CS1500
Users Manual

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Manual#: 700000-T

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Introduction

This manual contains specifications, operation instructions, and calibration instructions for Intercomp's model CS1500 crane scale.

Specifications

Controls

General:	Zero, lb/kg, Mode, Set, Print, Tare, On, Off
Display:	5 ½ digit LED or 5 digit LCD
Indicators:	lb/kg, Gross/Net, Total/Peak

Electrical

Batteries:	8 X D-size disposable alkaline dry cells or rechargeable Nickel-Cadmium cells.
Battery life:	Up to 90 hours with alkaline batteries. Approximately 30 hours on a set of fully charged Ni-Cad cells. (LED display)
Resolution:	20 bit A/D delivers over 1,000,000 internal counts.
Filtering:	6 Pole, 10 Hertz low pass.
Auto off:	Low battery, or after adjustable time without use or motion.
Sleep mode:	Display sleep mode after adjustable time without use or motion.
Auto-Zero:	Satisfies all HB-44 requirements; selectable 0.6, 1, or 3 graduations.

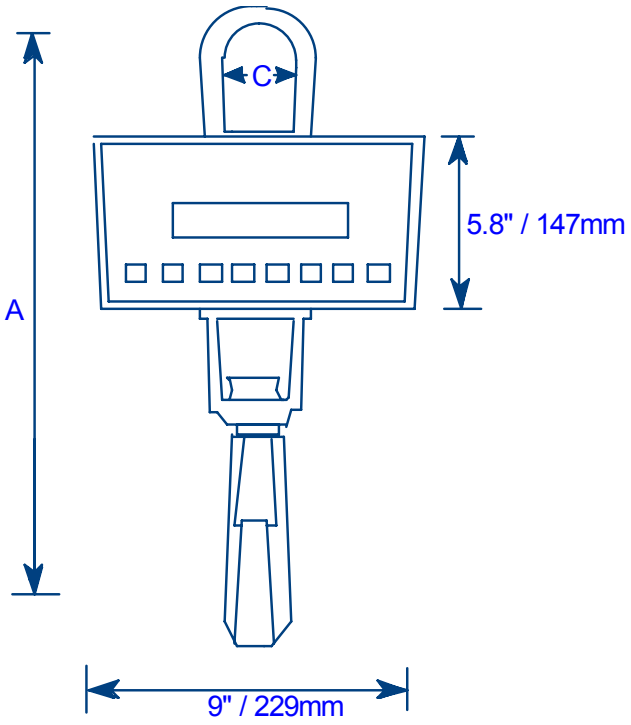
Performance

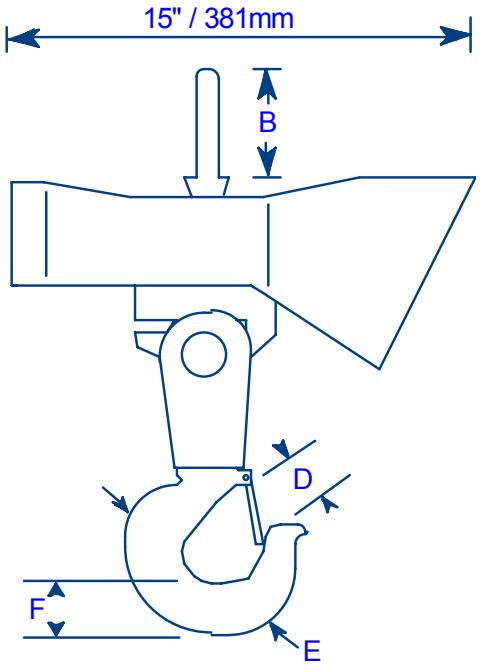
Accuracy:	±0.1% of applied load or ± display graduation, whichever is greater.

Environmental

Humidity:	10 to 95% Non-Condensing
Temperature:	Storage: -40 C to +75 C. / -40 F to +170 F.
	Operating -10 C to +50 C. / +14 F to +122 F.

Physical





Capacity	Graduation	A	B	C	D	E	F	Approx. Weight
250 lb 125 kg	0.1lb .05 kg	10.5 in 267 mm	2.38 in 61 mm	2.00 in 51 mm	0.97 in 25 mm	1.38 in 35 mm	0.84 in 22 mm	20 lb 9 kg
500 lb 250 kg	0.2 lb 0.1 kg	10.5 in 267 mm	2.38 in 61 mm	2.00 in 51 mm	0.97 in 25 mm	1.38 in 35 mm	0.84 in 22 mm	20 lb 9 kg
1,000 lb 500 kg	0.5 lb 0.2 kg	10.5 in 267 mm	2.38 in 61 mm	2.0 in 51 mm	0.97 in 25 mm	1.38 in 35 mm	0.84 in 22 mm	20 lb 9 kg
2,000 lb 1,000 kg	1 lb 0.5 kg	11.5 in 292 mm	2.38 in 61 mm	2.0 in 51 mm	0.97 in 25 mm	1.38 in 35 mm	0.84 in 22 mm	20 lb 9 kg
5,000 lb 2,500 kg	2 lb 1 kg	19 in 482 mm	2.88 in 73 mm	2.25 in 57 mm	1.69 in 43 mm	2.5 in 64 mm	1.82 in 46 mm	36 lb 16 kg
10,000 lb 5,000 kg	5 lb 2 kg	19 in 482 mm	2.88 in 73 mm	2.25 in 57 mm	1.69 in 43 mm	2.5 in 64 mm	1.82 in 46 mm	36 lb 16 kg
20,000 lb 10,000 kg	10 lb 5 kg	23 in 584 mm	3.5 in 90 mm	3.12 in 80 mm	2.41 in 62 mm	3.25 in 83 mm	2.60 in 66 mm	45 lb 20 kg

Weights and Measures

The CS1500 meets or exceeds class III standards for 3000 division accuracy from 300 lb to 20000 lb. The certification was completed by the National Type Evaluation Program (NTEP)s in accordance with the National Institute of Standards and Technology (NIST) Handbook 44. A NTEP Certificate of Conformance Number 97-135A4 was issued under the National Conference of Weights and Measures.

Also approved by Measurement Canada for 3000 division accuracy, accuracy class III, from 300 lb to 2000 lb. Approval no. AM-5228.

Optional Equipment

RS232 Serial data output (100721)
This option adds an RS232 connection so the unit may communicate with a computer or remote display.

LCD Display (100726)
Optional LCD (liquid crystal display) display instead of the standard LED display.

LED Display for CS1500 Stainless model (100725)
Optional LED (light emitting diode) display instead of the standard LCD (liquid crystal display) display. An LED display is fully readable in pitch-dark lighting situations.

Battery pack and 120V external charger (100730)
Rechargeable Ni-Cad battery pack (8 D-cells) with 120V external charger. Standard power uses 8 disposable alkaline dry cells.

Battery pack and 220V external charger (100731)
Rechargeable Ni-Cad battery pack (8 D-cells) with 220V external charger. Standard power uses 8 disposable alkaline dry cells.

Direct Power on crane unit, 120V (100723)
This option allows the CS1500 to use 120V power instead of batteries.

Direct Power on crane unit, 220V (100727)
This option allows the CS1500 to use 220V power instead of batteries.

Operations

Operating Practices

Warning: The crane scale will be operated by qualified designated persons, trainees under the direct supervision of designated persons, maintenance and test personnel when in performance of their assigned duties, or lifting device inspectors.

Warning: Do not exceed the rated load limit of the crane scale.

Warning: The crane scale shall be applied to the load in accordance with the instruction manual.

Warning: Prior to lifting the operator shall make sure that all ropes or chains are not kinked and if multiple lines are used they are not twisted around each other.

Warning: Ensure that the load is correctly distributed for crane scale use.

Warning: Ensure the temperature of the load does not exceed the maximum temperature limits of the crane scale.

Warning: Ensure that swinging of the crane scale is minimized when positioning it over the load.

Warning: Avoid any sudden acceleration of deceleration when moving the load.

Warning: Do not allow the crane scale or the lifter to come into contact with any obstruction when moving the load.

Warning: Do not operate the crane scale if it has damaged, malfunctioning or missing parts.

Warning: Do not lift people with the crane scale.

Warning: Do not lift suspended loads over people.

Warning: Do not use the crane scale to pull side loads or to slide loads unless specifically authorized by a qualified person.

Warning: Do not leave suspended loads unattended.

Warning: Do not remove or obscure warning labels.

Warning: Do not operate the crane scale without having read and understood the operating manual.

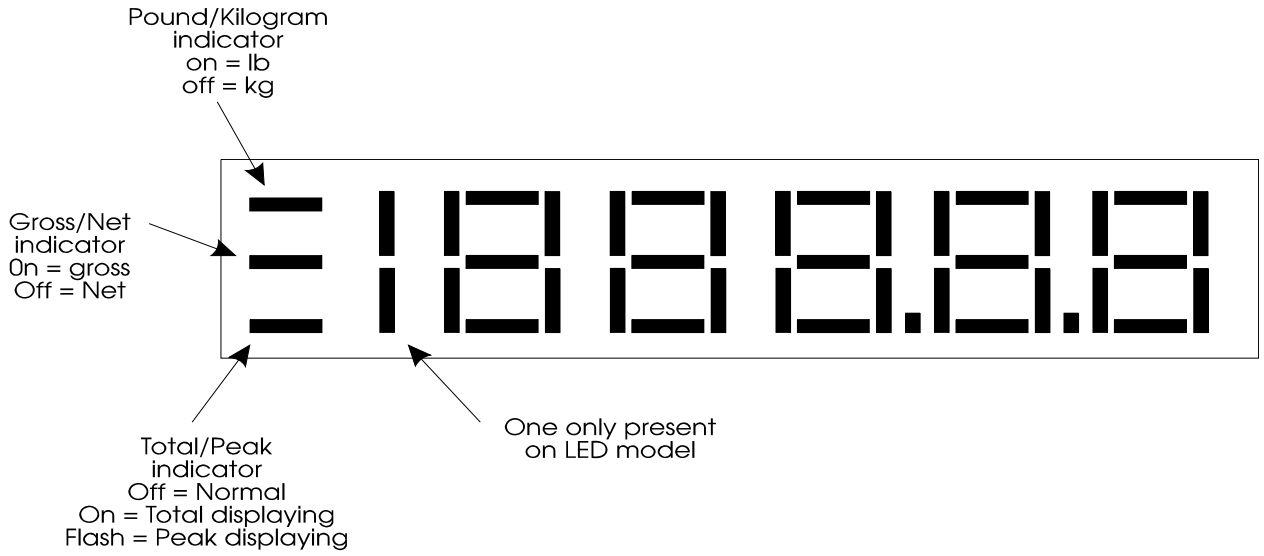
Warning: Stay clear of suspended loads.

Warning: Do not lift loads higher than necessary.

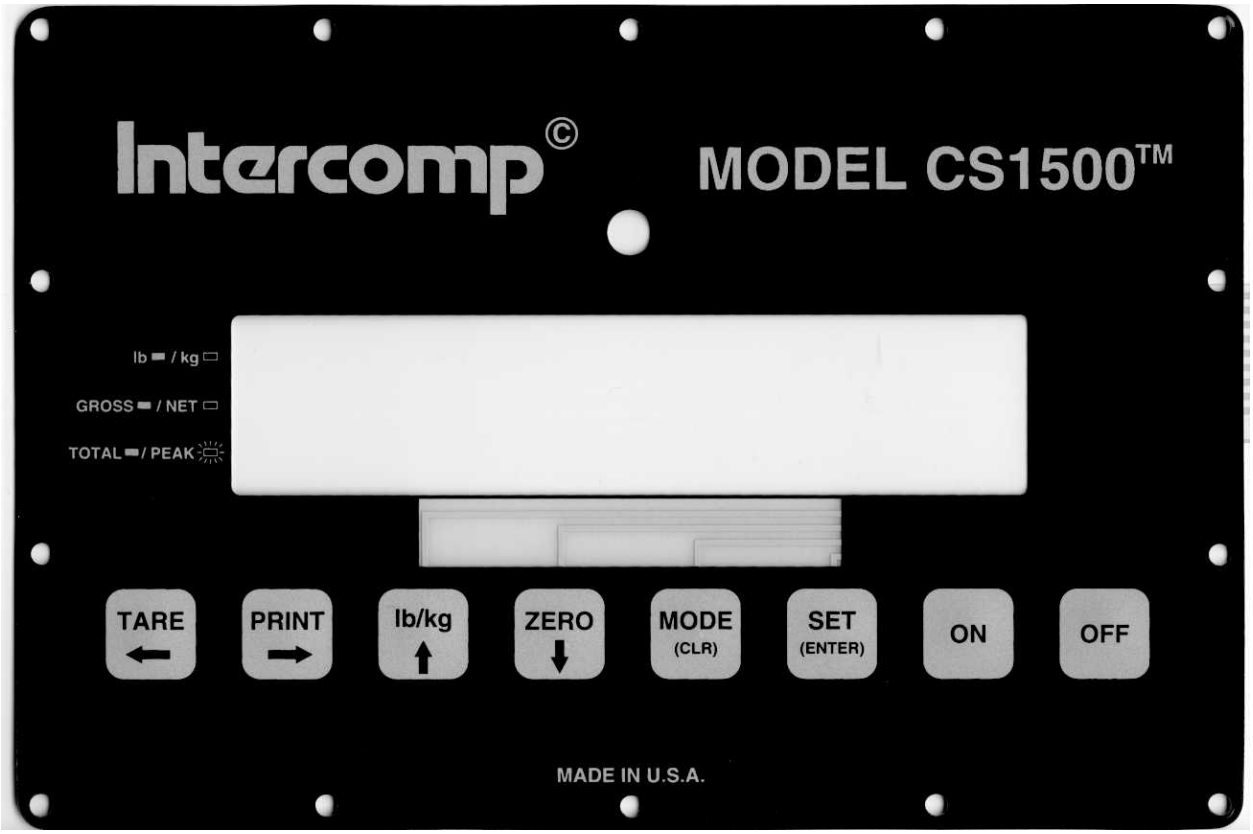
Warning: Do not make alterations or modifications to the crane scale.

Warning: Ensure all portions of the human body are kept clear of all device involved with the rigging during the lift.

Display



Controls



ON

Press this button to turn the scale on. The scale tests itself; when these tests have completed successfully, the system begins weighing.

Note: If you used the remote control to turn off the scale (the last time), you must first press the OFF key, then press the ON key.

OFF

Press this button to turn the scale off.

ZERO

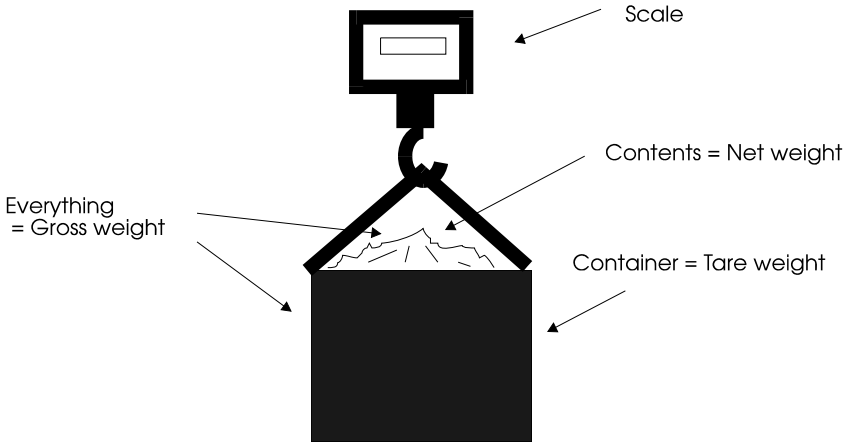
Tells the scale to display a zero weight. This button is used any time the scale shows a non-zero value with no weight on the hook. If you press ZERO with weight on the hook, that weight becomes the zero condition for the scale. This can be useful to cancel the weight of any weighing fixtures, such as containers, chains or cables. When this weight is removed, a negative weight shows until the system is zeroed again. NOTE: The “zero” command will be delayed any time a change in weight is detected. If there is continuous motion for more than 20 or 30 seconds, the zero command will be rejected and the scale will return to normal weighing.

NOTE: The scale contains a feature called Auto Zero Tracking (AZT), which

corrects for slight zero changes during normal operation. If small weights are added slowly, the scale could zero them off.

Lb/Kg

Toggles the weighing system between pound (English) and kilogram (SI metric) units of measure. The current unit of measure is shown by the top indicator on the left side of the display. If the scale is displaying pounds the indicator is on, if the scale is displaying kilograms the indicator is off. Note: Switching units clears the saved total and the peak value.



TARE Set/Display

Pressing the TARE key will set the tare equal to the current gross weight and switch the display to net weight. This is shown by the middle indicator on the left being turned off. The net weight is equal to the gross weight minus the tare weight. The tare weight will only be set if the current gross weight is positive. NOTE: The “tare” command will be delayed any time a change in weight is detected. If there is continuous motion for more than 20 or 30 seconds, the tare command will be rejected and the scale will return to normal weighing.

Push-button versus keyboard:
If the CS1500 is configured to have keyboard tare, pressing the tare key will bring up a screen that allows the user to enter a tare value. See the calibration section for how to configure the CS1500 for keyboard tare and how to enter a number. If the keyboard tare is being used the tare value is cleared when switching from pounds to kilograms or kilograms to pounds.

Displaying the tare weight:
If a tare weight is set, pressing the TARE key will display the current value of the tare. The tare will be displayed as long as you hold the key.

Clearing the tare:
Pressing the ZERO key than the TARE key, and releasing together will reset the tare to zero.

PRINT

If the scale is configured to demand output, pressing the print button will print a ticket. NOTE: The print ticket will be delayed any time a change in weight is detected. If there is continuous motion for more than 20 or 30 seconds, the print request will be rejected and the scale will return to normal weighing.

MODE

Moves through the available display modes; each time you press the button the display steps to the next mode.

The 3 display modes are:

Weight on the scale (lower indicator will be off)
Total accumulated weight (lower indicator will be on)
The peak weight experienced (lower indicator will be blinking)

Each press of the MODE key will move to the next piece of information. For example, if the peak weight is currently being viewed and the MODE key is pressed the scale will return to showing the weight on the scale.

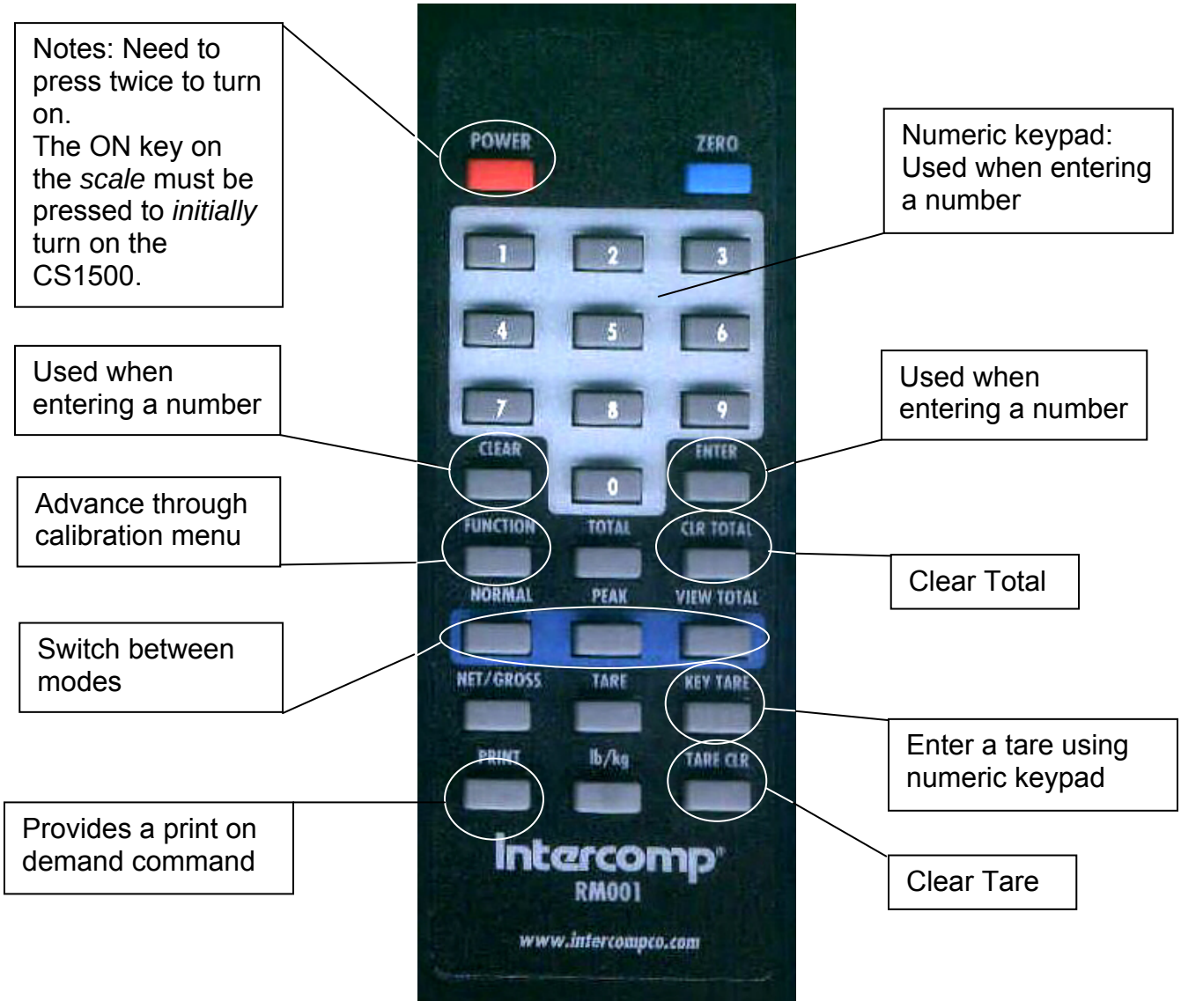
Totalizing:
Press the SET key to add the current net weight to the total accumulator. Use the MODE key to display the current total accumulated weight.

Clearing total:
Press the SET and ZERO keys and release together while viewing the total accumulated weight to zero the current total.

Peak hold:
The peak hold feature will remember the maximum weight applied. To view the current peak value, use the MODE key. To clear the peak weight press the SET and ZERO keys and release together while viewing the current peak weight.

Remote Control

All keys on the remote control are functional for the CS1500. This diagram aims to clarify any remote control functions that may not be obvious.



Remote Control Keypad Layout

Power/Batteries

Replacement
Remove the two caps in the back of the unit. Tip the old cells out. Change the cells, being careful to put the positive end in first (The end with the bump). Replace the battery caps.

You may use rechargeable Nickel-Cadmium “D” cells or standard “D” cells in the CS1500.

Warning: Do not plug the charger in while there are standard “D” cells inside. This could result in damage to the batteries and your scale.

Rechargeable (Ni-cad)
The typical recharge time for ni-cad cells is 16 hours. The rechargeable batteries have a life span up to 1000 cycles.

Maintenance

Periodic Inspection

The crane scale and all associated adaptive devices require periodic inspection and maintenance. The frequency and recording of the inspection requirements are found in service categories below and are dependant on the type of service that the equipment is used in as described below.

Service Categories

Normal Service – Crane scale is operated at less than 85% of it's capacity except for isolated instances. Complete the frequent service inspection monthly and record the periodic service inspection annually.

Heavy Service – Crane scale is operated at 85% - 100% of it's capacity as part of normal usage. Complete the frequent service inspection weekly to monthly and record the periodic service inspection semi-annually.

Severe Service – Crane scale is operated at 85% - 100% of it's capacity and used in environmental conditions that are unfavorable, harmful or detrimental to the use of the crane scale. Complete the frequent service inspection daily to weekly and record the periodic service inspection quarterly.

Inspection Requirements

Frequent Service Inspection (records not required)
A frequent visual inspection is completed at intervals indicated by the service category above by the operator or designated person of the following.

1. Inspect for structural deformation, cracks or excessive wear of any part of the crane scale or associated adaptive devices.
2. Inspect for loose or missing guards, fasteners, covers, stops, or nameplates.
3. Inspect all functional operating mechanisms and automatic hold and release mechanisms for improper adjustments interfering with operation of the crane scale or associated adaptive devices.
4. Inspect for distortion such as bending, twisting, or increased throat opening (if applicable)

Periodic Service Inspection (records required)
A periodic visual inspection is completed at intervals indicated by the service category above by the operator or designated person and documented to provide the basis for continuing evaluation. The periodic inspection will cover areas in the frequent service inspection above and the following.

1. Inspect for loose bolts or fasteners.
2. Inspect for cracked or worn gears, pulleys, sheaves, sprockets, bearings, chains, and belts.
3. Inspect for excessive wear of linkages and other mechanical parts.

4. Inspect for excessive wear at hoist hooking points and load support clevices or pins.
5. Inspect for any visible bends or twists of all used rigging devices.
6. Inspect all latches and locks for proper operation (if applicable)

Removal from Service Criteria

Note: Replacement parts of any device or parts of any device used in any aspect of rigging to lift a load shall be at least equal to the original manufacture's specifications

Hooks

Hooks shall be removed from service if damage such as the following is found and shall only be returned to service if a qualified person approves their continued use and initiates corrective action.

1. Hooks show cracks, nicks, or gouges.
2. Hook has wear exceeding 10% of the original sectional dimension.
3. Hook has any visible bend or twist from the plane of the unbent hook.
4. Hook has an increase in throat opening of 5% not to exceed ¼ of an inch.
5. If self-locking hooks have the inability to lock.
6. A hook latch that is inoperable (if applicable)

Shackles

Shackles shall be removed from service if damage such as the following is visible and shall only be returned to service when approved by a qualified person.

1. If the manufacturers name or trademark and / or the rated load identification is missing or illegible.
2. The device shows signs of heat damage including weld spatter or arc strikes.
3. The device shows excessive pitting or corrosion.
4. The device is bent, twisted, distorted, stretched, elongated, cracked, or has broken load-bearing components.
5. The device has excessive nicks or gouges.
6. The device has a 10% reduction of the original or catalog dimension at any point around the body or pin.
7. The device has incomplete pin engagement.
8. The device has excessive thread damage.
9. The device shows evidence of unauthorized welding.
10. Any other condition including visible damage that causes doubt to the continued use of the shackle.

Calibration

How to test the calibration

This calibration procedure should be performed annually for normal operating conditions. If the scale is dropped or damaged, or service has been performed on the scale, use this calibration check. Recommend calibration points at 10% intervals from 10% through 100% of the scales capacity.

1. Press the ON switch. The display does a lamp test; during this time the scale does a quick check of itself. Then the weighing system starts weigh mode.
2. Intercomp recommends that you allow the electronics to operate for three minutes after first turning power on. This allows the electronics to become stable for maximum accuracy before you check the calibrations.
3. Make sure no weight is on the hook. Press the ZERO switch. Press the TARE and ZERO key to clear tare. The weight shown is zero.
4. Apply weights throughout the weighing range, and verify the correct weight is displayed at each step. (+/- 0.1% of applied load or ±1 display graduation, whichever is greater)
5. If possible apply a weight of 105% of capacity, and verify the scale shows OE on the display.
6. Remove weights and verify the display returns to zero.
7. If there is a failure to meet any of the conditions above, please refer to the Calibration Procedure.
8. When all the conditions above are correct, the scale is operational.

How to enter a number

During this routine you will be asked to enter numbers at many points. The scale will show a number (originally all zeros) with a blinking digit. At this point the commands listed at the bottom of the keys become active. Press the UP and DOWN arrow keys to increase the blinking digit. Press the LEFT and RIGHT arrow keys to move to other digits. When you are finished entering the number, simultaneously press the ZERO and lb/kg keys. You can clear the entry by pressing CLR key.

Three point span

The scale has a three point calibration feature which reduces the effects on non-linearity in the load cells. This requires that you place three weights on the cell during calibration. The first weight must be greater than zero, the second greater than the first, and the final weight somewhere between the second and the capacity.

Calibration switch

The calibration of the scale is protected from accidental change by a shunt placed on "CAL" (instead of "RUN") of J8, located on the top/middle of the A/D 20 BIT circuit board.

Enabling the Calibration

The shunt must be moved from "RUN" to "CAL". When you are done calibrating, place the shunt back on "RUN" to protect the calibration from change.

How to calibrate the scale

The following details the calibration procedure for the crane scale. There are eight parameters that can be set without moving the calibration blocking switch, followed by five more parameters and calibration that require the calibration blocking switch be in the enabled position.

Step	Display	Parameter	Note	Default
4	EE-EE	Skip	0=no skip, 1=EE- 10, 2=LL-00	0
5	EE-00	Sample Rate	1 to 64	4
6	EE-01	Update Rate	1 to 32	4
7	EE-02	Demand Output	1=Yes, 0=Continuous	1
8	EE-03	Baud Rate	0 to 9	0
9	EE-04	Auto-off Time	0 to 255; 0=off	20
10	EE-05	Power up in KG	1=kg, 0=lb	0
11	EE-06	Tare Type	1=keyboard, 0=push-button	0
12	EE-07	Sleep Mode Time	0 to 255; 0=off	5
13	EE-08	Set Point 1	1 to 99999	99999
14	EE-09	Set Point 2	1 to 99999	99999
		Information saved		
		Check for calibration blocking switch		
15	EE- 10	AZT	0=off,1=0.6,2=1,3=3	2
16	EE- 11	Zero Range	0=off,1=on	0
17	EE- 12	Canadian Specifications	0=off, 1=on	0
18	EE- 13	Initial Zero Range	0=off, 1=on	0
19	EE- 14	Graduation	0 to 11	6
20		Information saved		
21	LL-00	Zero read	Enter capacity	
22	LL-01	First weight	Enter first weight	
23	LL-02	Second weight	Enter second weight	
24	LL-03	Third weight	Enter third weight	
25		Information saved		

Start up

1. Move the calibration blocking switch to the "CAL" position if you intend to calibrate.

2. Turn scale power ON and wait for scale to warm up (3 minutes from power on).
3. Press ZERO and lb/kg keys together and release to enter the calibration mode.

First ten parameters

4. The scale shows "EE-EE". Simultaneously press the ZERO and lb/kg keys. To skip to "EE- 10" enter a "1". To skip to "LL-00" enter "2". No skips will occur with an entry of "0".

   Note: If you don't know how to enter a number, see section titled "How to enter a number".

5. The scale shows "EE-00". Simultaneously press the ZERO and lb/kg keys. Enter the sample rate (1 to 64). The sample rate is the number of past readings that are averaged together to make a reading.
6. The scale shows "EE-0 1". Simultaneously press the ZERO and lb/kg keys. Enter the update rate (1 to 32). The update rate is the speed at which the displayed weight is updated. The smaller the number the faster the display will be updated.
7. The scale shows "EE-02". Simultaneously press the ZERO and lb/kg keys. Enter demand versus continuous on the optional serial output. See Serial Output section.

Setting	Type
0	Continuous
1	Demand

8. The scale shows "EE-03". Simultaneously press the ZERO and lb/kg keys. Enter the baud rate of the serial output (0 to 7).

Setting	Baud Rate
0	9600
1	4800
2	2400
3	1200
4	600
5	300
6	150
7	75
8	19.2K
9	38.4K

9. The scale shows "EE-04". Simultaneously press the ZERO and lb/kg keys. Enter the auto off time in minutes (0 to 255). The auto off time is how long the scale will remain ON without any activity (a key being pressed or a change in weight). An entry of 0 turns the auto off feature OFF.

10. The scale shows "EE-05". Simultaneously press the ZERO and lb/kg keys. Enter what unit of measure the scale should turn ON in; pounds or kilograms (0 to 1).

Setting	Units to turn ON in
0	pounds (lb)
1	kilograms (kg)

11. The scale shows "EE-06". Simultaneously press the ZERO and lb/kg keys. This function not used by CS1500.

12. The scale shows "EE-07". Simultaneously press the ZERO and lb/kg keys. Enter the sleep mode time in minutes (0 to 255). The sleep mode time is how long the scale's display will remain ON without any activity (a key being pressed or a change in weight). An entry of 0 turns the sleep mode feature OFF. The sleep mode is designed to conserve battery life on scales with a LED display.

13. The scale shows "EE-08". Simultaneously press the ZERO and lb/kg keys. Enter set point 1.

    SET POINT 1
    This is an optional feature that allows for an external set point. When the specified weight (set point) is reached, a logic level high will be on the set point connection. Set points are used with some other device (e.g. alarm, relay) in conjunction to the CS1500.
    To activate a set point press the Set Point 1 (or Set Point 2) key. Enter the weight you want the set point to activate.

    SET POINT 2
    Operates the same as Set Point 1.

    Note: If the scale is over capacity ("OE" will be displayed) the set points will always become active.

14. The scale shows "EE-09". Simultaneously press the ZERO and lb/kg keys. Enter set point 2.

Check for calibration blocking switch

•At this point the scale saves any changes that have been made.

•A check is than made to see whether or not the calibration blocking switch is enabled. If enabled, (CAL), the calibration procedure will continue. if disabled, (RUN), the scale returns to normal weighing.

Last five parameters

15. The scale shows "EE- 10". Simultaneously press the ZERO and lb/kg keys. Enter the AZT size (0 to 3). The AZT size is the number of graduations the auto zero tracking can remove.

Setting	AZT size
0	Off
1	0.6
2	1.0
3	3.0

16. The scale shows "EE- 11". Simultaneously press the ZERO and lb/kg keys. Enter whether the zero range is on or off (0 to 1). If the zero range is ON the push-button zero and AZSM can only operate within +/- 5% of the original zero obtained at calibration.

Setting	Zero range
0	Off
1	On

17. The scale shows "EE- 12". Simultaneously press the ZERO and lb/kg keys. The scale shows the current Canadian specification selection. Use the following table to select the Canadian specifications setting. When Canadian specifications are set (1): EE- 10, EE- 11, and EE- 13 have no meaning.

Setting	Canadian Specification
0	Off
1	On

A "0" setting implies normal operation:

1: AZT size is determined by the setting of EE- 10.

2: Zero operates over full range allowed by EE- 11.

3: The over-capacity point is determined by the setting of EE- 13.

A "1" setting implies Canadian specifications are used.

1: The AZT size fixed at 0.6d regardless of EE- 10 setting.

2: The IZSM (initial zero setting mechanism on power up) must be within +/- 10% of the zero obtained at calibration.

3: The push-button zero and AZSM can only operate within +/- 2% of the IZSM.
4: The over-capacity point is 103% of capacity above the IZSM.

18. The scale shows "EE- 13". Simultaneously press the ZERO and lb/kg keys. The scale shows the current initial zero range setting. Use the following table to select the "initial zero range" setting:

Setting	Initial zero range
0	Off
1	On

A "0" setting implies:
1: The initial zero setting mechanism (IZSM) will work over the entire range of the scale capacity.
2: The over-capacity point is 103% above the zero obtained at calibration.

A "1" setting implies:
1: The IZSM must be within +/- 10% of the zero obtained at calibration.
2: The over-capacity point is 103% above the IZSM.

19. The scale shows"EE- 14". Simultaneously press the ZERO and lb/kg keys. The scale shows the current graduation selection. Use the following table to select a graduation value.

Settings	Count by in lb	Count by in kg
0	100	50
1	50	20
2	20	10
3	10	5
4	5	2
5	2	1
6	1	0.5
7	0.5	0.2
8	0.2	0.1
9	0.1	0.05
10	0.05	0.02
11	0.02	0.01
12	0.01	0.01

NOTE: The stated accuracy specifications are based on the graduation setting in the table below. If the graduation setting is set other than the value in the table below the accuracy specification remains with the graduation size listed below.

If your capacity is:	Set your graduation to:
300 lb / 150 kg	.1 lb / 0.05 kg (9)
500 lb / 250 kg	0.2 lb / 0.1 kg (8)
1000 lb / 500 kg	0.5 lb / 0.2 kg (7)
2000 lb / 1000 kg	1 lb / 0.5 kg (6)
5000 lb / 2500 kg	2 lb / 1 kg (5)
10000 lb / 5000 kg	5 lb / 2 kg (4)
20000 lb / 10000 kg	10 lb / 5 kg (3)

Save

•At this point the scale saves any changes that have been made. This allows changes to be made to "EE- 10" through "EE- 14" without having to do a complete calibration. The scale can be turned off and any changes so far will be saved.

Weight calibration

20. The scale shows "LL-00". With no weight on hook simultaneously press the ZERO and lb/kg keys. This reads the pad zero. On the next screen, enter the scale's capacity.
21. The scale shows "LL-01". Apply the first weight. With the first weight stable on the hook, simultaneously press the ZERO and lb/kg keys. Then enter the value of the applied weight.
22. The scale shows "LL-02". Apply the second weight. With the second weight stable on the hook, simultaneously press the ZERO and lb/kg keys. Then enter the value of the applied weight.
23. The scale shows "LL-03". Apply the third weight. With the third weight stable on the hook, simultaneously press the ZERO and lb/kg keys. Then enter the value of the applied weight.

Finish

The new calibration information is saved.

24. Return the calibration blocking switch to it's original position (RUN). This prevents accidental entry into the calibration mode.
25. Verify the calibration.
26. Calibration complete.

Legal-for-Trade Sealing

1. On the front of the CS1500, replace the 2 upper right screws with the drilled screws provided.
2. Thread a lead & wire seal through these 2 screws.
3. Crimp the lead seal tightly.

Troubleshooting

Caution

Changing some parts on the circuit board may cause a large change in calibration while others may or may not change the calibration, depending on the nature of the problem.

The reference designators for the IC chips are on the "A/D 20-BIT" board unless indicated otherwise.

Problem: no power, nothing on display

Fix:

If nothing can be seen on the display, there probably is no power reaching the scale circuitry. Possible causes: bad or shorted battery pack, bad switch circuit, bad voltage regulator, or bad keypad. Power might be reaching the unit, but the power supply might be shorted by a component or PCB trace in the power supply circuitry.

Problem: random display (display usually reads "8.8. 8.")

Fix:

Check crystal (Y1). If the micro-controller is not receiving the correct or any oscillation, the microprocessor is not able to function properly. Other possibilities could be bad microprocessor (U1) or display driver (U1 & U2 on "GPI DISPLAY" board) circuitry not functioning.

Problem: low battery indicator won't turn off (display blinks "Lb")

Fix:

The display will be blinking "Lb". Check to make sure battery power is too low. Look at the cells and charger circuit for these problems. If that is not the cause, the display driver (U1 & U2 on the GPI display board) or low voltage circuitry could be bad.

Problem: rechargeable battery life has decreased

Fix:

The rechargeable batteries provided by Intercomp are high quality, high capacity Ni-Cad. However, all Ni-Cad batteries can exhibit some "memory" effects if they are repeatedly discharged to a certain point before recharging. If your observed battery life has decreased significantly from its initial performance, you may want to try this battery-conditioning sequence: Fully discharge the batteries by running the CS1500 until the display blinks "LB" (low battery) and keep the unit powered until the batteries are fully discharged. Following this, recharge the battery completely (typical charge time is 16 hours). This discharge/recharge cycle may need to be repeated. If this does not help, you may need to replace the Ni-Cad batteries.

Problem: scale shuts off by itself

Fix:

Check the battery holder terminals. They may be bent and not making solid contact. If the scale turns off immediately after you take your finger off the button, there may be defective power circuitry or a bad keypad.

Problem: scale "locks up"

Fix:

The microprocessor (U1) may need to be replaced. The microprocessor support circuitry could also be bad.

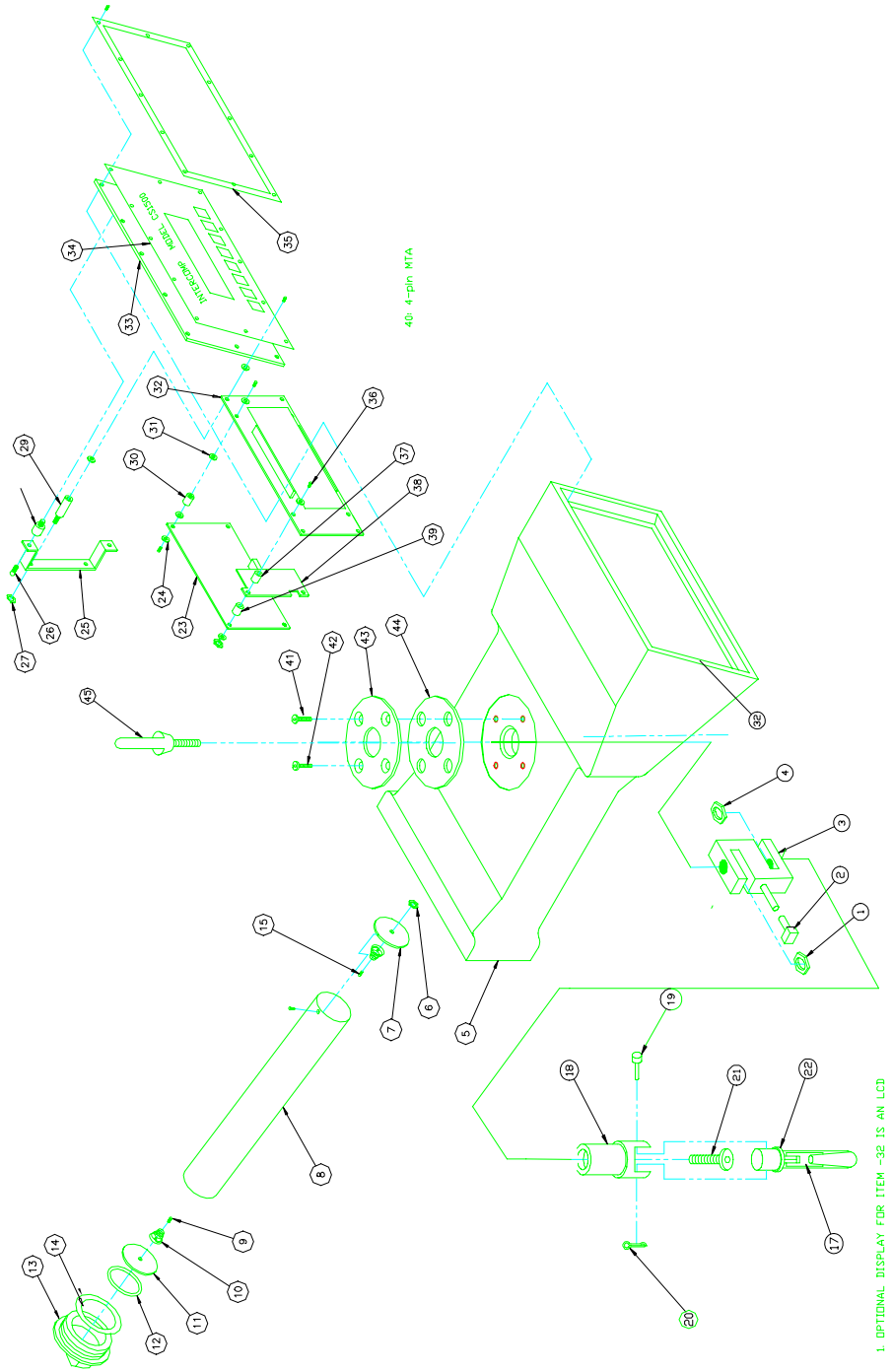
Problem: weights jump or drift

Fix:

Try increasing the sample rate as described in the calibration section (pg 13). If this does not help, the problem could be a bad load cell, defective amplifier (U5), bad A/D chip (U6), or contamination on the circuit board.

Parts and Accessories

Diagram: 250 lb, 500 lb capacity models

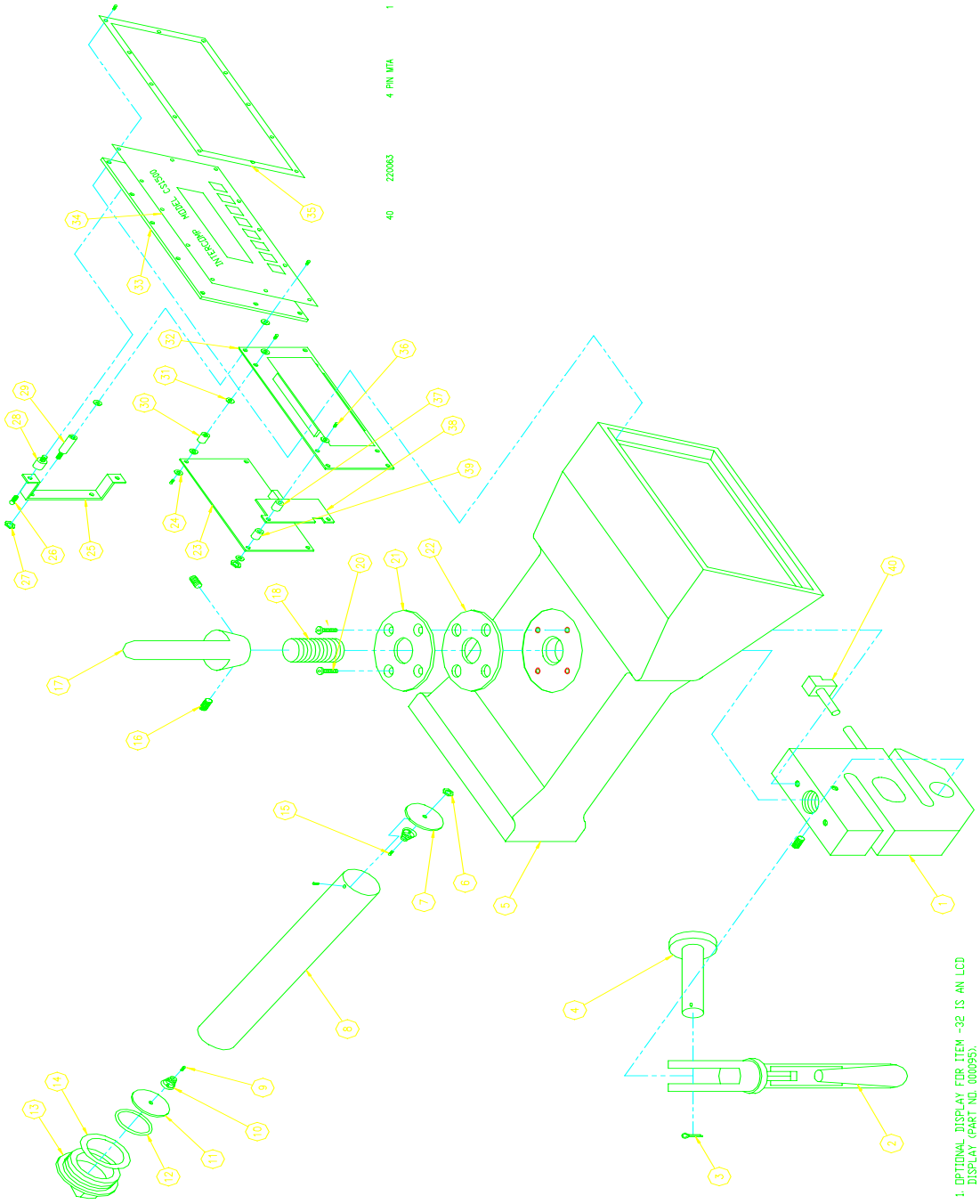


See following page for parts list

Parts List: 250 lb, 500 lb capacity

Item #	QTY	Part #	Description
1	1	601008	jam nut
2	1	220063	4-pin MTA
3	1	603055	loadcell (250, 500 capacity CS1500)
4	1	601008	jam nut
5	1	500742	scale housing
6	1	601003	8-32 nut
7	2	500708	end plate
8	2	500707	battery tube
9	26	600008	6-32 screw
10	4	330030	battery spring
11	2	500706	battery cap plate
12	2	280074	cap plate back spring
13	2	500705	battery cap
14	2	602422	o-ring
15	2	600014	8-32 screw
17	1	603000	safety latch
18	1	500608	swivel
19	1	601055	.250 clevis pin
20	1	601056	cotter pin
21	1	602009	.25-28 shoulder bolt
22	1	500607	hook
23	1	000094	A/D board
24	18	601207	.031 nylon washer
25	2	500703	board mounting strap
26	4	600012	8-32 screw
27	6	601002	6-32 nut
28	4	601311	8-32 vibration mount
29	4	601315	6-32 standoff
30	2	601301	6-32 f/f standoff
31	2	601208	.062 nylon washer
32	1	000092	LED display board
33	1	500737	display plate
34	1	250001, 250087	keypad assembly
35	1	500730	bezel frame
36	2	600163	6-32 screw
37	2	601314	.25 spacer
38	1	502859	heatsink plate
39	2	601313	.19 spacer
40	1	220063	4-pin MTA
41	1	600020	.25-20 torx screw long
42	1	600020	.25-20 torx screw long
43	1	500709	retaining ring
44	1	500710	retaining ring gasket
45	1	500614	top lifting eye assembly

Diagram: 1K lb - 20K lb capacity models



Please see following page for parts table

Parts List: 1K lb - 20K lb capacity

Item #	QTY	Part #	Description
1	1	000062 000061 000063	loadcell (1K, 2K capacity CS1500) loadcell (5K, 10K capacity CS1500) loadcell (20K capacity CS1500)
2	1	603059	yoke assembly
3	1	601804	cotter pin
4	1	603060	yoke pin
5	1	500742	scale housing
6	1	601003	8-32 nut
7	2	500708	end plate
8	2	500707	battery tube
9	26	600008	6-32 screw
10	4	330030	battery spring
11	2	500706	battery cap plate
12	2	280074	cap plate back spring
13	2	500705	battery cap
14	2	602422	o-ring
15	2	600014	8-32 screw
16	4	600023	.25-20 set screw
17	1	500754	eye nut
18	1	500740	loadcell adapter
19	2	600019	.25-20 torx screw short
20	2	600020	.25-20 torx screw long
21	1	500709	retaining ring
22	1	500710	retaining ring gasket
23	1	000094	A/D board
24	18	601207	.031 nylon washer
25	2	500703	board mounting strap
26	4	600012	8-32 screw
27	6	601002	6-32 nut
28	4	601311	8-32 vibration mount
29	4	601315	6-32 standoff
30	2	601301	6-32 f/f standoff
31	2	601208	.062 nylon washer
32	1	000092	LED display board
33	1	500737	display plate
34	1	250001, 250087	keypad assembly
35	1	500730	bezel frame
36	2	600163	6-32 screw
37	2	601314	.25 spacer
38	1	502859	heatsink plate
39	2	601313	.19 spacer
40	1	220063	4-pin MTA

Error Messages

[Minus signs cycle across the display]: The CS1500 has entered sleep mode.
Press any key or change the weight to return to normal weighing.
NOTE: a pressed key here will perform its designated function as well as exit the scale from sleep mode.

[Minus signs fill the display]: The CS1500 is waiting for a stable reading to continue.

Lb	Low batteries. This message blinks, and if ignored too long the unit will shut itself off.
OE	The scale is over capacity or outside the A/D converter range. Reduce the load to the scale.
dI SE	Display error, the scale is unable to display the number completely. Press zero to return the weight reading to zero.
EEPE	EEPROM error, the scale has had it's calibration corrupted or destroyed; the scale will require calibration.
OL	Zero overload; the CS1500 has attempted to zero a reading outside of its zero-range limit. This message can occur only when the “Zero range” or “Canadian specifications” is turned on. See EE- 11 and EE- 12 in the “calibration” section.
E-0	This message occurs if the scale is turned on with a load applied which is greater than +/- 10% of capacity. Return the scale's load to zero. This only occurs when “Canadian specifications” or “Initial zero range” is turned on. See EE- 12 and EE- 13 in the “calibration” section.

Serial Output (Optional)

The CS1500 can be set to output either a scoreboard (continuous) or printer ticket (demand). The default is a printer ticket, but this can be changed in the "calibration" section "EE-02".

The signal comes out of the 8-pin Serial I/O connector located on the side of the unit. The connector has the following pinout:

Signal	Pin
TXD	F
GND	B

The transmitted signal has the following characteristics:

Fixed 8 Data bits, no parity, 1 stop bit.
Baud rate is configurable under EE-03, see calibration section.
The output swings from -9 VDC to 9 VDC.

Scoreboard

The scoreboard output is an externally available signal designed to drive a numeric overhead display board or a computer's RS-232 input.

Transmitted data: #xxxxxxx>0@ cr lf

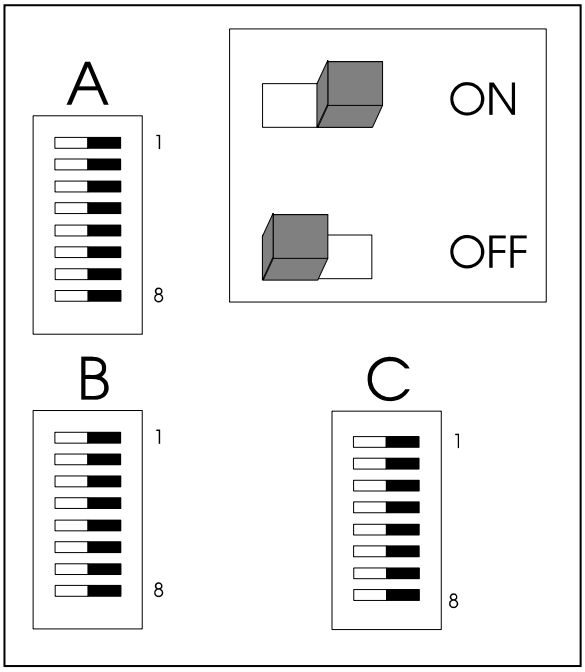
The xxxxxxx field will vary in length depending on the length of the number and could contain a decimal point and/or a minus sign. This data will be sent out about once a second, with the exception that the transmission is delayed whenever there is motion.

Item	Meaning	ASCII Hex	ASCII Decimal
#	start character	23	35
xxxxxxx	data		
>	separator	3E	62
0	data identifier	30	48
@	end character	40	64
<cr>	carriage return	0D	13
<lf>	linefeed	0A	10

There are 3 pieces of data transmitted dependent on which display mode is selected:

Data Identifier	Data
0	Net/Gross weight
1	Total weight
2	Peak weight

The scoreboard is designed to work with Intercomp's S400 (4 inch) and SA2000 (2 inch) scoreboards. The following describes how to configure the S400 or SA2000 to work with the scoreboard output.



The above diagram is the S400 switch pack layout, The SA2000 has pack C below B. The switch is to the right for on and to the left for off.

Switch #	Pack A	Pack B	Pack C
1	OFF	OFF	See next page
2	ON	ON	"
3	ON	OFF	"
4	ON	OFF	"
5	ON	ON	ON
6	OFF	ON	ON
7	OFF	ON	OFF
8	ON	ON	OFF

The above switches should be set on switch packs A, B, and C.

Pack C, SW 1 to 4:

Baud Rate	C-1	C-2	C-3	C-4
9600	ON	ON	ON	OFF
4800	OFF	ON	ON	OFF
2400	ON	ON	OFF	OFF
1200	OFF	OFF	ON	OFF
600	ON	OFF	OFF	ON
300	OFF	ON	OFF	OFF
150	ON	OFF	OFF	OFF
75	OFF	OFF	ON	ON

The connection to an Intercomp S400 display is:

CS1500	S400
TXD (F)	2 (RXD)
GND (B)	7 (GND)

The connection to an Intercomp SA2000 display is:

CS1500	SA2000
TXD (F)	3
GND (B)	7

The connection to a 9-pin PC communication port is:

CS1500	PC 9-pin
TXD (F)	2
GND (B)	5

Note: For some setups it may be necessary to jump pins [6, 1, and 4] together, and pins [7 and 8] together on the PC port connector.

The connection to a 25-pin PC communication port is:

CS1500	PC 25-pin
TXD (F)	3
GND (B)	7

Note: For some setups it may be necessary to jump pins [6, 8, and 20] together, and pins [4 and 5] together on the PC port connector.

Printer Ticket

The printer ticket output is an externally available signal designed to drive a printer or a computer's RS-232 input.

Transmitted data:

G*xxxxxxx*lb<cr><lf>
N*xxxxxxx*lb<cr><lf>
T*xxxxxxx*lb<cr><lf>
<cr><lf>
TOT**xxxxxxx*lb<cr><lf>
PEAK*xxxxxxx*lb<cr><lf>
<cr><lf>
<cr><lf>

The items have the following meanings:

Item	Meaning	ASCII Hex	ASCII Decimal
G	Gross weight	47	71
N	Net weight	4E	78
T	Tare	54	84
TOT	Total accumulated		
PEAK	Peak weight		
lb	pounds		
kg	kilograms		
xxxxxxx	data		
*	space	20	32
<cr>	carriage return	0D	13
<lf>	linefeed	0A	10

NOTE: The “lb” in the printout will be replaced by “kg” if the CS1500 is in kilograms units.

NOTE: The xxxxxxx field has a fixed length of 7 digits and could contain spaces, a decimal point, and/or a minus sign.

How to reach Intercomp Service

Things to know:

1. The service is for a CS1500 crane scale.
2. When did you purchase your scale?
3. What is your serial number?
4. Whom did you purchase the scale through?

For Intercomp Service call or fax:

FAX # (763)-476-2613
(763)-476-2531
1-800-328-3336

or fill out Service Support form at:

www.intercompcompany.com