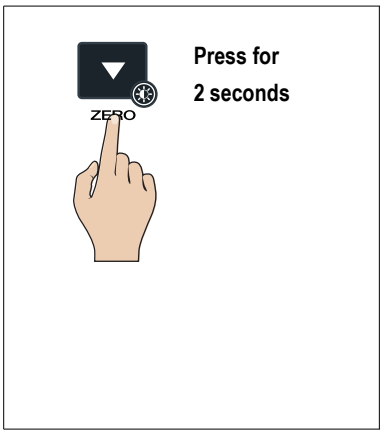


3.3.4 Display Brightness Adjustment

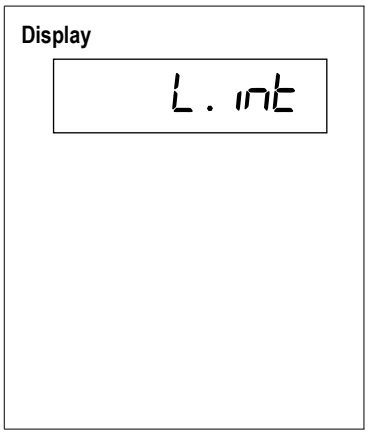
1. Display



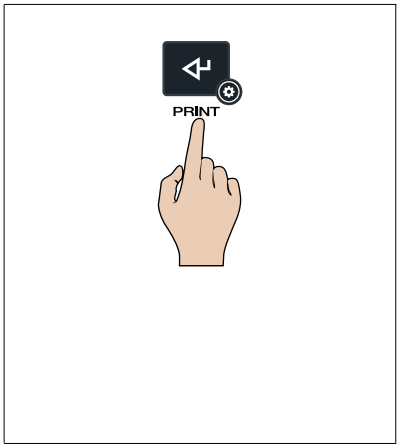
2.



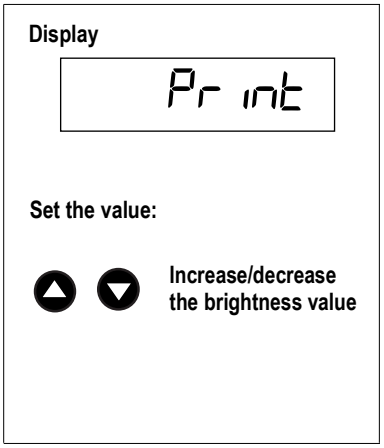
3. Display



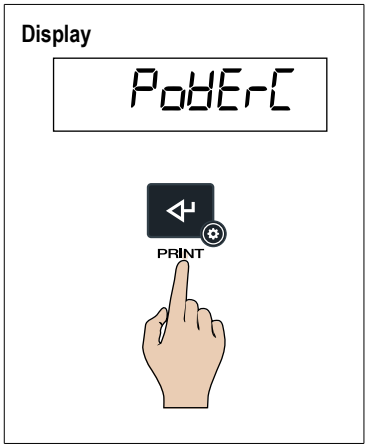
4.



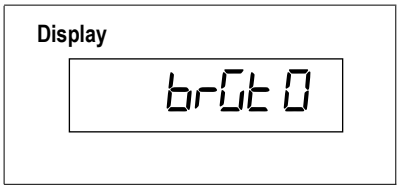
5. Display



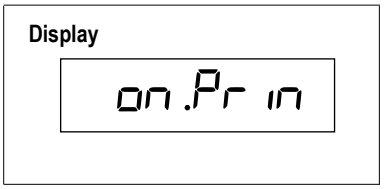
6. Display



7. Display



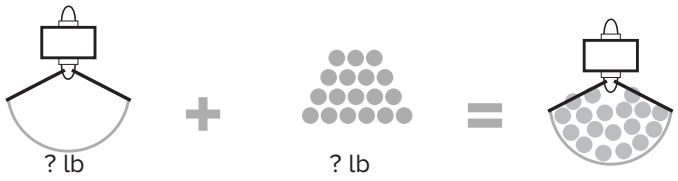
8. Display



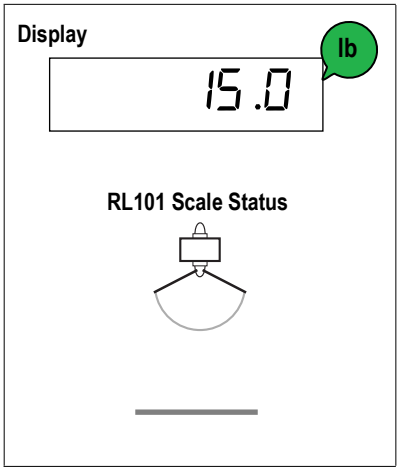
9. Display



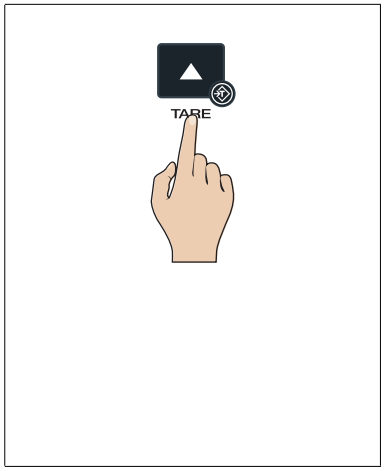
3.3.5 Automatic Tare



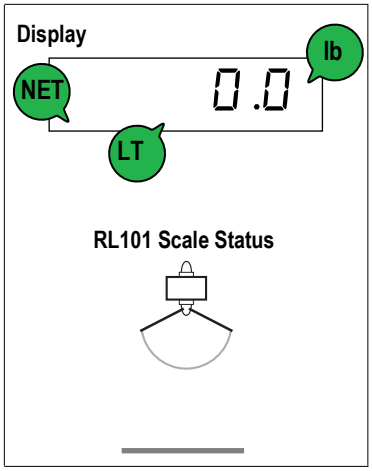
1. Display



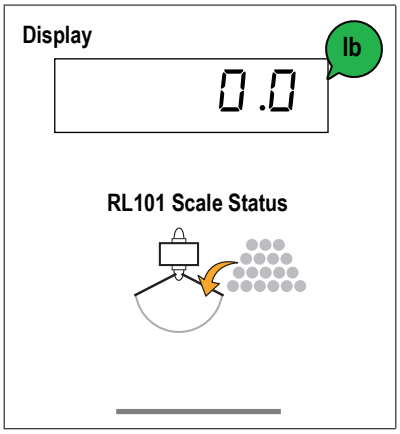
2.



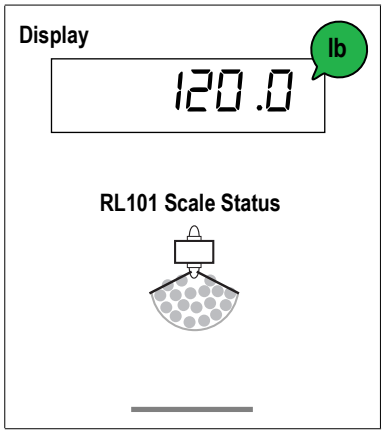
3. Display



4. Display



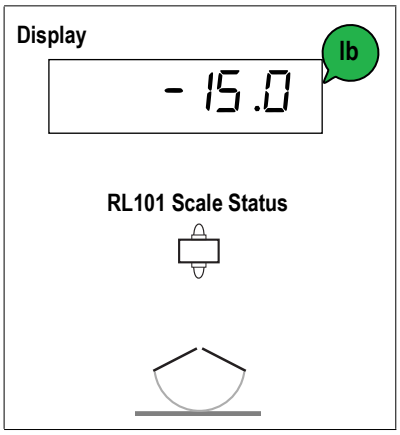
5. Display



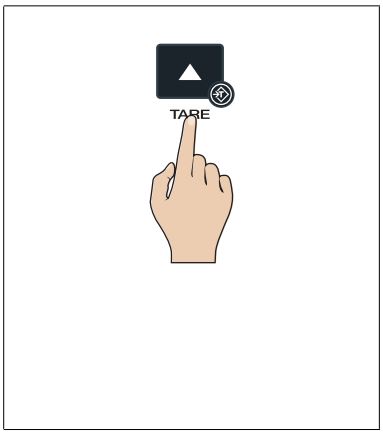
NOTE: The RL101 scale must return to actual Zero before deleting the stored Tare.

3.3.6 Tare Deletion

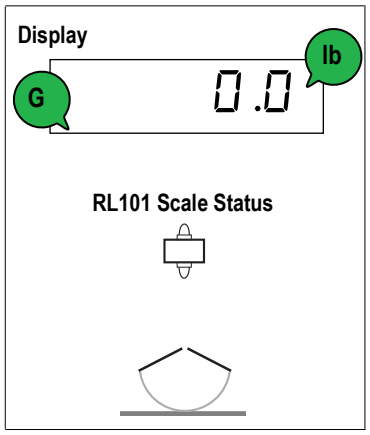
1. Display



2.

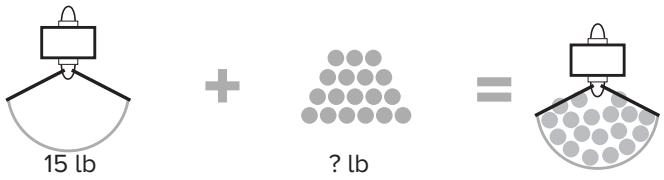


3. Display

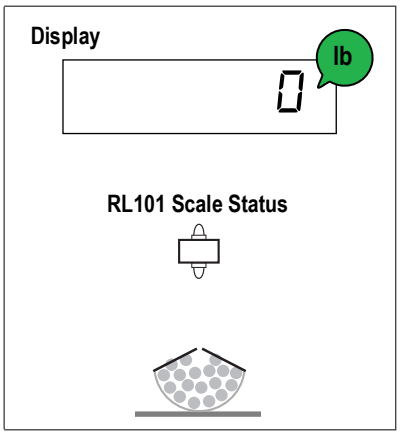


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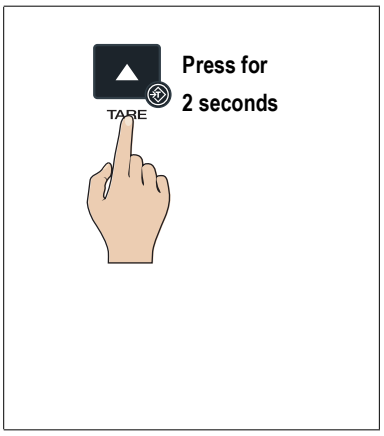
3.3.7 Set Preset Tare Value (PT)



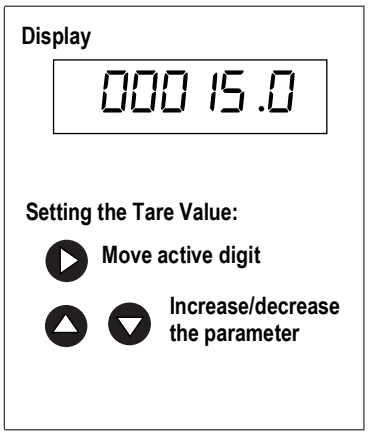
1.



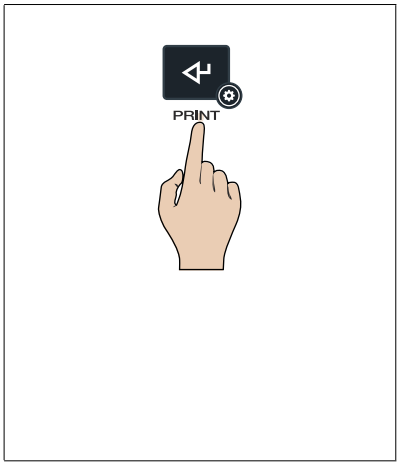
2.



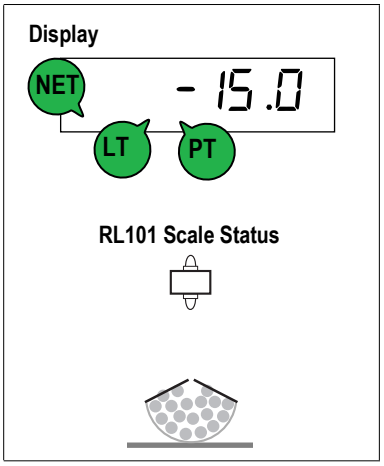
3.



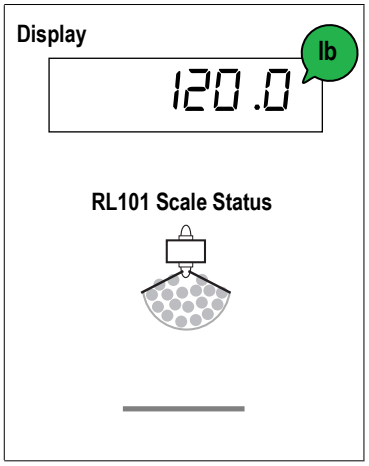
4.

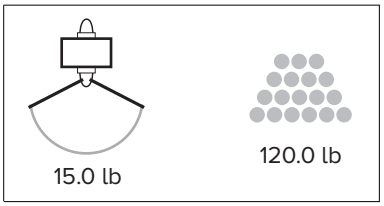


5.



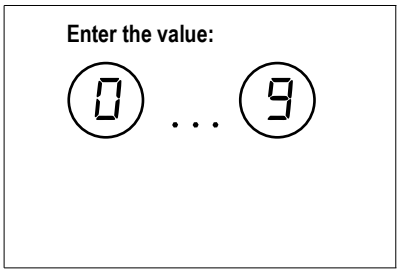
6.



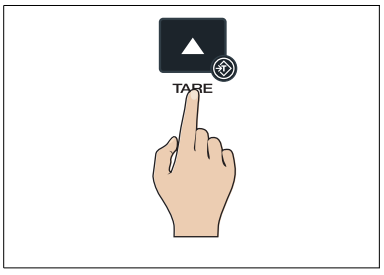


NOTE: The Tare can be entered quickly form the number buttons on the infrared remote control:

1.



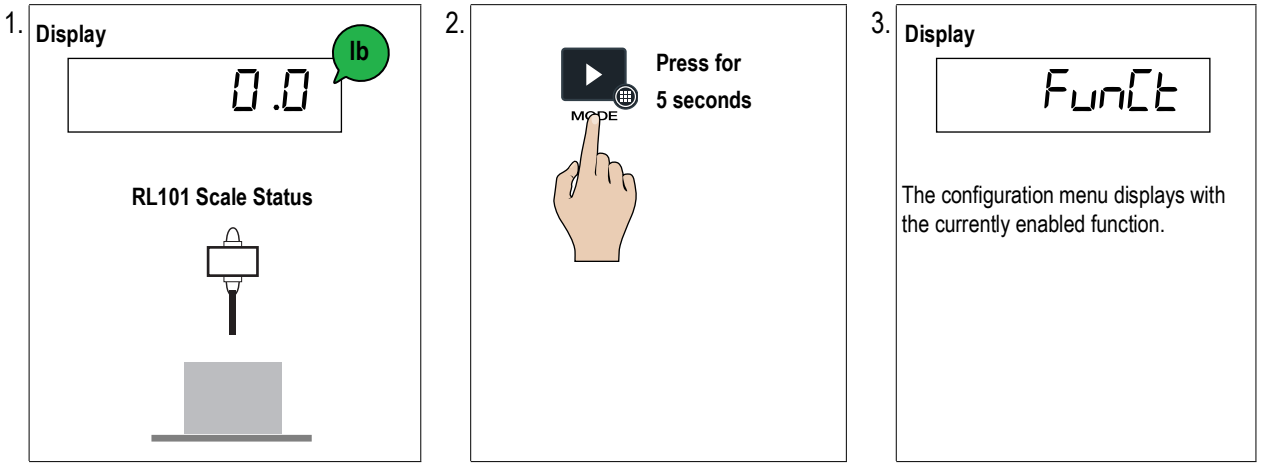
2.

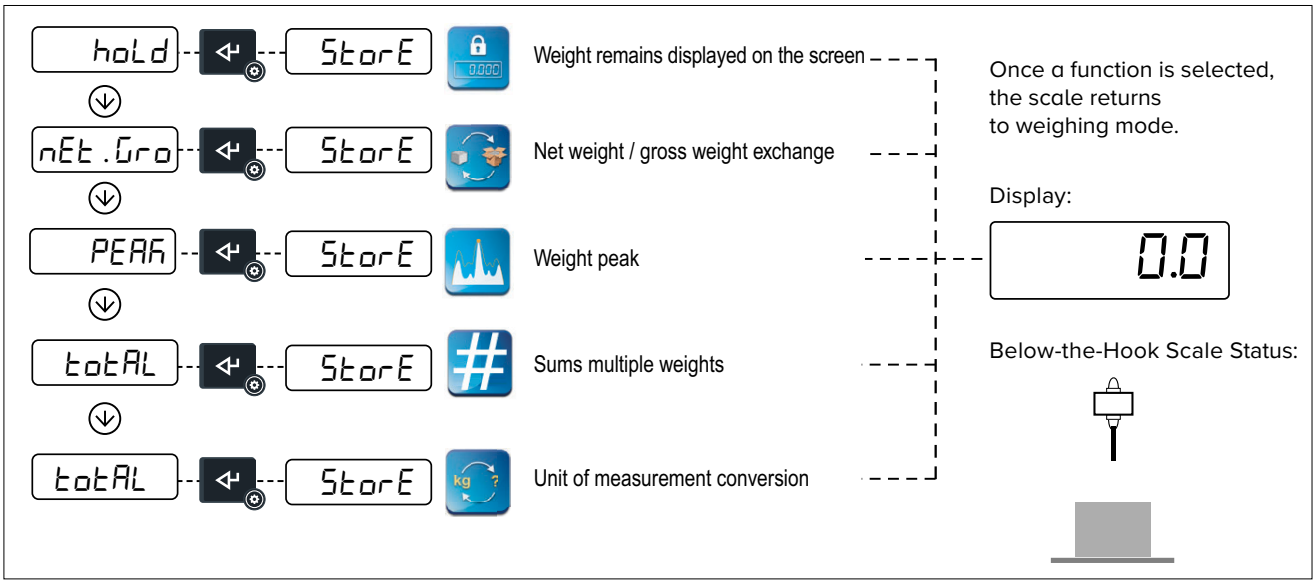


3.4 Advanced Scale Functions

3.4.1 Access the Function Menu and Set the Mode Button

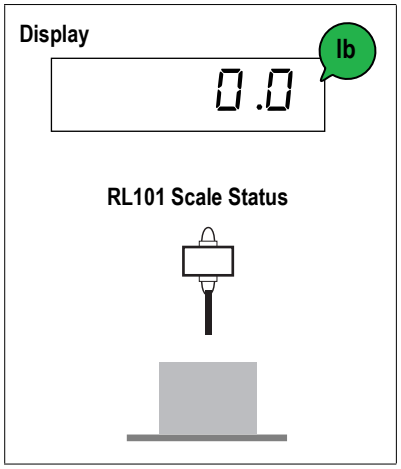
The Mode button may be set to hold weight, net/gross toggle, peak weight or unit of measure conversion functions.

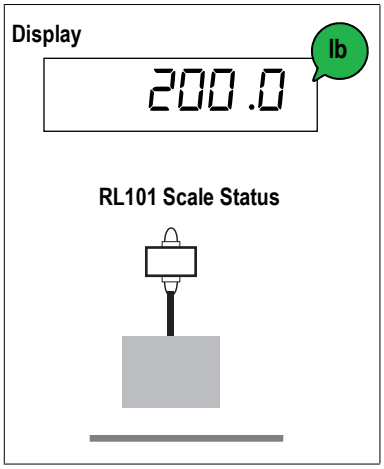


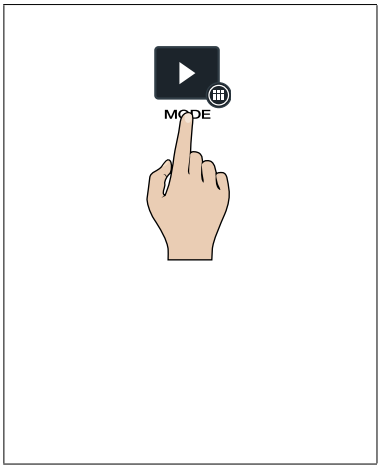


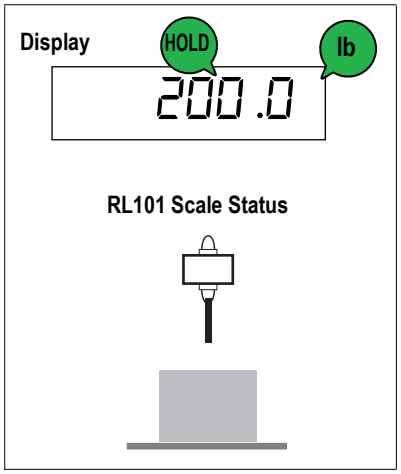
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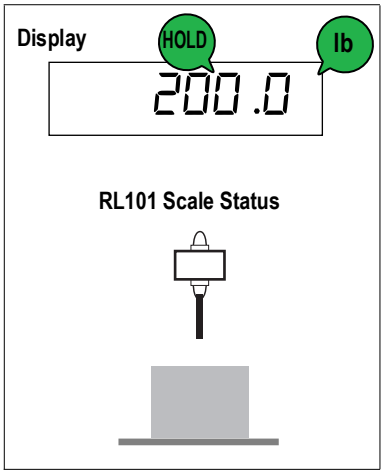
3.4.2 Activate Weight Hold Function

1. 

2. 

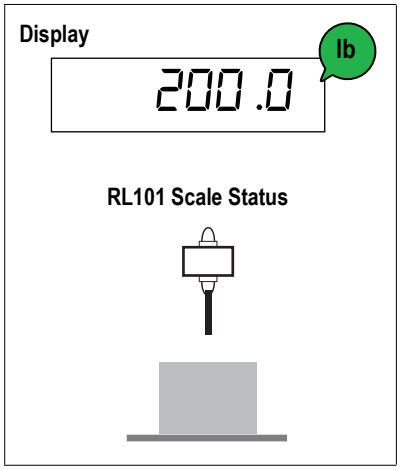
3. 

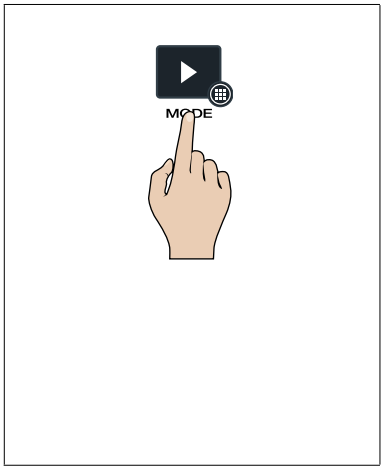
4. 

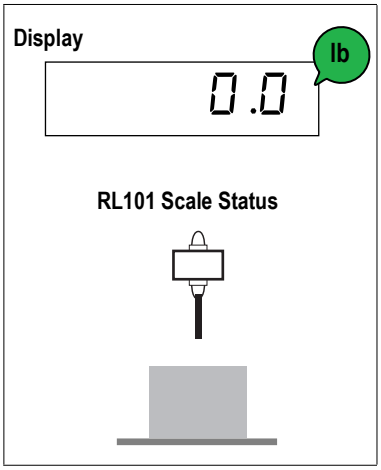
5. 

6. The weight remains on the screen even when the scale is unloaded.

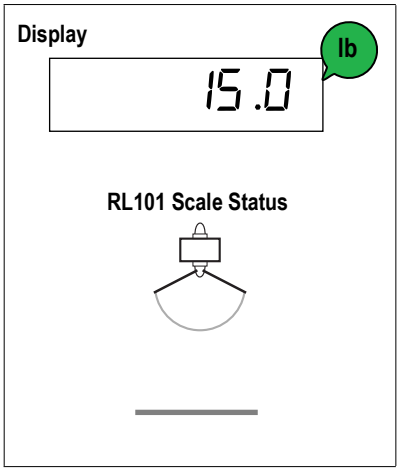
3.4.3 Disable the Weight Hold Function

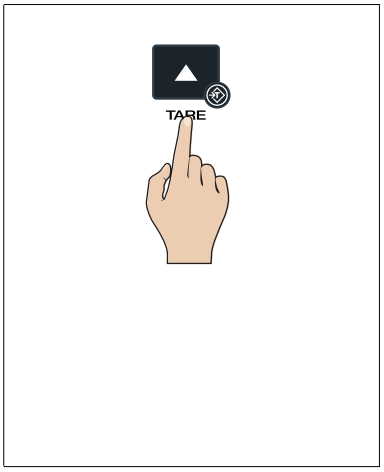
1. 

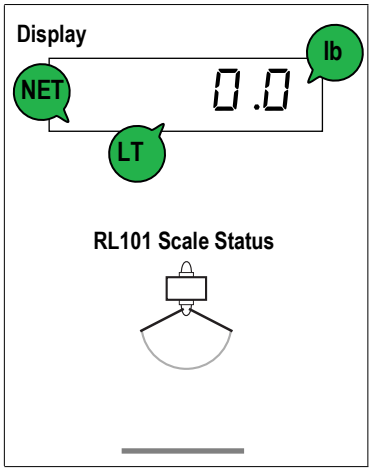
2. 

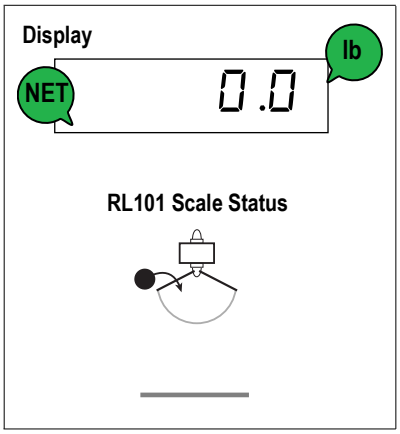
3. 

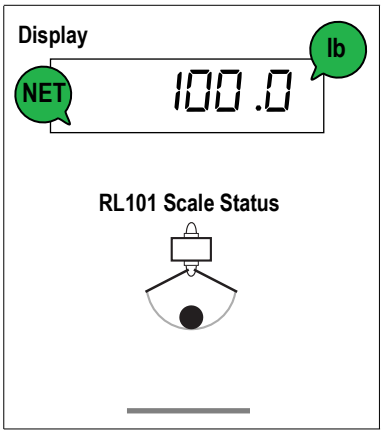
3.4.4 Change between Net and Gross Weight

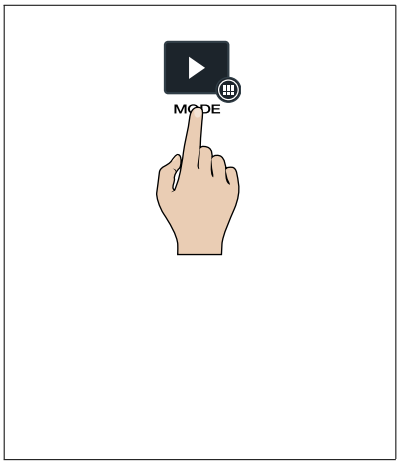
1. 

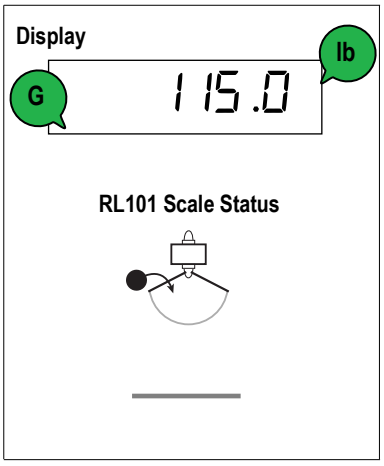
2. 

3. 

4. 

5. 

6. 

7. 

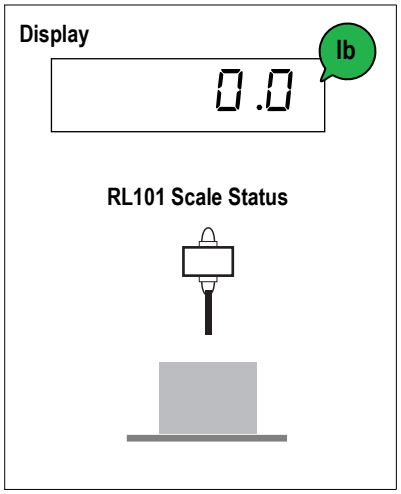
NOTE: Change from Net weight to Gross weight at any time by pressing  *.*

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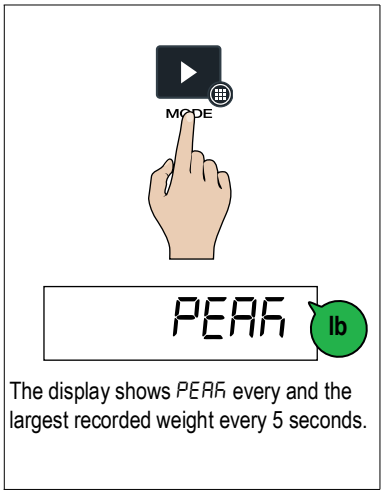
3.4.5 Weight Peak Function

3.4.5.1 Weight Peaks Detection (*PEAK*)

1. Display

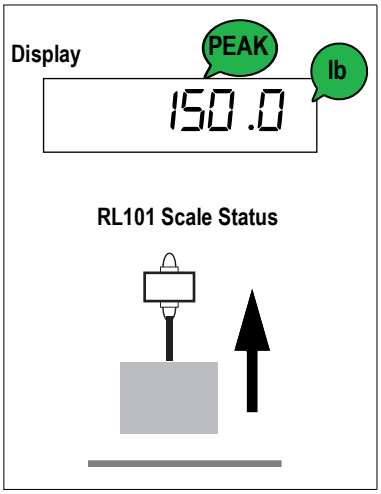


2.

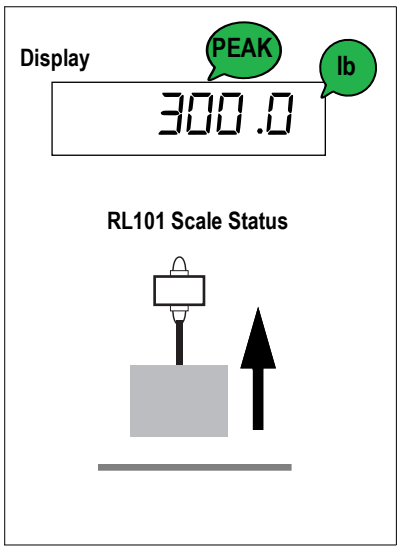


The display shows *PEAK* every and the largest recorded weight every 5 seconds.

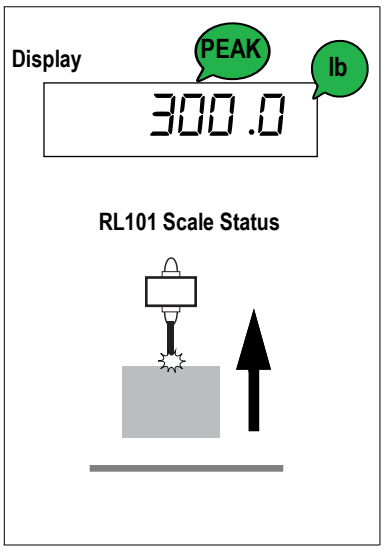
3. Display



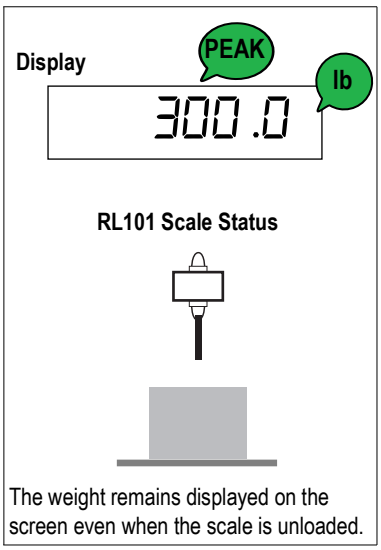
4. Display



5. Display



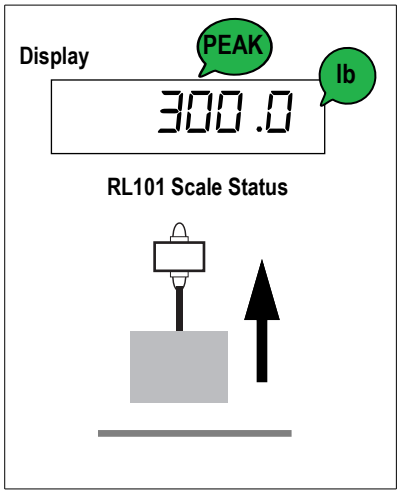
6. Display



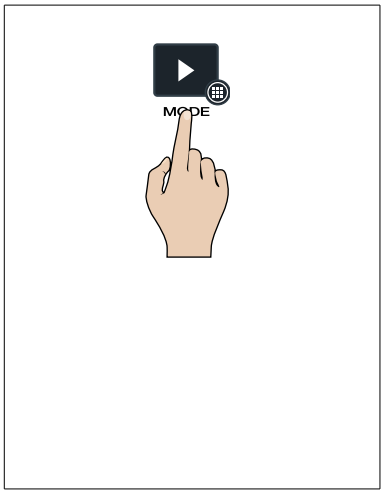
The weight remains displayed on the screen even when the scale is unloaded.

3.4.6 Disable Weight Peak Function

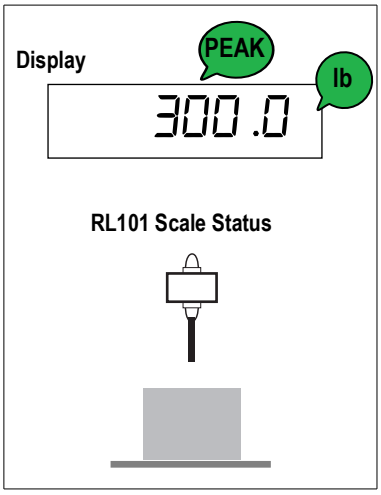
1.



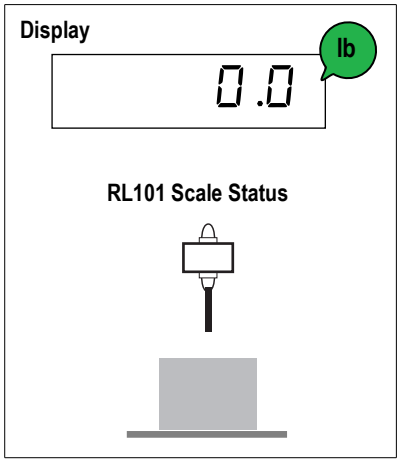
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3.



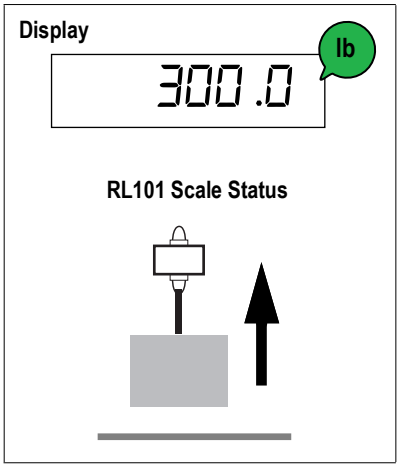
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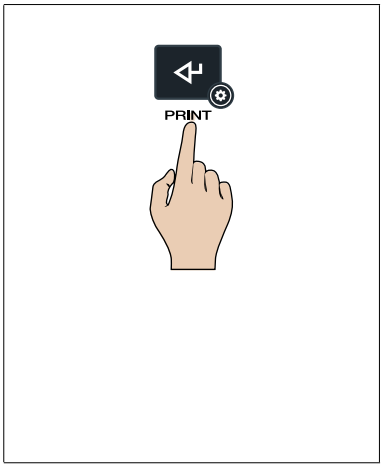
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3.4.7 Total Function (Weight Summation)

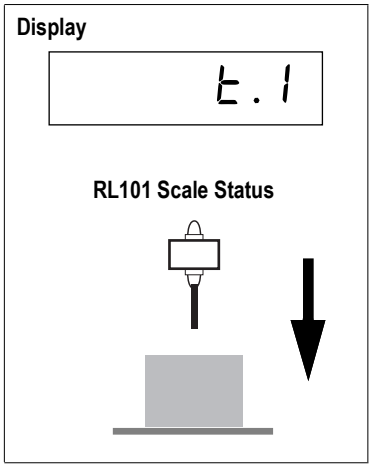
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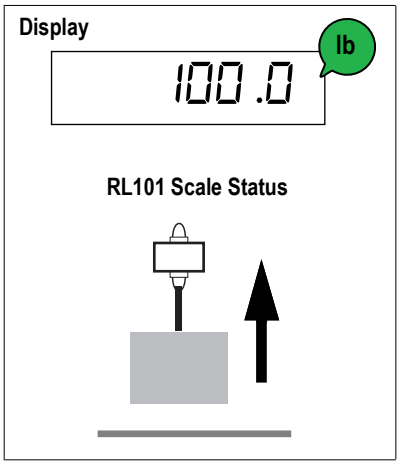
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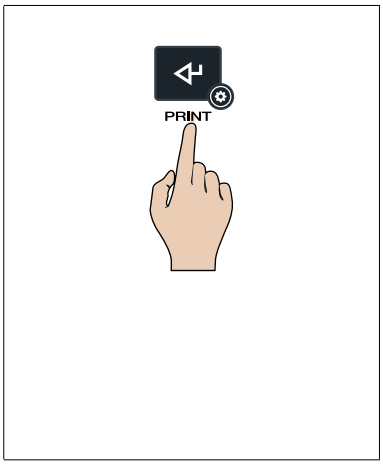
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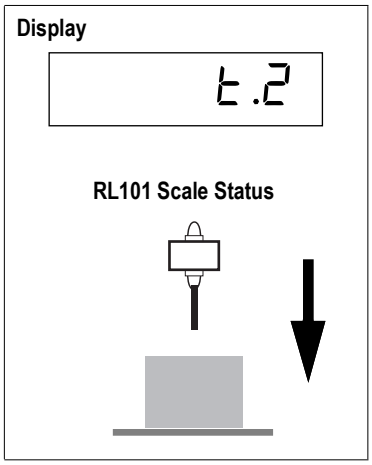
4. Display



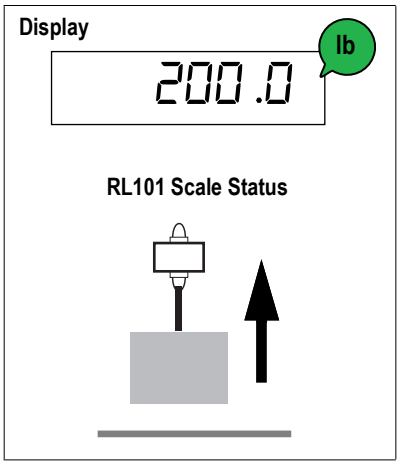
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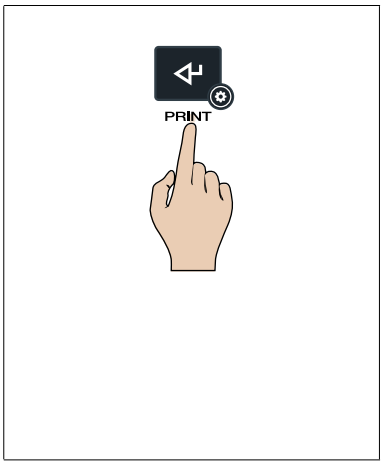
6. Display



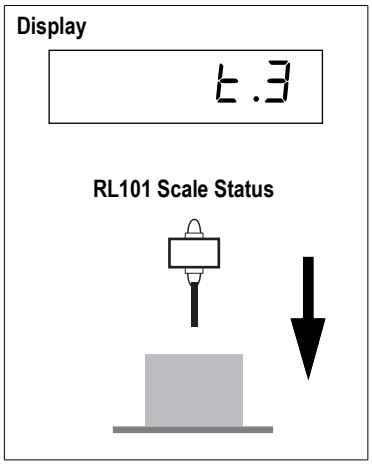
7. Display



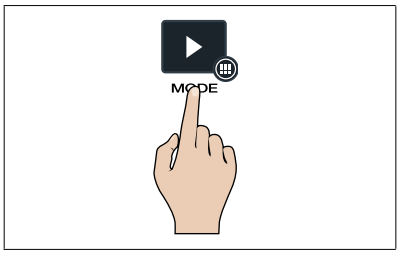
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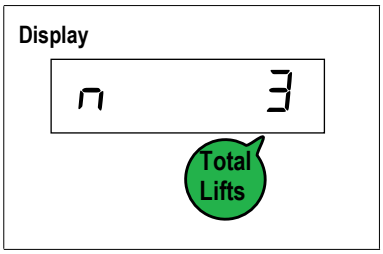
9. Display



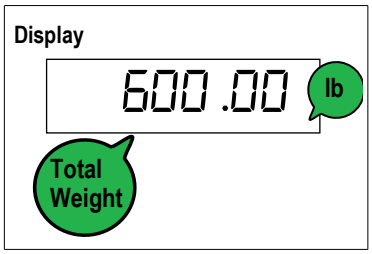
10.



11. Display

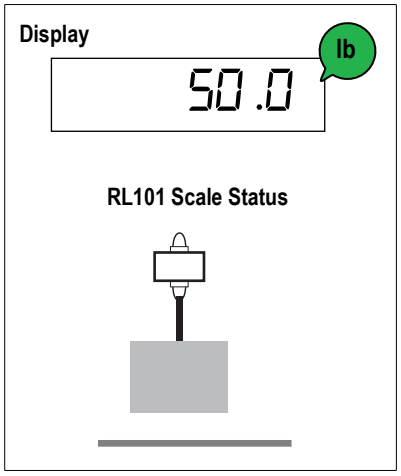


12. Display

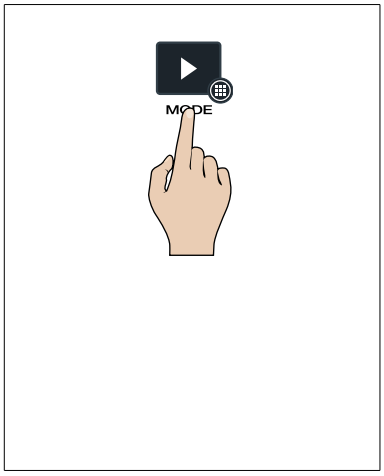


3.4.8 Convert Measurement Units

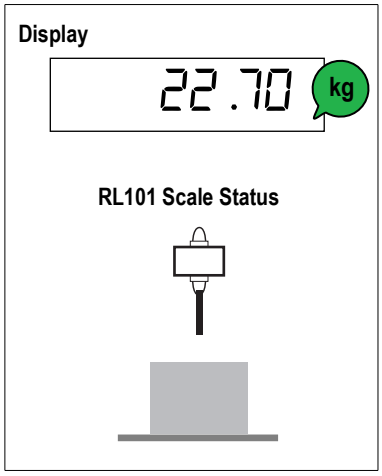
1. Display



2.

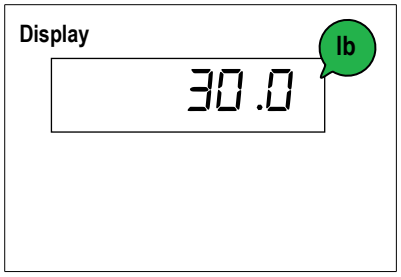


3. Display

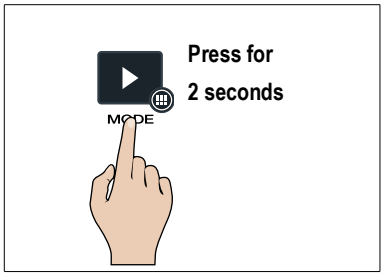


3.4.9 How to Convert Measurement Units with Unit Conversion Factor

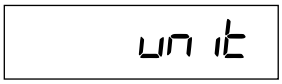
1. Display



2.



3. Display



4. **Select Conversion Unit:**

Change the unit

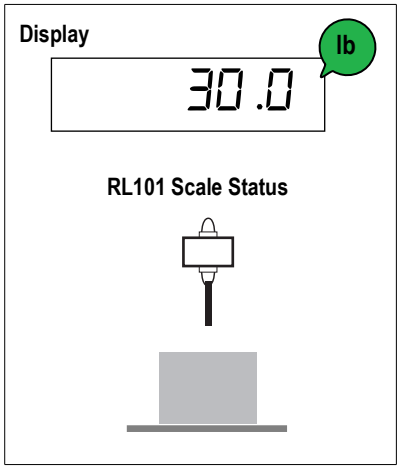
Confirm the unit

5. Converts configured units to:
   - KG: Converts to kg
   - N: Converts lb to Newton
   - KG N: Converts lb to kg and N

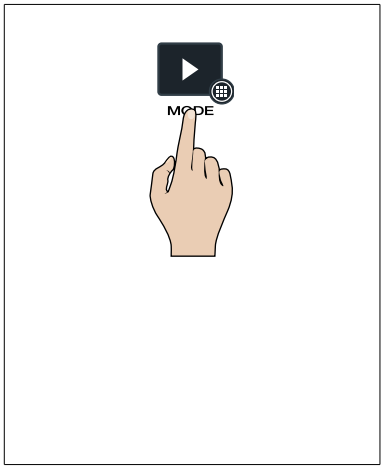
6.



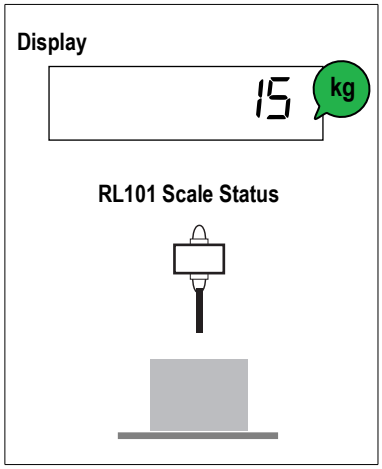
7. Display



8.



9. Display



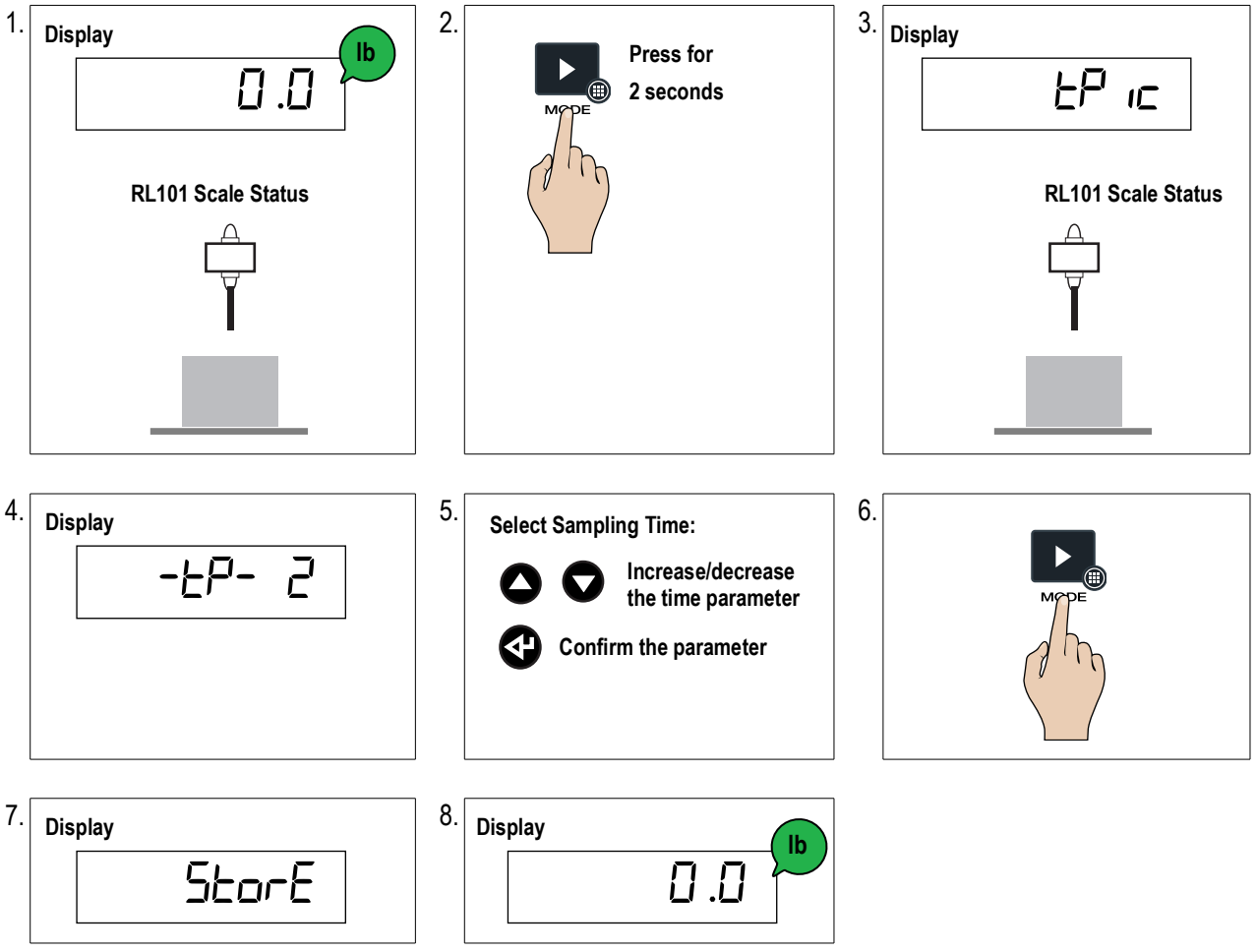
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3.5 Set PEAK Sampling Time

The minimum time period of the peak impulse may be set longer than the standard measurement duration. This time is set by pressing MODE for two seconds when the indicator is not in the peak mode. The message tP ic appears on the display followed by a number (indicates the minimum time length of the impulse expressed in hundredths of a second).

Time	Samples Per Second	Acquired Values	Mediated Values
1	400	1	1
2 (default)	200	1	1
3	100	1	1
4	100	4	2
5	50	4	2
10	25	4	2
20	12	4	2
50	6	4	2
100	6	8	2
127	6	12	2

Table 3-2. Sampling Time Parameters for PEAK Mode



NOTE: When enabling PEAK mode, it is possible the displayed weight is not suspended from the scale. The greater the number of samples per second, the greater the weight that can be shown on the display. For example, if 0.000 lb is on the scale and the sampling time is equal to 1, when the PEAK mode is enabled, 0.034 lb could be displayed.

4.0 Maintenance

The RL101 scale and all lifting accessories must be regularly subjected to inspection and maintenance. For the prevention of accidents or damages, it is necessary that the maintenance is done according to the manufacturer's instructions. To ensure a safe operation, perform the following instructions:

- Perform continuous regular maintenance and cleaning.
- Entrust maintenance and repair operations only to trained and authorized personnel.
- Use only original spare parts.
- Do not use the RL101 scale when there is non-compliance with the safety checklist.
- Any maintenance, repair or cleaning should be done away from dangerous areas and with the RL101 scale powered off.

4.1 Daily Monitoring

Each time the operator starts a new work cycle with the RL101 scale, perform the following:

- Check all RL101 scale parts.
- Perform a general visual inspection of the whole system.
- Check the integrity and efficiency of all weighing systems parts: safety lever of the hooks, the locking nuts secured with pins, the shackles, etc.

4.2 Regular maintenance

Maintenance should be performed by persons who have acquired the necessary technical expertise and trained for this purpose.

Operation	Frequency	
	Every 3 months	Every 12 months
Check dimensions of all parts comprising the RL101 scale.	X	
Check wear on the handle or the eyelet; verify if there are any plastic deformations, mechanical damages (irregular), cracks, corrosion, damage to threaded portions and the twists.	X	
Check tightness of the splice plate on the hook, the presence of defects, and ensure it is functioning properly.	X	
Ensure the cotter pin and shackle nuts are secured tight.	X	
If other metrological and mechanical irregularities are detected, have the RL101 scale repaired by qualified personnel.	X	
All elements that transmit the load, including the load cell, should be checked by specialized personnel qualified in inspection and maintenance of cranes and bridge cranes.		X

Table 4-1. Regular Maintenance

WARNING: An incorrect measurement of weight may be a sign of a mechanical problem with the RL101 scale. If the RL101 scale weighs incorrectly, the RL101 scale must be repaired by skilled personnel (Authorized Service Center).

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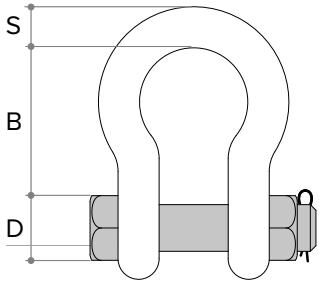
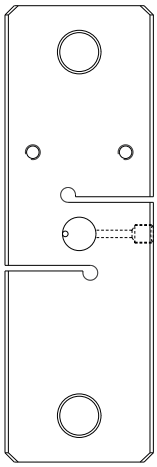
Component		Part	Control	Limit
Shackle		Locking bolts	Loosening	No slack allowed
		Pin	Deformation	Dmax – 5%
		Shackle surface	Wear Deformation	No sign or deformation allowed
		Cotter pin	Positioning	Mandatory
		Shape of the shackle	Elongation	Bmax +5%
		Section	Diameter	Smax -5%
Load Cell		Structure	X-Ray inspection (Radiography)	No defects in the material allowed
		Surface	Mechanical Damage	No mechanical damage allowed
		Dimensions	Elongation Deformation	No elongation No deformation

Table 4-2. Regular Shackle, Hook, and Load Cell Maintenance

Control	Daily	Weekly	Quarterly	Yearly
Verify the presence of all components of the system	X			
General visual inspection of the entire system	X			
Control safety lever hook	X			
Check cotter pin shackle	X			
Cleaning and lubrication		X		
Marking the presence of the RL101 scale		X		
Control of all the dimensions of the parts that make up the system			♦	
Checking the wear of hooks, shackles and bells			♦	
Checking of the Load Cell				♦
X = User ♦ = Specialized personnel				

Table 4-3. Test Frequency

Form and structure of the shackle:

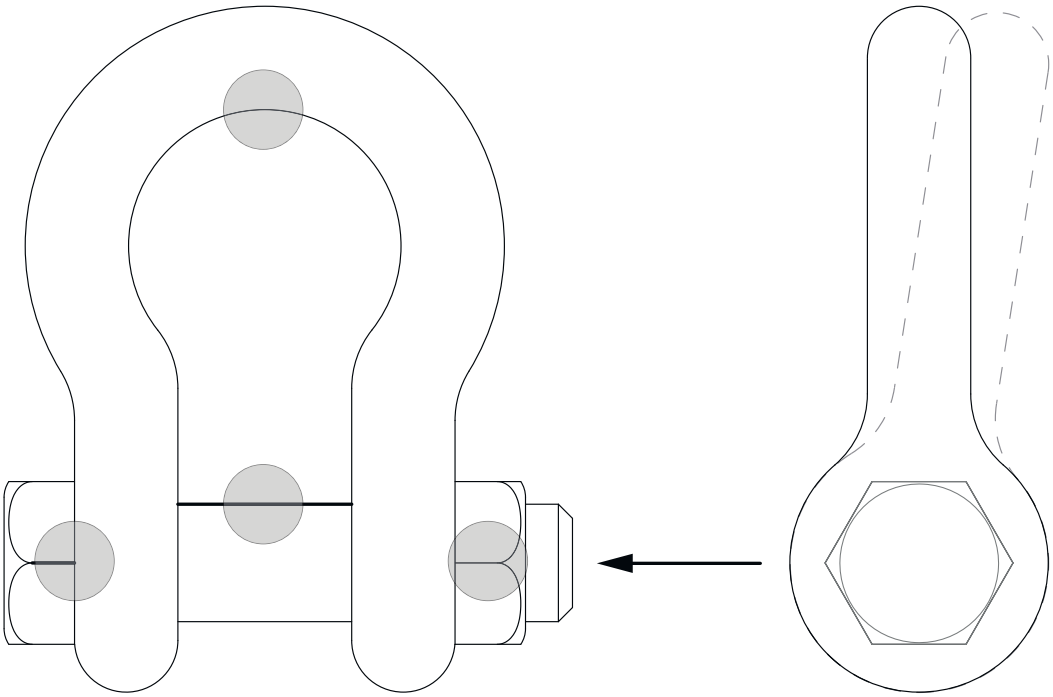


Figure 4-1. Shackle Illustration

Shackles should be examined regularly by qualified personnel. The time interval from one check to another depends on frequency of use, but it is recommended to not exceed six months.

- Always inspect the shackle before use.
- Perform regular visual inspections for nicks, cracks, wear or damaged areas, damaged threads on the pivot and body; if it is necessary, carry out a magnetic test or nondestructive testing .
- Maintain a file in regards to the accessory sheet and keep track of the checks.
- Discard shackles which do not fully or partially satisfy the requirements.

4.3 Maintenance Log

In order to handle problems like wear of components and grip load devices, it is necessary to perform regular and systematic maintenance. Maintenance and respective time intervals must occur according to the manufacturer.

Maintenance must be made only by qualified personnel. Maintenance personnel must have attended training courses and know safety norms in the use of RL101 scales and apply them.

In this manual, the user must document in chronological order maintenance carried out on the RL101 scale (inspection/control, revision, repair), and facts or events which might affect safety matters.

Upon receipt of the RL101 scale, record all dimensions of the hooks and shackles in the manual. All subsequent dimensional checks specified in maintenance, will be compared with the first measurements and the tolerance limits given in Table 4-2 on page 36, refer to the actual size detected in the first inspection.

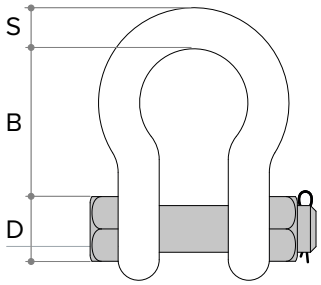
A “maintenance registry” is included in this manual in which all maintenance should be recorded. All information is important and can invalidate the warranty in the case that it is not recorded with detail and accuracy. It is also advisable to ensure that:

- Authorized personnel perform quarterly verification and records it in this manual.
- Authorized personnel stamps the appropriate box at the end of each annual maintenance intervention.

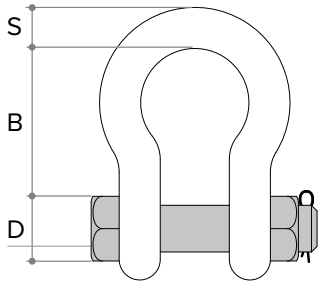
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4.4 Maintenance Registry

Serial number:	
Capacity:	
Date of first check (*):	
Controller:	Signature:

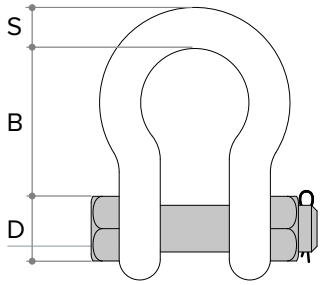


		Maximum tolerance allowed / Verification criteria	Reference measurement, to perform before putting into	3 months		6 months		9 months		12 months		15 months		18 months		21 months		24 months	
				Date	Signature	Date	Signature	Date	Signature	Date	Signature	Date	Signature	Date	Signature	Date	Signature	Date	Signature
Upper Shackle	B (mm)	± 5 %																	
	D (mm)	± 5 %																	
	S (mm)	± 5 %																	
	Wear and tear	Must be absent																	
	Nut and cotter	Preset fixed strong																	
Lower Shackle	B (mm)	± 5 %																	
	D (mm)	± 5 %																	
	S (mm)	± 5 %																	
	Wear and tear	Must be absent																	
	Nut and cotter	Preset fixed strong																	



		Maximum tolerance allowed / Verification criteria	Reference measurement, to perform before putting into service	Date	Signature	Date	Signature	Date	Signature	Date	Signature	Date	Signature	Date	Signature	Date	Signature	Date	Signature
				27 months		30 months		33 months		36 months		39 months		42 months		45 months		48 months	
Upper Shackle	B (mm)	± 5 %																	
	D (mm)	± 5 %																	
	S (mm)	± 5 %																	
	Wear and tear	Must be absent																	
	Nut and cotter	Preset fixed strong																	
Lower Shackle	B (mm)	± 5 %																	
	D (mm)	± 5 %																	
	S (mm)	± 5 %																	
	Wear and tear	Must be absent																	
	Nut and cotter	Preset fixed strong																	

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		Maximum tolerance allowed / Verification criteria	Reference measurement, to perform before putting into service	51 months		54 months		57 months		60 months	
				Date	Signature	Date	Signature	Date	Signature	Date	Signature
Upper Shackle	B (mm)	± 5 %									
	D (mm)	± 5 %									
	S (mm)	± 5 %									
	Wear and tear	Must be absent									
	Nut and cotter	Preset fixed strong									
Lower Shackle	B (mm)	± 5 %									
	D (mm)	± 5 %									
	S (mm)	± 5 %									
	Wear and tear	Must be absent									
	Nut and cotter	Preset fixed strong									

5.0 Appendix

5.1 Troubleshooting

Issue		Resolution
Tare	The RL101 scale does not tare	The weight is unstable (unStAb) The gross weight is negative (LoW) The weight is insufficient The weight exceeds the maximum capacity The tare function has been disabled With manual tare, the value exceeds the maximum capacity
Weighing	The RL101 scale does not power on	Check if the batteries are inserted in the correct orientation. Replace the batteries and try again. If the RL101 scale continues to malfunction, contact the dealer or manufacturer.
	The RL101 scale powers off suddenly	Automatic switch-off enabled Low battery Power supply line failure
	The RL101 scale does not react	An energy saving mode is enabled An unsuitable weighing filter has been selected
	Characters from the RL101 scale screen disappear and then a dot displays	Stand-by mode is enabled, press a key to re-enable weighing. Energy saving mode is enabled: contact the technical support.
	The RL101 scale displays a permanent "2Ero" message	The scale is unable to automatically reset the weight because it exceeds the maximum resettable weight at power on. Release the hook and try again. If the scale continues to have the same problem even when the hook is unloaded, contact technical support.
	The weight is unstable	Check if the weighing filter is enabled. If the system is subjected to vibrations from machinery or moving vehicles, move the scale onto another surface and try again.

Table 5-1. Troubleshooting

5.2 Error messages

Message	Description	Solution
unStAb	The weight is unstable	Check the weighing filter. If the support surface is subject to vibrations from machinery or moving vehicles, move the scale onto another surface and try again.
LoW	The net or gross weight is negative or insufficient for printing	Add weight and try again.
undEr	Underload	Load the scale and restore a valid weight condition. If the problem persists, contact technical support.
oUEr	Overload	Unload the scale and restore a valid weight condition. If the problem persists, contact technical support.
no.0.uns	The scale was not unloaded after the last print out	Completely unload the scale. Load the weight and try again.
Err.Not	The weight is unstable	Wait for stability (the indicator appears) and try again.

Table 5-2. Error Messages

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