

**ONE** DIGITALSCALES.com

A DIVISION OF MASTERLINE GROUP

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**800-620-7811**



## 447 LOW CAPACITY CRANE SCALE

500 lbs – 3,000 lbs



One Digital Scales – toll free (800) 620-7811

[www.OneDigitalScales.com](http://www.OneDigitalScales.com)

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ICS, LLC's products are intended for use in normal commercial applications. Applications requiring extended temperature range or unusual environment requirements such as military, medical life-support or life-sustaining equipment are specifically not recommended without additional testing for such application

## **Limited Warranty**

For a period of one (1) year from the date of purchase, ICS, LLC warrants the crane scales against defects in materials and workmanship. ICS, LLC will not honor this warranty (and this warranty will be automatically void) if there has been any:

1. Tampering or signs of tampering.
2. Use of AC power adapters and cables other than those originally supplied with the crane scales.
3. Repair or attempt to repair by anyone other than an ICS, LLC authorized technician.

This warranty does not cover and ICS, LLC will not be liable for, any damage or failure caused by misuse, abuse, acts of God, accidents, electrical irregularity, or other causes beyond ICS, LLC's control, or claim by other than original purchaser

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# PRECAUTIONS

1. Do not disassemble the scale. If any damage or defect occurs, contact ICS, LLC. Immediately for proper repair. Disassembly by anyone other than an ICS, LLC. Technician can void the factory warranty (see limited warranty disclaimer).
2. Do not overload scale beyond maximum recommended weight limit.
3. When charging scale, ensure that the charger is connected to a grounded outlet. This will minimize electricity static that could cause equipment defects or electrical shock.
4. When removing the charger from its electrical outlet, do not pull by the cord, this could cause electrical shock or fire.
5. When removing the charger from the charging port on the crane scale, ensure that the charger has been unplugged from its electrical outlet first. Do not remove charger plug, by pulling the cords, as this could damage the connector and possibly cause damage or fire upon next use.
6. To avoid fire hazards, do not operate or store the scale near flammable or corrosive materials, gas.
7. To avoid electrical shock or malfunction, prevent scale from being stored or operated in extremely wet or humid conditions.
8. Be sure to maintain a safe distance when weighing a load. Never stand directly under scale when a load is being weighed.
9. Avoid shock loading the scale (ensure that there is minimal or no slack when lifting a load. The sudden SNAP of a load pulling on the scale, could potentially cause damage to scale and/or lifting hardware.
10. Keep the scale away from any other electromagnetic generating devices as they may cause incorrect or false readings.
11. To ensure consistent and accurate readings, maintain periodic calibration checks by your ICS, LLC. Dealer.

# **PREFACE**

Thank you for purchasing you ICS, LLC. 447 series crane scale. This series was designed with reliability, functionality, quality, and performance in mind. We believe that whatever your overhead lifting needs are, they can be met by our outstanding line of crane scales.

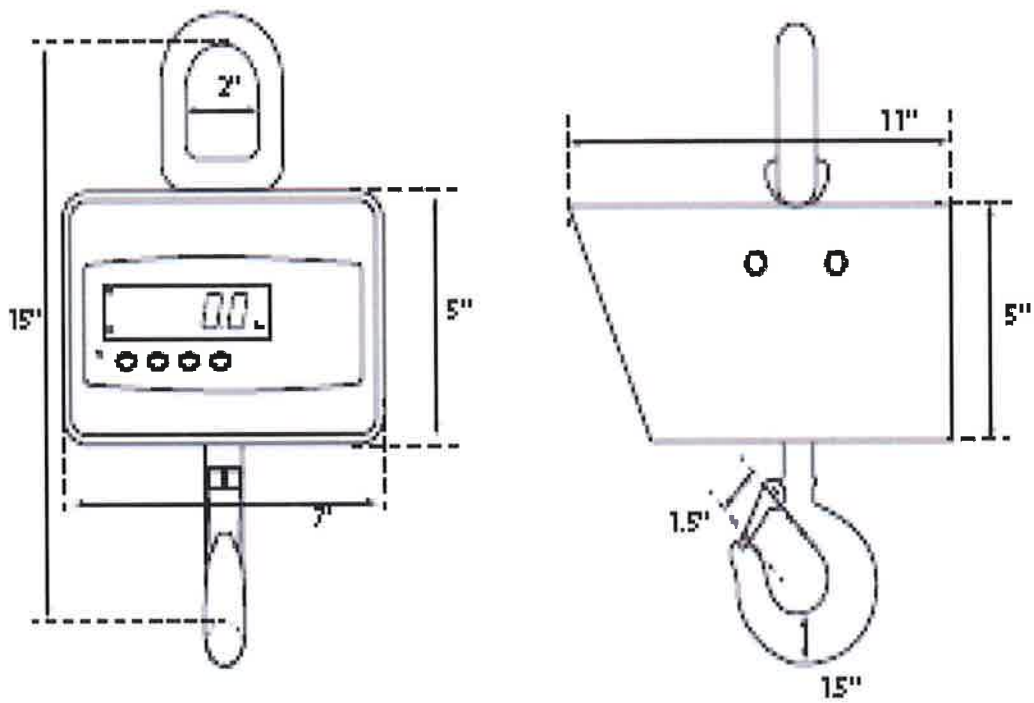
This manual will help you with proper operation and care of the 447 series crane scales. Please keep this manual handy for future reference.

## **SCALE FEATURES**

- Overload Capacity 500%
- NEMA 4 IP 65
- Full Tare Subtraction
- Auto Span Calibration
- Pounds And Kilograms Conversion
- 0.05% Accuracy Of Applied Load
- Automatic Overload Indication At 115%
- Solid Steel Construction
- Peak Hold, Hold
- Accumulation
- Counting Functions
- RS 232 and 4-20 mA Available
- Battery and Charger Included

# SCALE SPECIFICATIONS

## 500 lbs – 3,000 lbs. CAPACITY MODELS

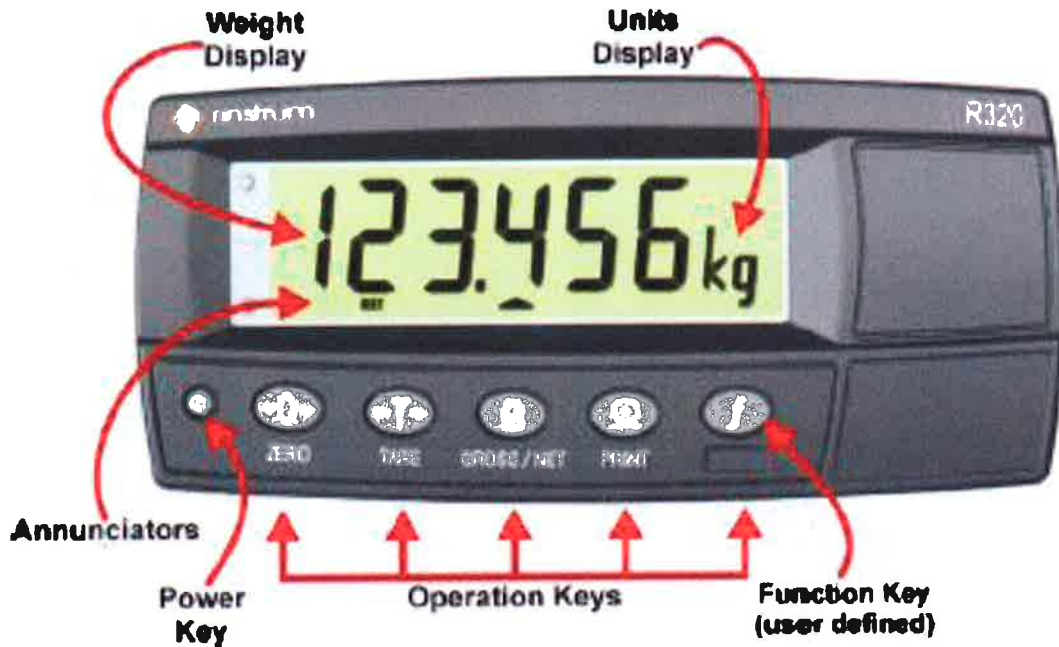


# INDICATOR SPECIFICATIONS




<b>Performance</b>		
Resolution	Up to 30,000 divisions, minimum of 0.25 $\mu$ V/division, 20 updates/second (Trade 4000 divisions at 0.8 $\mu$ V/division)	
Approvals	OIML (TC6242, T6244), CE, FCC, NSC (S420), C-Tick	
Zero Cancellation	$\pm$ 2.0mV/V	
Span Adjustment	0.1 mV/V to 3.0mV/V full scale	
Stability/Drift	Zero: $<$ 0.1 $\mu$ V/ $^{\circ}$ C (+ 8ppm of deadload max) Span $<$ 8 ppm/ $^{\circ}$ C, Linearity $<$ 20ppm, Noise $<$ 0.2 $\mu$ V/p-p	
Excitation	5 volts for up to 4 x 350 or 8 x 700 ohm load cells (4-wire or 6-wire plus shield) Maximum total load cell resistance: 1,000 ohms	
A/D Type	24bit Sigma Delta with 8,388,608 internal counts	
A/D Conversion Rate	20Hz with FIR filtering $>$ 80dB	
Operating Environment	Temperature: $-10$ to $+50^{\circ}$ C ambient, Humidity: $<$ 90% non-condensing Storage: $-20$ to $+50^{\circ}$ C ambient R310 and R320: IP55 when panel mounted, R321: IP65	
Case Materials	R310 and R320: ABS, Silicon Rubber, Nylon, Acrylic (no halogen used)	
Packing Weights	Basic Indicator - R310 and R320: 0.34kg, R321: 2.4kg	
<b>Digital</b>		
Display	LED Backlit LCD with six 20mm high digits with units and annunciators	
Setup and Calibration	Full digital with visual prompting in plain messages	
Digital Filter	Sliding window average from 0.1 to 4.0 seconds	
Zero Range	Adjustable from $\pm$ 2% to $\pm$ 20% of full capacity	
<b>Power Input</b>		
Standard Power Input	12 to 24VDC (2.5 VA max) - ON/OFF key with memory feature	
Variants	AC	AC Plug pack: 110/240VAC 50/60Hz in 12VDC 0.5A out
	Battery	4 x AA batteries (Alkaline or rechargeable NiMH, NiCad, etc.)
<b>Features</b>		
rin-LINK Data Coupling	Infra-red Connector for optional rin-LINK PC cable (to RS-232 PC port)	
R320 Extra Features	Five point linearity correction	
	RS-232 automatic transmit, network or printer outputs. Transmission rate: 2400, 4800 or 9600 baud	
	Assignable function key: Unit switching, counting, manual hold, peak hold, live weight and totalising	
	2 isolated transistor drive outputs (300mA total at 50VDC)	
	Battery backed clock calendar (Battery life 10 years minimum)	
R321 Features	Equivalent to an R320 with IP65 stainless steel housing.	

# INDICATOR DISPLAY AND CONTROLS



## KEYPAD BUTTONS AND FUNCTION

 The **<POWER>** key is used to turn the instrument on and off. To initially turn the instrument on, press and hold the **<POWER>** key. The display will show the following:

- Display segments will light and then clear.
- Software Version (eg. V1.0).
- Calibration Counter (eg. C.00010). information.
- The current weight will then display.

To turn the instrument off, press and hold the **<POWER>** key for three seconds. The instrument will display **OFF** followed by the three-second countdown.

When using batteries the backlight will automatically turn off to conserve power after a short period of inactivity. A short press of the **<POWER>** key will turn the backlight on again.

## ZERO Key



When an empty scale has drifted away from a true zero reading, this key is used to perform a zero adjustment on the scale display. On the **R320**, the zero adjustment is stored when power is removed and is re-used when next powered up.

## TARE Key



This key is used to temporarily set the scale to zero (such as cancelling the weight of a carton before performing a filling operation). The display will show the Net weight and the **NET** annunciator will be lit.

The **<TARE>** key can operate in all modes (ie. Industrial, OIML and NTEP).

## GROSS/NET Key



This key toggles the weight display between the Gross weight and the Net weight (provided that a Tare has previously been acquired using the **<TARE>** key).

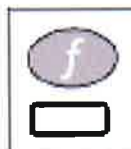
## PRINT Key (R320 only)



If a printer or computer has been attached to the instrument and the manual print function has been selected, the **<PRINT>** key will trigger an output of the current weight reading. The **PRINT** prompt is displayed while waiting for the printer to accept data. If the printer is offline the **PRINT** prompt will remain for a maximum of 10 seconds before the operation is cancelled. Each weight printed is automatically added to an internal Total Weight.









**Long Press:** A long press of the **<PRINT>** key will print the total. The total weight is then cleared automatically.

## FUNCTION Key (R320 only)



When leaving the factory, the **<FUNCTION>** key is blank and has no primary function pre-programmed. The primary function of this key can be selected from a number of different functions including peak-hold, counting, etc. Refer to Special Functions page 45 for details of the available functions. Each primary function has an associated overlay sticker that should be applied to the **<FUNCTION>** key to label the function of the key.

# ANNUNCIATORS

Symbol	Name	Description
	<b>ZERO</b>	Visible when the gross reading is within $\pm \frac{1}{4}$ of a division of true zero.
	<b>NET</b>	Visible when the displayed reading represents NET weight.
	<b>MOTION</b>	Visible when the displayed reading is not stable.
	<b>OVER</b>	Visible when the setpoint weight is over the setpoint target.
	<b>UNDER</b>	Visible when the setpoint weight is under the setpoint target.
	<b>ZERO BAND</b>	Visible when the displayed weight is within the zero 'dead' band setting. (The zero band symbol shows near the top right corner of the display.)
	<b>HOLD</b>	Visible when the displayed reading is held.
	<b>LOW BATTERY</b>	Visible when battery voltage is too low and batteries need replacing or recharging. (The low battery symbol shows in the top right corner of the display.)

## BASIC WEIGHING

### NORMAL WEIGHING


1. Ensure indicator is on and “Zero” annunciator is lit.
2. Secure item that is to be weighed properly to the scale.  
(ie... lifting hardware, straps, shackles, ect...)
3. Lift item slowly to avoid shock loading scale.
4. Read the displayed weight.

### USING TARE

1. Ensure that the “Zero” annunciator is lit and displaying “0”
2. Place lifting hardware or item to be tared on scale.

3. Press the “Tare” key.



4. The indicator will display “0” and the “Net” annunciator will be lit.
5. Weigh the desired item.
6. Press the “Gross/Net” key  to toggle between the net weight and the total weight.

## SPECIAL FEATURES

### UNITS SWITCHING (LB/KG)

Use the <UNITS> key to switch the displayed reading between **lb** and **kg**.

### COUNTING

Use this key to perform pieces counting. Press the <COUNT> key to switch between weight display and counts display. The unit annunciator shows **p** for pieces.

To record a new sample do the following:

- |  |
|--|
| • Tare off any containers.   |
| • Place the sample on the scale  |
| • Press and hold the <COUNT> key for two seconds. The default number of items in the sample will be displayed. |
| • Use the <SEL> and <EDT> keys to alter the number of items.   |
| • Press <OK> and the current sample will be stored against the entered items.                                  |
| • If printing is enabled the sample quantity and weight will be printed.                                       |

### HOLD AND PEAK HOLD

The <HOLD> key implements a manual **Hold** function. The <PEAK> key implements a **Peak Hold** function where the largest absolute weight, either positive or negative is stored in the peak value (eg. -30 is larger than 25). The **Hold** annunciator is active when the display is showing the held weight. Refer to Status Annunciators page 19.

To perform the **Hold** function, do the following:

- |   |
|---|
| • Press the manual <HOLD> key once to hold the current displayed weight.      |
| • Press the manual <HOLD> key again to return the display to normal weighing. |

To perform the **Peak Hold** function do the following:

- |   |
|---|
| • Press the <PEAK> hold key once to show the absolute peak weight reading.    |
| • Press the <PEAK> hold key again to return the display to normal weighing.   |
| • A long press of the <PEAK> hold key clears the peak value back to 0 (zero). |

All printouts that print the displayed weight will use the held weight reading if it is currently being displayed.

## LIVE WEIGHT

The **<LIVE.WT>** key is used to enable live weight averaging. With this feature, it is possible to determine the weight of a continually moving mass (eg. livestock).

- |  |
|--|
| <ul style="list-style-type: none"><li>• Press and hold the <b>&lt;LIVE.WT&gt;</b> key to switch between normal weighing and live weight mode. The display will briefly show <b>NORMAL</b> or <b>LIVE.WT</b>.</li></ul> |
|--|

During normal weighing, this key operates exactly like a manual **<HOLD>** key.

In Live-Weight mode the following sequence is followed:

- |  |
|--|
| <ul style="list-style-type: none"><li>• While the net weight is within the zero 'dead' band, the instrument shows the current weight.</li></ul>  |
| <ul style="list-style-type: none"><li>• Press the <b>&lt;TARE&gt;</b> or <b>&lt;ZERO&gt;</b> key to clear any residual weight and return the scale to the zero state.</li></ul>  |
| <ul style="list-style-type: none"><li>• Place the mass to be weighed on the scale.</li></ul>   |
| <ul style="list-style-type: none"><li>• Once the weight moves outside the zero 'dead' band the instrument begins to calculate a long term average that compensates for any movement in the mass. The instrument flashes the <b>Hold</b> annunciator and shows the current average value.</li></ul> |
| <ul style="list-style-type: none"><li>• The <b>Hold</b> annunciator is steady when the final sample weight is shown on the display.</li></ul>  |
| <ul style="list-style-type: none"><li>• Press the <b>&lt;LIVE.WT&gt;</b> key to force the sample to be re-calculated.</li></ul>  |
| <ul style="list-style-type: none"><li>• Once the weight is returned to the zero 'dead' band, the cycle can be repeated.</li></ul>  |

## SHOWING TOTALS

The **SHOW.T** item stands for **Show Total**. The function key will be labelled **<TOTAL>**.

The **PRINT** key is used not only to print the current weight but also to add that weight to the current total.

- |  |
|--|
| <ul style="list-style-type: none"><li>• When the <b>&lt;TOTAL&gt;</b> key is pressed the indicator displays <b>count</b> followed by the number of items in the total.</li></ul> |
| <ul style="list-style-type: none"><li>• After this, <b>TOTAL</b> is displayed followed by the current total weight.</li></ul>  |

If the total weight is too large to display in six digits, the weight is shown in two sections labelled with the upper six digits displayed before the lower six digits.

A long press of the **<PRINT>** key causes the total accumulated weight to be printed and then cleared. The SERIAL:TYPE option must be set to PRINT to activate this function.

## ERROR MESSAGES

Error	Description
(U-----)	The weight reading is below the normal weighing range.
(O-----)	The weight reading is above the maximum capacity of the equipment.
(ZERO)(ERROR)	The weight is outside the zero range tolerance setting. See Note below.
(STABLE)(ERROR)	The scale motion has prevented a zero, tare or print operation from occurring. See Note below.
(QA)(DUE)	Quality assurance testing is due. Press any key to clear this warning for one hour.

**Note:** The **ZERO** and **STABLE** error messages are accompanied by a series of long beeps. The messages repeat until a key is pressed.

## BATTERY OPERATIONS

**BAT** is flashed on the auxiliary display if the battery voltage falls below 11V. If the battery voltage falls below 10.5V the instrument automatically powers down.

# DIAGNOSTIC ERRORS

The instrument continually monitors the condition of the internal circuits. Any faults or out-of-tolerance conditions are shown on the display as an E type error message.

In the table below the following terms are used:

- Check: This item can be checked on site by service personnel.
- Return for Service: The instrument must be returned to the manufacturer for factory service.

Error	Description	Resolution
(E0001)	The power supply voltage is too low.	Check supply
(E0002)	The power supply voltage is too high.	Check scale / cables
(E0010)	The temperature is outside of allowable limits.	Check location
(E0020)	Scale build is incorrect. The number of graduations has been set too low or too high.	Fix up scale build
(E0100)	The digital setup information has been lost.	Re-enter setup
(E0200)	The calibration information has been lost.	Re-calibrate
(E0300)	All setup information has been lost	Enter setup and calibrate
(E0400)	The factory information has been lost.	Return for Service
(E0800)	The EEPROM memory storage chip has failed	Return for Service
(E2000)	ADC Out of Range Error. This may be caused from a broken load cell cable.	Check BUILD:CABLE setting. Check load cell cable, wiring, etc.
(E4000)	The battery backed RAM data has lost data.	Re-enter setup
(E8000)	The FLASH program memory is incorrect	Return for Service

The E type error messages are additive. For example if instrument is running off batteries and the temperature drops, the battery voltage may be too low. The resulting error messages will be **E 0011** (0001 + 0010). The numbers add in hexadecimal as follows:

**1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - A - B - C - D - E - F**  
 (For example, 2 + 4 = 6, or 4 + 8 = C)