CW-40

Stainless Steel Checkweigher

OPERATING MANUAL

RICE LAKE WEIGHING SYSTEMS

Rev. 2.1, Software Rev. 3.6, July 1993

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RICE LAKE WEIGHING SYSTEMS
CW40 OPERATING AND SERVICE MANUAL

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1. INTRODUCTION

Congratulations! You have chosen the most technologically advanced, highest quality stainless steel Checkweighing scale available today. The RLWS Model CW40 incorporates state-of-the art CMOS Microprocessor technology, full front panel programmability, and an environmentally sealed load cell to provide you, the user, with the ultimate in scale power, flexibility and reliability. This combination of the CW40's leading edge electronics with its rugged, stainless steel, gasketed construction and high quality, water resistant double-capacity load cell is designed to provide the highest degree of accuracy while maintaining the durability necessary to hold up to hostile industrial environments.

Major features of the CW40 that set it apart from other scales are:

* Fully front panel programmable
* Environmentally protected load cell
* 304 stainless steel construction
* Automatic pushbutton calibration.
* Pushbutton ZERO, TARE, CONVERT and PRINT.
* Bright, easy to read LED display.
* Read weight in LB, KG, OZ, grams, and LB & OZ.
* 25 Tare/Over/Under Register Storage
* Bi-directional Communication
  - Supports RS232 or 2 wire RS485 hardware selections
  - Baud Rate Selection
  - Data Bits and Parity Selection
  - Scale Addressability for network applications
* User programmable features include:
  - -display update rate/averaging.
  - -zero tracking.
  - -legal for trade operation.
  - -data output modes.

WARRANTY

Seller warrants that the equipmentsold hereunder will conform to written specifications, drawings, and other descriptions made by the manufacturer, including any modification thereof. The Seller warrants the equipment against faulty workmanship and defective materials. If any equipment fails to conform to these warranties, Seller will, as its sole and exclusive liability hereunder, repair or replace such goods if they are returned within the following warranty period:

Twelve (12) months from the date of shipment from the manufacturer.

These warranties are made subject to the following conditions:

1) Upon discovery by Buyer of such nonconformity, Rice Lake Weighing Systems is given prompt written notice with a detailed explanation of the alleged defect;
2) The equipment is returned to the Seller at the expense of the Buyer;
3) Examination of such equipment by the Seller discloses that the defect actually exists and was not caused by accident, misuse, neglect, alteration, improper installation, improper or unauthorized repair, or improper testing;
4) Such equipment has not been modified, altered, or changed by any person other than the Seller or its authorized repair agents;
5) Rice Lake Weighing Systems will have a reasonable time to repair or replace the defective equipment.

THESE WARRANTIES EXCLUDE ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE SELLER WILL NOT IN ANY EVENT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

IN ACCEPTING THIS WARRANTY, THE BUYER AGREES TO WAIVE ANY AND ALL OTHER CLAIM TO WARRANTY, OR IF SUCH BE THE CASE, ANY CLAIM OR WARRANTY FROM RICE LAKE WEIGHING SYSTEMS. SHOULD THE SELLER BE OTHER THAN RICE LAKE WEIGHING SYSTEMS, THE BUYER AGREES TO LOOK ONLY TO THE SELLER FOR WARRANTY CLAIMS.

No terms, conditions, understanding, or agreements purporting to modify the terms of this warranty shall have any legal effect unless made in writing and signed by a corporate officer of Rice Lake Weighing Systems and the Buyer.

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Tel.: 715 234-9171 Direct Service Hotline: 715 234-2003 Fax: 715-234-6967

2. USING THE CW40

2.0 INTRODUCTION

Once the CW40 has been properly programmed for your application, it is ready for use.

2.1 FRONT PANEL CONTROLS AND INDICATORS

There are eight buttons on the front panel of the CW40 indicator. They are "OVER", "UNDER", "TARE", "ZERO", "UNITS", "PRINT", "△", and "▽". Additionally, there are eight red LED annunciators adjacent to the weight display. They are "lb", "kg", "oz", "NEG", "MOT", "ZERO", "NET" and "GROSS".

2.1.1 PUSHBUTTON FUNCTIONS

The functions of the buttons are as follows:

ZERO - Zeros weight display. Menu programmable for full range or +/-1.9% legal for trade range.

OVER - Can be programmed in one of two ways-

In "set" mode, "OVER" recalls Over tolerance value to display when pushed. While value is displayed (i.e. finger still on the button), it can be adjusted by simultaneously pressing the up or down arrow buttons to increase or decrease the value. An adjusted value is permanently stored in non-volatile memory when the OVER button is released.

In "P.t.t." mode, a weight equivalent to over tolerance value can be placed on the scale and the "OVER" button pushed to accept this value.

UNDER - Can be programmed in one of two ways-

In "set" mode, "UNDER" recalls Under tolerance value to display when pushed. While value is displayed (i.e. finger still on the button), it can be adjusted by simultaneously pressing the up or down arrow buttons to increase or decrease the value. An adjusted value is permanently stored in non-volatile memory when the UNDER button is released.

In "P.t.t." mode, a weight equivalent to over tolerance value can be placed on the scale and the "UNDER" button pushed to accept this value. This value will always be a negative when in the P.t.t. mode.

TARE - Has two user programmable modes of operation:

1) SET Mode

Functions similarly to OVER and UNDER. Pressing "TARE" causes tare weight to be displayed and allows tare to be adjusted via the up and down arrows.

2) P.T.T.

Functions as a simple pushbutton tare. Pressing "TARE" momentarily stores displayed gross weight value as tare. Holding "TARE" for more than 2 seconds causes tare to be cleared to zero.

UP ARROW - Used to increase tolerance or tare value. Also when the multiple tare is enabled, the up arrow increments the tare index select 1-25.

DOWN ARROW - Used to decrease tolerance or tare value. Also when the multiple tare is enabled, the down arrow decrements the tare index select 1-25.

UNITS - Changes weight display unit; lb-kg-oz-lb&oz.

PRINT - Initiates manual serial data transmission.

2.1.2 LED ANNUNCIATORS

The functions of the LED Annunciators are as follows:

ZERO - Indicates center of zero.

GRS - Indicates Gross weight display mode. Gross weight mode is assumed when the Tare weight is equal to zero.

NET - Indicates Net weight display mode. Net weight mode is assumed when a non-zero tare weight is entered.

NEG - Indicates that the displayed weight value is negative. Active only in the lb&oz weighing mode.

lb, kg, oz - Indicates displayed weight unit. The "lb" and "oz" annunciators illuminate simultaneously for lb & oz mode.

MOT - Indicates motion.

2.2 SCALE OPERATION

2.2.1 POWER UP

To turn the scale on, simply plug the line cord into a proper wall receptacle. The display will first display the current software revision number then will sequence through a display test which consists of illuminating all eight display annunciators, the Over, Accept, and Under indiçators, and each weight display digit one by one. The CW40 then performs an auto zero operation. If a tare was entered when the scale was last operating, then the display will initially read negative of the entered tare value and indicate the Net weighing mode. If no tare was entered, the CW40 will come to zero in the Gross weighing mode. If something is left on the scale platform when the scale is turned on, it will be zeroed out. Care should be taken to make sure the scale platform is empty prior to turning the scale on to avoid confusion and possible weighing errors.

When the CW40 is set for the "Legal for Trade or "44" mode, the reference point for the +/-1.9% Zero Band is set upon power-up. If something is on the platform when the scale is turned on, it will distort the ability to zero the scale. Additionally, when the "44" mode is selected, the CW40 will automatically clear the stored Tare value upon power up in order to come to a zero reading (a Handbook 44 requirement).

2.2.2 ZERO AND TARE FUNCTIONS

The "ZERO" button causes the CW40 to perform an Auto-Zero function. This causes one of two things to happen on the scale display. If there is no tare entered and the scale is in the gross weighing mode, the scale display goes back to a zero reading. If a tare is entered and the scale is in the net mode, then the scale display returns

to a reading that is the negative equivalent of the entered tare.

When the CW40's operating mode is set for "Std" operation, the "ZERO" button will always make the scale come to zero or to the negative tare reading. When the CW40 is set for "Legal for Trade" or "44" operation, the "ZERO" button will only zero out amounts equivalent to +/-1.9% of the scale's capacity (e.g. Scale capacity=30lb, +/-1.9% x 30lb= +/-0.57lb) when the scale is in the gross weighing mode. In the "44" mode, the zero button will not operate when the scale is in the net weighing mode (a tare value has been entered).

The "TARE" button has two modes of operation. When the CW40 Tare Entry Mode in the user set up menu has been programmed to the "P.t.t." option, "TARE" operates nearly the same as "ZERO" with the exception that it will only operate on weight values that are positive. When a Tare weight is entered by pressing "TARE", the CW40 will indicate that a Tare is entered by illuminating the "NET" indicator. This also indicates that the scale is in the net weight mode. A new Tare can be entered at any time by simply placing the object to be tared on the scale and pressing the "TARE" button momentarily. To clear a Tare and return to the Gross weight mode, simply hold the "TARE" button for two seconds-the "NET" indicator will extinguish and the scale will show the current gross weight.

When the CW40's Tare Entry Mode is programmed to the "SEt" option, pressing "TARE" will cause the current tare value to be displayed and the OVER/UNDER/ACCEPT indicators to turn off. To alter the tare value, press the up or down arrow buttons while still holding down the "TARE" button. When the "TARE" button is released, the adjusted tare value will be stored in non-volatile memory after 2 seconds. If the tare value is adjusted to zero, the CW40 will enter the Gross weighing mode.

Programming the CW40's Tare Entry Mode to "diS" will cause the "TARE" button to only recall a stored tare value. This provides the ability to enter a tare value with the CW40 programmed in either of the above described entry modes, and then to disable the "TARE" button to secure the tare from operator tampering.

2.2.3 OVER AND UNDER FUNCTIONS

The CW40 is provided with a programmable Over and Under function. This enables the operator to perform repetitive checkweighing tasks without the added burden of interpreting a digital weight for each piece that is weighed. In order to make use of this feature, all that is necessary is that proper Over and Under tolerances are entered and the desired final weight is set either as a tare or via the "ZERO" button.

Tolerance values can be entered in two different ways depending upon how the Tolerance Entry Mode is programmed in the user set up menu.

If the Tolerance Entry Mode is set to the "SEt" option, pressing "OVER" or "UNDER" causes the current tolerance value to be displayed and the OVER/UNDER/ACCEPT indicators to turn off. To adjust the tolerance, press the up or down arrow button while still holding the tolerance button. When the tolerance is set to its desired value, release the tolerance button and the adjusted value will be permanently stored in non-volatile memory.

If the Tolerance Entry Mode is set to "P.t.t.", tolerance values are entered by placing a weight equivalent to the desired tolerance on the scale platform and pressing the corresponding tolerance (OVER/UNDER) button. The weight value is then stored in the non-volatile memory. Note that Under values are assumed to be negative (e.g. a weight value of 1 oz on the scale platform will be stored as an Under tolerance value of -1 oz).

Selecting the "diS" option for the Tolerance Entry Mode causes the "OVER" and "UNDER" buttons to only recall the tolerance value to the display. This provides the ability to enter a tolerance value with the CW40 programmed in either of the above described entry modes, and then to disable the "OVER" and "UNDER" buttons to secure the tolerances from operator tampering. The checkweighing function can be turned off entirely by selecting the "off" setting on the Tolerance Entry Mode. This turns off the Over, Accept and Under status indicators.

2.2.4 UNITS FUNCTION

When the Units function is internally enabled, pressing the "UNITS" button causes the CW40 to change the weight display unit each time "UNITS" is pressed. In "Std" mode the weight will convert from "lb" to "kg" to "oz" to "lb & oz".

In the "Legal for Trade" or "44" mode, the "lb & oz" mode is disabled since HANDBOOK 44 does not recognize "lb & oz" as a Legal for Trade display at this time.

2.2.5 PRINT FUNCTION

Pressing the "PRINT" button causes the Data Interface to transmit displayed weight data in the format described in Section 5. The weight data will be transmitted as long as the scale is stable and not in overrange. The "PRINT" button is active in all data output modes except Continuous Transmission. Refer to Section 5 for details on the Data Interface.

2.2.6 STORED TARE/OVER/UNDER OPERATION

The 25-Tare Memory function can be enabled by setting the STORED TARE ENABLE setting to "EN".

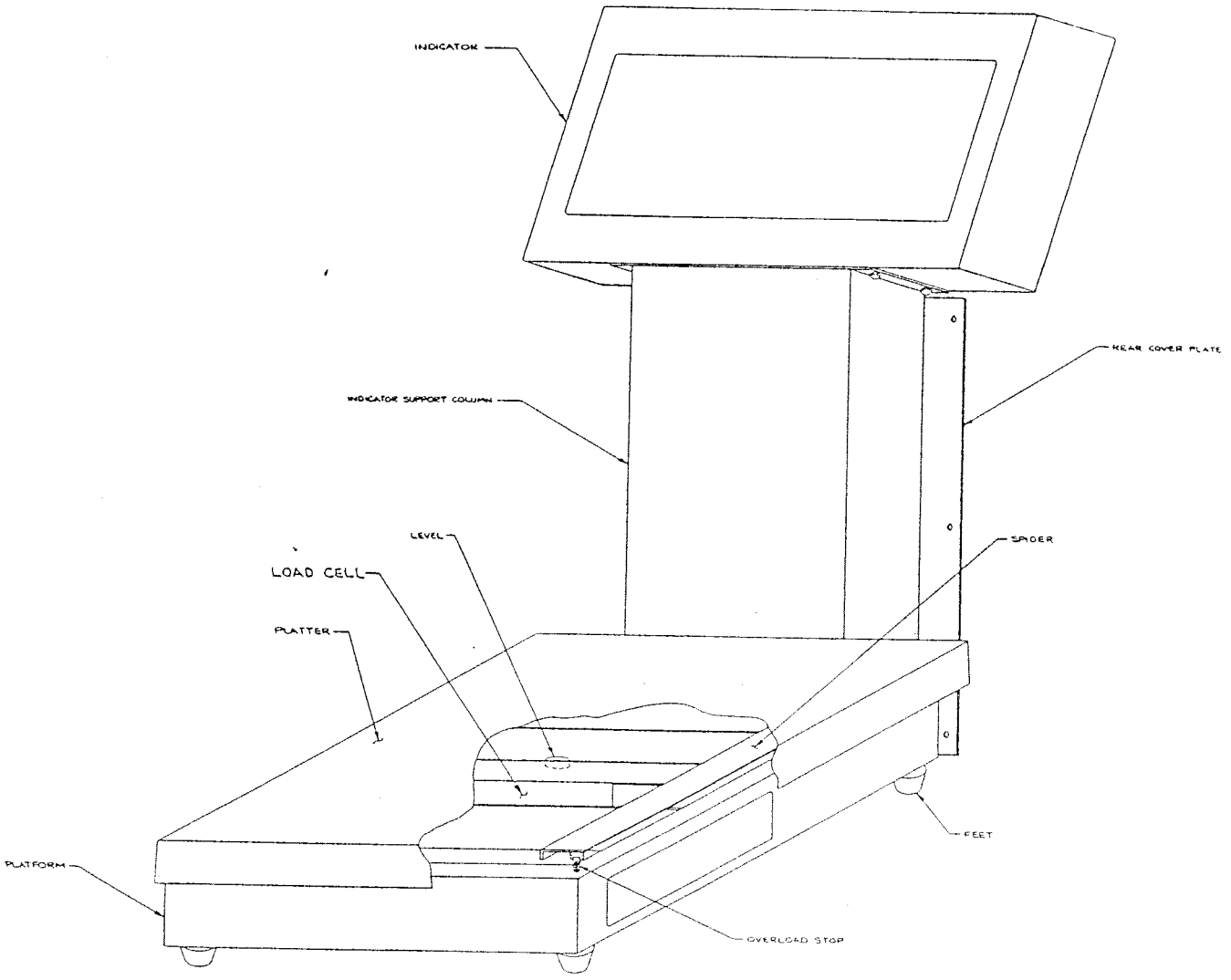
To select the Tare/Over/Under register, momentarily push the up/down arrow button in the operating mode. The current tare index number will be displayed. To change the number, press the up arrow to increment the number or the down arrow to decrement the number.

If after 2-3 seconds no changes are made, the scale will automatically return to the operating mode selecting the Tare/Over/Under register selected. Once the desired register is selected, the Tare/Over/Under values can be changed as outlined in the previous section.

For example, if the current tare index is 10, then tare 10, over 10 and under 10 become the operating values and will remain until the index is again changed. This implies that there are 25 tare, over and under values.

3. UNPACKING AND INSTALLATION

CW40 COMPONENTS



Caution

Before proceeding to unpack your Model CW40 please note that although it is a highly durable industrial scale, it is also a sensitive weighing instrument. Normal care should be taken when handling and using the scale. Please observe the following precautions to insure years of trouble free service from your Model CW40.

* DO NOT drop the scale.

* DO NOT drop objects onto the scale platform.

* DO NOT immerse the scale platform or indicator.

* DO NOT pick up the scale platform by the "spider"

Improper handling or abuse of the scale could be damaging and result in costly repairs to your unit that may not be covered under warranty.

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Carefully remove the scale and the platter from the shipping carton. With Models CW40-5, -10, -30, -60, and -100, the scale is shipped as one piece. Take care when removing any of these models from the shipping carton. The scale should be removed by grasping the indicator support column and gently lifting straight up out of the carton. Be sure to retain the shipping carton and all packing material in case reshipment is required.

When unpacking the CW40-200 or -300, note that the scale is shipped with the indicator and support column detached from the weighing platform. Lift the entire platform and indicator/column from the carton by grasping the side rails of the top spider underneath the platter and gently lifting straight up. To attach the indicator/column to the platform, first locate a suitable area at the edge of a table or bench that is taller than the indicator/column assembly. Lift the indicator off of the platform and set it aside. Note that the indicator and platform are connected by a 5' cable; be careful not to pull too hard on this cable. Remove the platter from the weighing platform and set it aside. Invert the platform and set it such that the side holding the four indicator column mounting bolts is at the edge of the table. Remove the four mounting bolts from the bottom of the platform and lift and place the indicator column over the

mounting holes. Reinstall and tighten the four mounting bolts. Right the scale and replace the platter onto the platform.

The Model CW40 requires 115 VAC, 50/60 Hz power (220 VAC optional) for operation. Be sure that the AC power is not too noisy - this can occur if large inductive loads, like solenoids or motors are on the same power line. The Model CW40 has a filtered power supply to reduce the effect of normal line noise, but it cannot limit severe fluctuations. If problems occur, noise producing devices may have to be suppressed to minimize their effect or a suitable inline power conditioning unit may be installed.

When choosing a location for the scale, keep in mind that the spot should be on a sturdy table that is free of vibration and air currents. Vibration from heavy equipment or appliances and air currents from fans, heating ducts, etc... can cause bounce on the scale display. Using the Model CW40's Digital Averaging feature to minimize these effects is outlined in Section 3 of this manual.

Place the scale in its desired location. Level the platform by adjusting the four corner feet until the bubble in the bubble level, located beneath the top platter of the platform, is within the center circle. After a level condition is achieved, test for a stable condition by trying to rock the platform backward and forward and side to side. Adjust the feet beneath the indicator column for final levelness and stability.

4. PROGRAMMING THE CW40

4.1 INTRODUCTION

Before using your CW40 for the first time, you may first go through the "user set-up menu" to program the CW40. The "user set-up menu" allows you to program options such as how many times per second the display is refreshed (update rate), how the data output works, what weight display units the CW40 starts up in when it is turned on (lb, kg or oz), and others. Each CW40 is programmed at the factory to the most commonly used of these settings.

It is important that you read the description of each of the set-up parameters and set each one to best fit your application. If you are unsure of the

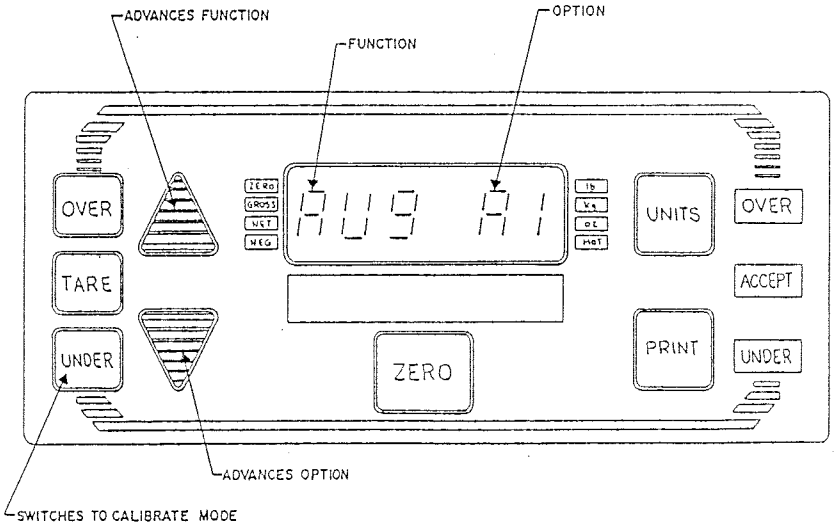
parameter setting you need, a trial and error process will assist you. If any parameter setting is not suitable, you can easily try a different setting of that particular parameter very easily. If you run into problems, you can contact the RLWS service department for advice on the set-up of your CW40.

4.2 ENTERING THE "USER SET-UP MENU"

To enter the "user set-up menu" it is necessary to remove the small rectangular access panel on the rear of the scale indicator. Do so by removing the two hex screws holding the panel in place. You are now ready to enter the "set-up menu" by flipping SW1 located on the PCB just inside the access port (red toggle handle switch). The scale display will respond by showing the message AUG --. You are now ready to begin programming the CW40.

4.3 TO SET OR REVIEW PARAMETER SETTINGS.

The actual programming of the various scale parameters on the CW40 is accomplished by pushing the up and down arrow buttons of the front face of the indicator. Pressing the up arrow causes the function shown on left of the display to increment to the next function. Pressing the down arrow causes the option shown on the right of the display to increment to the next option (see figure). Each function has several options to select from which affect scale operation.



FRONT PANEL FUNCTIONS
SET UP MODE

To change or review parameter settings, simply step through each function by pressing the up arrow to change setting, select the desired option parameter of each function by pressing the down arrow. If you wish to go back to make changes or review the set-up, simply press the up arrow. The normal programming procedure applies again to change or review this set-up. To calibrate the CW40, refer to Chapter 4 of this manual: CALIBRATING THE CW40.

To return to normal operation, simply flip SW1 back to its original position. This can be done at any point in the set up menu. It is not necessary to go all the way through the functions if there is only one specific change that you want to make. Simply select the function and desired option when it comes up in the menu, and flip SW1 back to the operate position after programming. At this point all set-up parameters are saved in a non-volatile EEPROM (electronically erasable /programmable read-only memory) so that they are permanently saved even when the scale is off.

When you are done programming the CW40, be sure to replace the access cover on the back of the unit to maintain its water resistant and dust-tight integrity.

4.4 USER SET-UP PARAMETERS

The following is a detailed list of the function and option parameters in the CW40, as well as a description of how they affect the operation of the scale. Be sure to read these descriptions carefully, and select settings that you feel will best fit your needs.

NOTE: Factory default settings are shown in **bold** type.

4.4.1 DIGITAL AVERAGING OR DISPLAY UPDATE RATE (AVG)

Function	Option	Description
AVG	**A1**	**Approx. 12 updates/second**
(Averaging)	1*	Approx. 12 updates/second
	2	Approx. 6 updates/second
	4	Approx. 3 updates/second

8	Approx. 1.3 updates/second
16	Approx. .75 updates/second
A2	Approx. 12 updates/second

* Refers to the number of reading per average cycle

The Digital Averaging function is used to tailor the CW40's display update rate to your application and environment. The circuitry in the CW40 takes weight readings at a rate of approximately 12 per second. In some instances because of factors such as wind currents and vibrations that are read as changes by the scale's weight sensor, 12 updates per second is too fast and makes the scale display appear to be "bouncy". In order to filter or "smooth" out the effects of these factors, the CW40 is equipped with an averaging function. The averaging function simply takes a series of weight readings and averages them together. This smooths out the small changes caused by outside influences. The more readings taken per average cycle, the more stable the weight reading will appear. However, as this number of readings per average increases, the rate at which the display updates slows down. When selecting a setting for the Digital Averaging function, refer to the above chart which shows the relationship between the number of readings per average and the display update rate.

The "A1" and "A2" settings refer to a software utility called "Auto Averaging". The update rate of the display varies based upon the amount of change (motion) taking place on the scale platform. "Auto Averaging" allows for maximum speed of weighing while maintaining a high degree of stability of the final weight reading. The difference between "A1" and "A2" is in the number of readings averaged when the weight reading is stable. "A2" has more readings averaged at stability than "A1". This type of averaging may not be desirable in certain filling applications as it has a tendency to be too slow when a product is being "trickled in" or "topped off".

4.4.2 AUTOMATIC ZERO TRACKING (AZT)

Function	Option	Description
AZT	.5	+/- .5 div from zero will be automatically
	1	**+/- 1 div zeroed**
	3	+/- 3 div
	OFF	none

Automatic Zero Tracking is used to compensate for small deviations from zero normally caused by such things as slight air currents or foreign material/product left on the scale platform. Automatic Zero Tracking will measure this deviation every scale update, and if it is within the specified range of scale divisions, it will automatically re-zero the scale.

Adjust the Zero Track Aperture so that it best fits your application/environment. If you are working with minute weights that are near zero, it is advisable to turn Automatic Zero Tracking off, as it may interfere with the weighments.

4.4.3 SERIAL DATA OUTPUT BAUD RATE (b.r.)

Function	Option	Description
b.r	**960**	**9600 baud**
	480	4800 baud
	240	2400 baud
	120	1200 baud
	30	300 baud
	19.2k	19200 baud

For more information concerning the baud rate setting, see Section 5 on using the data interface.

4.4.4 SERIAL DATA OUTPUT MODE (d.o.)

Function	Option	Description
d.o.	**tod**	**Transmit on Demand**
	cnt	Continuous Transmission
	AP1	Auto Print 1
	AP2	Auto Print 2
	AP3	Auto Print 3
	AP4	Auto Print 4
	LOd	Latch on Demand

'For a detailed explanation of the Data Output Modes, see Section 5 on using the data interface.

4.4.5 START-UP UNIT (S.U.)

Function	Option	Description
S.U.	**lb**	**Start-up in "lb"**
	kg	Start-up in "kg"
	oz	Start-up in "oz"
	*L O	Start-up in "lb & oz"
	g	Start-up in grams

The Start-Up Unit is simply the weight display unit that the CW40 reads in when the scale is turned on. Select the unit you will use exclusively or the unit most frequently used as your start-up unit.

*Note, however, that when the operating mode of the CW40 (see below) is set to HB44 (Legal for Trade), the "lb & oz" weight display mode does not function since HANDBOOK 44 does not recognize this as a legal for trade display. If the "lb & oz" option is selected for SU and the operating mode is set for "44", the CW40 will start up in the "lb" weight display mode. In

addition, if a capacity of 500 lb or above (see below) is selected, the "lb & oz" display is invalid and will not function since the graduation size is greater than 2 oz.

4.4.6 SCALE CAPACITY (CAP)

Function	Option	Description
CAP	5	n1 5x.002lb/2.3kgx.001kg/80x.05oz
		n2 5x.001lb/2.3kgx.0005kg/80x.02oz
	10	n1 10x.005lb/4.5kgx.002kg/160x.1oz
		n2 10x.002lb/4.5kgx.001kg/160x.05oz
	30	n1 30x.01lb/13.6kgx.005kg/480x.2oz
		n2 30x.005lb/13.6kgx.002kg/480x.1oz
	60	n1 60x.02lb/27x.01kg/960x.5oz
		n2 60x.01lb/27kgx.005kg/960x.2oz
	100	100x.05lb/45x.02kg/1600x1oz
		n2 100x.02lb/45x.01kg/1600x.5oz
	200	200x.1lb/91x.05kg/3200x2oz
		n2 200x.05lb/91x.02kg/3200x1oz
	300	300x.1lb/136x.05kg/4800x2oz
		n2 300x.05lb/136x.02kg/4800x1oz
	500	500x.2lb/227x.1kg/8000x5oz
		n2 500x.1lb/227x.05kg/8000x2oz
	1.0	1000x.5lb/454x.2kg/16000x10oz
		n2 1000x.2lb/454x.1kg/16000x5oz
	5.0	5000x2lb/2268x1kg/80000x50oz
		n2 5000x1lb/2268x.5kg/80000x20oz

NOTES: 1. Top line for each capacity is the resolution for 1:3000 (see section 3.4.10 on displayed resolution).

2. n2 represents 1:6000 displayed resolution.

3. n1 represents capacities that can display in grams when selected. See section 4.4.5.

"Scale Capacity" defines the capacity and resolution that the display will read out. It is used to match the scale indicator to the scale platform. In most cases, the factory has already selected the proper capacity to match the scale platform that is supplied with the indicator.

Should it be necessary to change the capacity of the indicator, make sure that the proper capacity label is applied to the insert card and inserted into the capacity window of the faceplate of the indicator.

Refer to Section 6 on Calibrating the CW40 to make sure that the scale is properly calibrated after changing capacity.

4.4.7 TARE ENTRY MODE (tar)

Function	Option	Description
tar	**set**	**Tare entered via up and down arrow buttons.**
	P.t.t.	Tare entered by single press of "TARE"
	dis	Tare entry disabled

The Tare Entry Mode function allows the user to select how the tare function on the CW40 operates. It can be either a standard "Push to Tare" button, causing the weight display to come to zero when pressed, or it can be used in conjunction with the up and down arrow buttons to preset a tare value from the front panel. In addition, the tare button can be disabled if it is not to be used, or if it is desired to preset a tare to secure it from tampering by the scale operator.

4.4.8 OPERATING MODE (OP)

Function	Option	Description
OP	**Std**	**Standard (not Legal for Trade)**
	44	HB44 (Legal for Trade)

n-d Weight display off

The Operating Mode defines whether or not the CW40 will operate in a "Legal for Trade" or a "Not Legal for Trade" mode.

In "Legal for Trade" or "44" mode, the CW40's "ZERO" button and "Auto Zero Tracking" function will only zero out up to 1.9% of the scale's capacity in compliance with NIST Handbook 44. The reference point for this 1.9% band is set at the time the scale is turned on. Care should be taken to make sure that the scale platform is empty when the scale is turned on to insure proper operation of the "ZERO" button.

In addition, when the "44" mode is selected, the "lb & oz" weight display mode is disabled, since it is not recognized as a "Legal for Trade" weight display.

When the "Std" mode is selected, the "ZERO" button and "Auto Zero Tracking" function will work through the full capacity of the scale. The "lb & oz" weight display will also function normally, if selected.

The "n-d" (weight display off) setting will cause the CW40 to not show weight readings on the digital display. The Over/Under Tolerances and Tare can still be set and recalled in this mode.

4.4.9 PUSH BUTTON ENABLE (P.b.)

Function	Option	Description
Pb	non	Neither "UNITS" nor "PRINT" enabled
	U	"UNITS" only enabled
	P	"PRINT" only enabled
	U P	**Both "UNITS" and "PRINT" enabled**

In order to make the CW40 as flexible as possible for the greatest number of applications, each scale is equipped with a Convert (UNITS) and Print button.

The "UNITS" button's function is to change the weight display unit. This is necessary in applications where there is need to read equivalent weights in different units.

The "PRINT" button provides a means to manually tell the CW40 to transmit weight data from its data interface to a printer, computer or other peripheral device.

In recognition of the fact that some users would not need to make use of these features, and to eliminate the possibility of inadvertently activating one of these functions, the CW40 provides this capability of selectively enabling or disabling either of these functions.

4.4.10 DISPLAYED RESOLUTION (Cts)

Function	Option	Description
Cts	3	**1:3000 displayed resolution**
	6	1:6000 displayed resolution

The CW40 is provided with the ability to increase its displayed resolution from a nominal 1 part in 3000 to 1 part in 6000. This ability is provided for users who require finer resolution weighing for more precise checkweighing. It should be noted however, that the CW40 is only intended to be certified to be "Legal for Trade" up to the 1 part in 3000 displayed resolution. Make sure that your application does not require this certification before selecting the higher resolution.

4.4.11 TOLERANCE (OVER/UNDER) ENTRY MODE (tol)

Function	Option	Description
tol	**Set**	**Tolerance entered via up and down arrow buttons.**
	P.t.t.	Tolerance entered by single press of "OVER" or "UNDER"
	dis	Tolerance entry disabled

off	Over/Accept/Under indicators turned off

The Tolerance Entry Mode function allows the user to select how the Over and Under tolerance values on the CW40 are entered. They can be entered either by simply placing a weight equivalent to the desired tolerance value on the scale platform and pressing either "OVER" or "UNDER", or by pressing the up or down arrow buttons while holding the "OVER" or "UNDER" button to preset a tolerance value from the front panel. The under tolerance, when using the P.t.t.option, will automatically register a negative (-) weight. In addition, the "OVER and "UNDER" buttons can be disabled if they are not to be used, or if it is desired to preset tolerances and secure them from tampering by the scale operator.

4.4.12 PRINT FORMAT (P.O.)

Function	Option	Description
Prt	**tol**	**O/A/U label printed at end of print message.**
	buF	Abbreviated output of weight and O/A/U format only.
	CCC	Consolidated Controls (ConDec)

The Print Format function simply allows the CW40 to print or not print the current Over/Accept/Under status at the end of the weight data message. See section 5 for more information on print formats.

4.4.13 BIDIRECTIONAL ENABLE (bhS)

Function	Option	Description
bhs	**On**	**Bidirectional acknowledge enable**
	Off	Bidirectional acknowledge disable

The bidirectional enable is used to enable the acknowledgement of the processing or acceptance of the serial command sent to the scale. A "*" is returned from the scale when the command previously sent has been

accepted and processed. A "?" is returned when the command received is not a correct command.

When disabled, nothing is returned from the scale.

4.4.14 DATA BITS AND PARITY (d.b.P.)

Function	Option	Description
d.b.p.	**8 n**	**8 databits no parity**
	7 n	7 databits no parity
	7 o	7 databits odd parity
	7 e	7 databits even parity

Note: When P.O. is set to CCC, the data bits and parity are automatically defaulted to 7 odd.

The Data Bits and Parity parameter is used to select the number of data bits for each character transmitted. For error checking, a parity bit can be selected for the device(s) that require it. Select the proper option for the peripheral device(s) being used in the application.

4.4.15 UNIT TIME ON (tdy)

Function	Option	Description
tdy	**On**	**No timedelay for unit shut off**
	0.5	0.5 min. before shut off
	1.0	1.0 min. before shut off
	1.5	1.5 min. before shut off
	2.0	2.0 min. before shut off
	2.5	2.5 min. before shut off
	3.0	3.0 min. before shut off
	5.0	5.0 min. before shut off
	10.0	10.0 min. before shut off

20.0	20.0 min. before shut off
30.0	30.0 min. before shut off

The Unit Time On is the amount of time that the scale will remain on. This is specifically used with the battery option. However, if this is selected on A.C. operated units, the unit will go to "sleep" and will awaken when a weight is applied or a push button is pressed. The unit is asleep when the message on the display shows "ASLEEP".

4.4.16 MULTIPLE TARE ENABLE (Str)

Function	Option	Description
str	En	Enable 25 Tare storage
	Dis	**Disable 25 Tare storage**

The Mulitple Tare Enable enables the mulitple tare function within the scale. When enabled, the CW40 provides access to 25 Tares/Overs/Unders using the up/down arrows on the keyboard to select the currently operating Tare/Over/Under values.

When disabled, the up/down arrows will not select tares and only a single Tare/Over/Under value is available.

4.4.17 SCALE I.D. (I.d.)

Function	Option	Description
I.d.	1-31	Scale ID for communications
	1	**Default ID**

The Scale I.D. specifically used in applications when serial data is sent to a peripheral device and the scale I.D. is included in the serial data string. This is used so that the device can identify which scale the weight data came from.

Also, the ID is used as an address to identify the scale when the RS485 is used in a network with multiple scales, each with its own unique ID. An ID of 00 is not selectable since it is a broadcast ID and is used when all the scales on the network are to receive the same data.

5. USING THE DATA INTERFACE

5.0 INTRODUCTION

Your Model CW40 is equipped with a Serial Data Port. The serial data output is a single, RS232C compatible, active 20 mA current loop output or RS485 Multidrop. Data output connections are made at TB1 (TB3 for RS485).

For pinout information, refer to the CW40 interconnection diagram at the back of this manual and Section 5.4.

5.1 DATA TRANSMISSION MODES

Transmission from the CW40 can be initiated in one of six ways as follows:

5.1.1 TRANSMIT ON DEMAND

When the data output mode is set to Transmit on Demand ("tod"), transmission of weight data from the Serial data port is initiated by pressing the "PRINT" button. Upon pressing "PRINT", weight data will be transmitted provided the scale is stable and not in overload. If either of these two criteria is not met at the time that the "PRINT" button is pressed, the request will be ignored. Meeting these two criteria insures that no erroneous weights are transmitted.

This output mode is used with a printer when only selective samples need be printed.

5.1.2 LATCH ON DEMAND

The Latch on Demand (LOd) setting is very similar to the Transmit on demand setting in that the transmission of weight data from the CW40 is initiated by pressing the "PRINT" button. The only difference is in the fact that in the Latch on Demand mode, if the weight reading is in motion or the scale is in overload the print request is "latched" (remembered) and the data will be transmitted upon the first valid stable weight reading.

5.1.3 AUTO-PRINT 1

When the data output mode is set to "AP1", the scale will transmit each stable weight once and only once each time the scale reading goes into motion. When the scale reading goes into motion, the data output is enabled to transmit as soon as the weight stabilizes again.

This output mode can be used with either a printer or computer/data-logger when a complete sampling of weights is required and a minimum of operator intervention is desired.

5.1.4 AUTO-PRINT 2

When the data output mode is set to "AP2", the scale will transmit stable weights above gross zero once and only once for each transition from "Start-Up Gross Zero" (This is the initial Zero Reading taken when the scale is turned on), to the stable weight. This means that when an object is placed on the platform, the scale reading will go to the object's weight and stabilize. At this point the data output will transmit the weight data and remain disabled until the scale returns to "Start-Up Gross Zero" (object is removed). Once the scale returns to "Start-Up Gross Zero", the data output is enabled to transmit the next stable, non-zero weight.

This differs from the Auto-Print 1 mode in that in "AP1" mode, the scale did not have to return to zero to re-enable the data output; it simply had to go into motion.

The Auto-Print 2 mode is useful with printers or computers where there is a need for a large number of high quality weight samples with a minimum of operator intervention.

5.1.5 AUTO-PRINT 3

This output mode is very similar to Auto-Print 2. The only difference is that the zero reset point for enabling transmission is based upon displayed zero rather than "Start-Up Gross Zero".

This mode is useful to automatically transmit weights when the amount of tare weight on the scale will vary.

5.1.6 AUTO-PRINT 4

This output mode is very similar to Auto-Print 3. The last stable weight before returning to zero is printed. The gross zero is used as the threshold and can be reestablished by pressing the Zero button. Make sure the Over and Under values are set correctly.

5.1.7 CONTINUOUS MODE

When the data output mode is set to "CNT", the scale will transmit weight data once each scale update. Since there is no qualification of weight data as to stability or overrange, an additional status character is transmitted with the weight data. This status character appears at the end of the message after the last weight unit character and before the carriage return/line feed.

This output mode is almost exclusively used with computers and data loggers where real-time monitoring of the weight is necessary.

5.2 DATA OUTPUT FORMAT

5.2.1 "tOL" OUTPUT FORMAT

Data Character Format in "tOL" mode and is ASCII:

Data output message format for "tOL" mode- "lb", "kg" and "oz":

STX POL DATA SP lb/kg/oz SP GR/NT O/A/U ST* CR+LF

Data output message format for "tOL" mode- "lb & oz":

STX POL DATALB SP LB SP DATAOZ SP OZ O/A/U SP GR/NT ST* CR+LF

*Continuous mode only

Where: STX=Non-recording "START OF TEXT" character (02H)

POL=Single character polarity; space for positive, minus (-) for negative

DATA=Six character field including decimal point for weight data. Leading zeros are transmitted as spaces.

DATALB=One to three character field (depending on scale capacity) for pound weight in pounds & ounces. Leading zeros are transmitted as spaces.

DATAOZ=Two to five character field (depending on scale capacity) including decimal point for ounce weight data in LB & OZ mode. Leading zeroes are transmitted as spaces.

lb/kg/oz=Two character field for weight units.

lb for pounds
kg for kilograms
oz for ounces

GR/NT=Two character field for gross or net weight data.

GR=gross
NT=net

O/A/U=Four character field for over/accept/under status.

OVER=Over
ACPT=Accept
UNDR=Under

ST=One character field for status in continuous transmit mode.

M=motion
R=overload
SP=stable

SP=space

CR+LF=carriage return and line feed

5.2.2 "CCC" OUTPUT FORMAT

Data format in ASCII characters, in "CCC" mode as follows:

1 START BIT, 7 DATA BITS, 1 PARITY BIT (ODD), 2 STOP BITS

Data output message format in "CCC" demand mode:

STX POL DATA SP LB/KG/OZ SP GR/NT CR/LF

Data output message format in "CCC" continuous mode:

STX POL DATA L/K/O G/N STATUS CR/LF

Where: STX=START OF TEXT, non-recording character (02H).

POL=Single character polarity; space for positive, minus (-) for negative

DATA=Seven character field including decimal point for weight data. Leading zeros are transmitted as spaces.

LB/KG/OZ=Two character field for weight units.

LB for pounds
KG for kilograms
OZ for ounces

L/K/O=One character field for weight units.

L for pounds
K for kilograms
O for ounces

GR/NT=Two character field for gross or net data.

GR=gross NT=net

STATUS=One character field for status in continuous transmit mode.

M=motion
R=overload
SP=stable

SP=space

CR+LF=carriage return and line feed

5.2.3 "buF" Buffer Output Format

Data Character Format in "buF" mode and is ASCII:

Data output message format for "buF" mode:
"L", "K", "O", "Z", "G":

POL DATA L/K/O/Z/G O/A/U/SP/M/9 CR

Where: POL=Single character polarity; space for positive, minus (-) for negative.

DATA=Five or six character field. Six if decimal is present. Leading zeros are transmitted as spaces.

L/K/O/Z/G=Single character field for weight units.

L for pounds
K for kilograms
O for ounces
Z for pounds and ounces
G for grams

O/A/U/SP/M/9=Single character field for over/under/accept/motion/overload status.

O for Over
A for Accept
U for Under
SP for stable
M for Motion
9 for Overload

SP=space

CR=Carriage Return

5.3 Bi-Directional Communications - Board Rev. 2.0

The CW40 can support parameters and data transmitted to and from the scale via a computer or terminal. This is convenient for data retrieval and scale function change in a real time environment. All characters are standard ASCII values.

There are four types of commands that can be sent to the CW40, single commands without data, double commands without data, double commands with location, and double commands with location and data.

The CW40 can be setup to respond to commands that do not return values so that a verification can be made for a particular request. These commands will return a '*' for a properly processed command and '?' for an unrecognized or unprocessed command. These commands are identified with an (ACK) after the description of the command.

5.3.1 Single Commands Without Data

| SOH | ID MSD | ID LSD | COMMAND | CR |

SOH : Start of header. ASCII equivalent is 01H.

ID MSD : This is a single character for the most significant digit of the I.D.

ID LSD : This is a single character for the least significant digit of the I.D.

COMMAND : This a single character for the command that instructs the scale to perform a certain function. The commands list is:

'Z' = Performs a Zero function on the selected scale. This is only active in the Gross mode. (ACK)

'X' = Transmits the selected format to the computer or terminal.

'B' = Enables the transaction buffer. Once enabled, all data that is usually transmitted immediately to the serial data port is buffered and the port remains inactive. A data request can be generated by pushbutton or one of the auto-print

functions. The buffered data can then be requested by the computer or terminal on demand. and transmitted to the now active serial data port. It is suggested for multidrop applications that all data are buffered. Once enabled, the buffer remains enabled even while the scale is turned off. The buffer must disabled using the 'U' command. (ACK)

'U' = Disables the transaction buffer. Once disabled, data will be transmitted when requested via the keyboard or one of the autoprint functions. (ACK)

'H' = Clears the buffer of its contents without sending the contents to the serial data port.

'Y' = Sends buffer contents to the serial data port and clears the buffer. If the buffer is empty, the CW40 will return "*".

'D' = Transmits the contents of the buffer. The contents of the buffer will remain intact until a 'Y' command is given to dump and clear the buffer.

Note: The buffer is 100 a character buffer. When the buffer is approximately 90% full, an error message ('ERRBO1") will flash on the display of the CW40 to signify that the buffer will be full soon and data will be lost.

When the buffer is enabled, 100 characters can be stored in the buffer. (i.e. 10 transactions when the buffer format is selected can be sent.)

When the buffer is full, another message ("ERRBO2") will flash on the display of the CW40 to signify that data is now being lost.

When scale power is removed, then all buffer data is lost.

5.3.2 Double Commands Without Data

| SOH | ID MSD | ID LSD | COMMAND | CR |

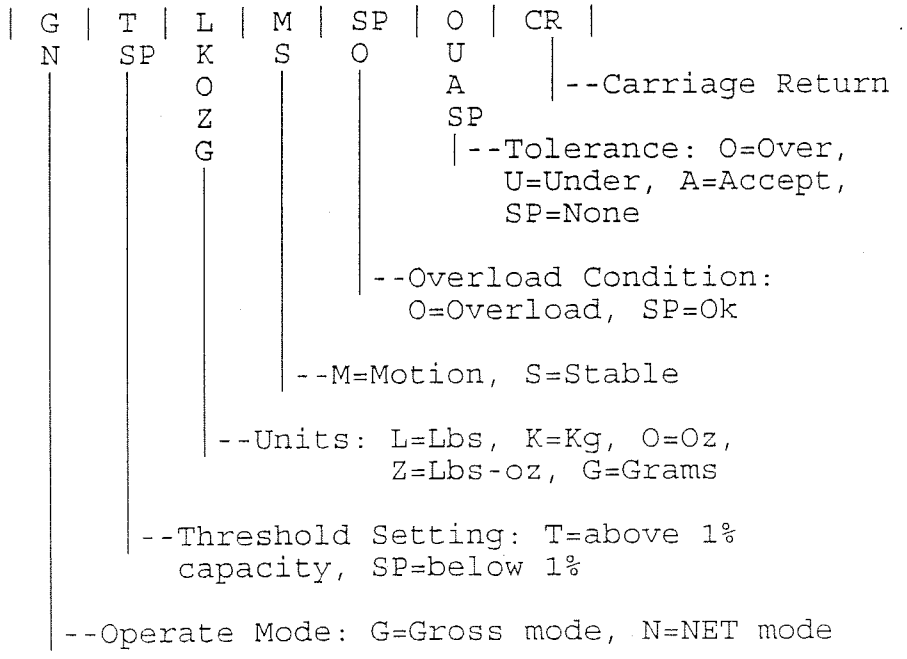
SOH : Start of header. ASCII equivalent is 01H.

ID MSD : This is a single character for the most significant digit of the I.D.

ID LSD : This is a single character for the least significant digit of the I.D.

COMMAND : This is a two character for the command that instructs the scale to perform a certain function and the commands are as follows:

"XS" = This character set transmits the current status of the CW40 with the following legend:



"RT" = Transmits the current Tare number selected. The valid values are 01-25 and follow the format:

| STX | 'T' | ':' | ** | CR |

** = This is the tare selected (01-25).

"XO" = This command will transmit the Over value that is currently being used by the CW40. The format is:

| STX | "OVER:" | POL | D6-D1 | CR |

"XU" = This command will transmit the Under value that is currently being used by the CW40. The format is :

| STX | "UNDER:" | POL | D6-D1 | CR |

"XT" = This command will transmit the Tare that is being used. The format is:

| STX | "TARE **:" | POL | D6-D1 | CR |

** = This is the Tare selected (01-25)>

"XW" = This command will transmit the weight only that is displayed. The format is:

| STX | POL | D6-D1 | CR |

"XC" = This command will transmit the tolerance that is currently actuated. The format is:

| STX | OVER, UNDER, or ACCEPT | CR |

"XTA" = This command will transmit a list of all TARE values (01-25). The format is :

| STX | "T**:" | POL | D6-D1 | CR |

T**: = Tares 01-25.

"XOA" = This command will transmit a list of all OVER values (01-25). The format is:

| STX | "O**:" | POL | D6-D1 | CR |

O**: = Over 01-25.

"XUA" = This command will transmit a list of all UNDER values (01-25). The format is:

| STX | "U**:" | POL | D6-D1 | CR |

U**: = Under 01-25.

"CT" = This command clears the Tare value currently being used by the CW40. The CW40 will return '*' when successful.

"CO" = This command clears the Over value currently being used by the CW40. The CW40 will return '*' when successful.

"CU" = This command clears the Under value currently being used by the CW40. The CW40 will return '*' when successful.

5.3.3 Double Command With Location Only

| SOH | ID MSD | ID LSD | COMMAND | LOC | CR |

SOH : Start of header. ASCII equivalent is 01H.

ID MSD : This is a single character for the most significant digit of the I.D.

ID LSD : This is a single character for the least significant digit of the I.D.

COMMAND : This is a two character field for the command that instructs the scale to perform a certain function and the commands are as follows:

LOC : This is a two character field that specifies the location of the Tare, Over, or Under that is being transmitted.

"RT" = This recalls the specified Tare in the LOC character field and selects it as the current operating Tare value. The CW40 returns '*' when successful.

"XT" = This transmits the selected Tare specified in the LOC field. This returns the weight value in the format previously mentioned for Tare values.

"XO" = This transmits the selected Over specified in the LOC field. This returns the weight value in the format previously mentioned for Over values.

"XU" = This transmits the selected Under specified in the LOC field. This returns the weight value in the format previously mentioned for Under values.

"CT" = This clears the selected Tare as specified in the LOC field. The CW40 returns '*' when successful.

"CO" = This clears the selected Over as specified in the LOC field. The CW40 returns '*' when successful.

"CU" = This clears the selected Under as specified in the LOC field. The CW40 returns '*' when successful.

5.3.4 Double Command With Location and Data

| SOH | ID MSD | ID LSD | COMMAND | LOC | DATA | CR |

SOH : Start of header. ASCII equivalent is 01H.

ID MSD : This is a single character for the most significant digit of the I.D.

ID LSD : This is a single character for the least significant digit of the I.D.

COMMAND : This is a two character field for the command that instructs the scale to perform a certain function and the commands are as follows:

"ET" = This enters the data specified in the DATA character field in the location specified by the LOC character field. If no value is given for the LOC field, then the DATA is stored in the current operating Tare location. When successful, the CW40 returns '*'. (ACK)

"EO" = This enters the data specified in the DATA character field as the Over value. When successful, the CW40 returns '*'. (ACK)

"EU" = This enters the data specified in the DATA character field as the Under value. When successful, the CW40 returns '*'. (ACK)

Example :

| SOH |'0'|'1'|'E'|'T'|'0'|'1'|'+'|'0'|'0'|'1'|'.'|'0'|'0'|'L'| CR |

This enters +1.00lb into Tare register 1.

DATA : The format of the DATA character field is:

| POL | D6-D1 | CR |

LOC : This is a two character field that specifies the location of a Tare value that is to be recalled or stored.

Where : POL = A single character that specifies the polarity of the data being entered. '+' = positive, '-' = negative.

SP = A single character representing a space. ASCII equivalent is 20H.

D6-D1 = Single characters that represent the weight data being entered. This can include 5 digits plus a decimal point.

CR+LF = Two character field that represents a carriage return and line feed.

STX = Start of Text character.

NOTES :

1. For multidrop applications, make sure that a broadcast ID (00) is not transmitted with a command that requires acknowledgment or data transmission from the CW40. Data will be either lost or corrupted.

2. When entering data into the Tare, Over, or Under locations, make sure that the format of the weight data matches the data format of the display. If weight data doesn't match the display format, the weight information may be entered incorrectly.

3. Spaces in the data string will be ignored except when weight data is transmitted. Spaces in the weight data will converted to 0.

4. Only one request is handled per serial string. Two commands can not embedded into the same serial transmission.

5. A time delay may required between successive requests of the same scale to allow for processing time. Approximately 0.5 seconds should be allowed.

6. The CW40 must be stable for the push to tare function (P.t.t.) to enter a tare weight.

5.4 SERIAL DATA CONNECTIONS

The terminal block connections for the Revision 4.0 PCB is as follows:

TB1
1 - Chassis ground
2 - S1
3 - TXD/RS232
4 - RXD/RS232
5 - Print Request 2/ Signal ground.
6 - Print Request
7 - 20ma + 20ma TXD
8 - 20ma -20ma TXD

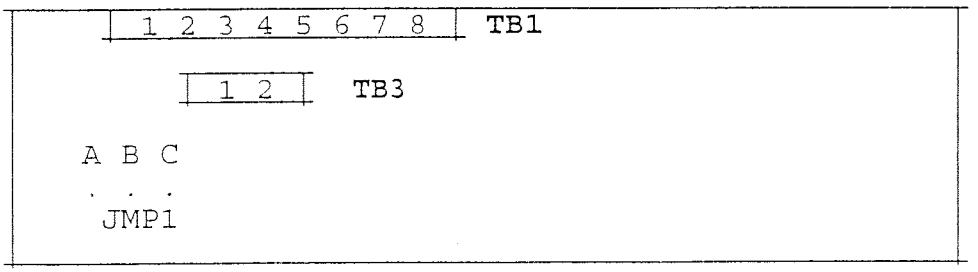
TB3
1 - TXD/RXD + RS-485
2 - TXD/RXD - RS-485

There is a jumper that determines whether serial data is received from EIA-232 (RS-232) or EIA-485 (RS-485). The position of the jumper for each function is shown below.

JMP 1

RS-485 Operation: Connect A to B.
C: Leave open.

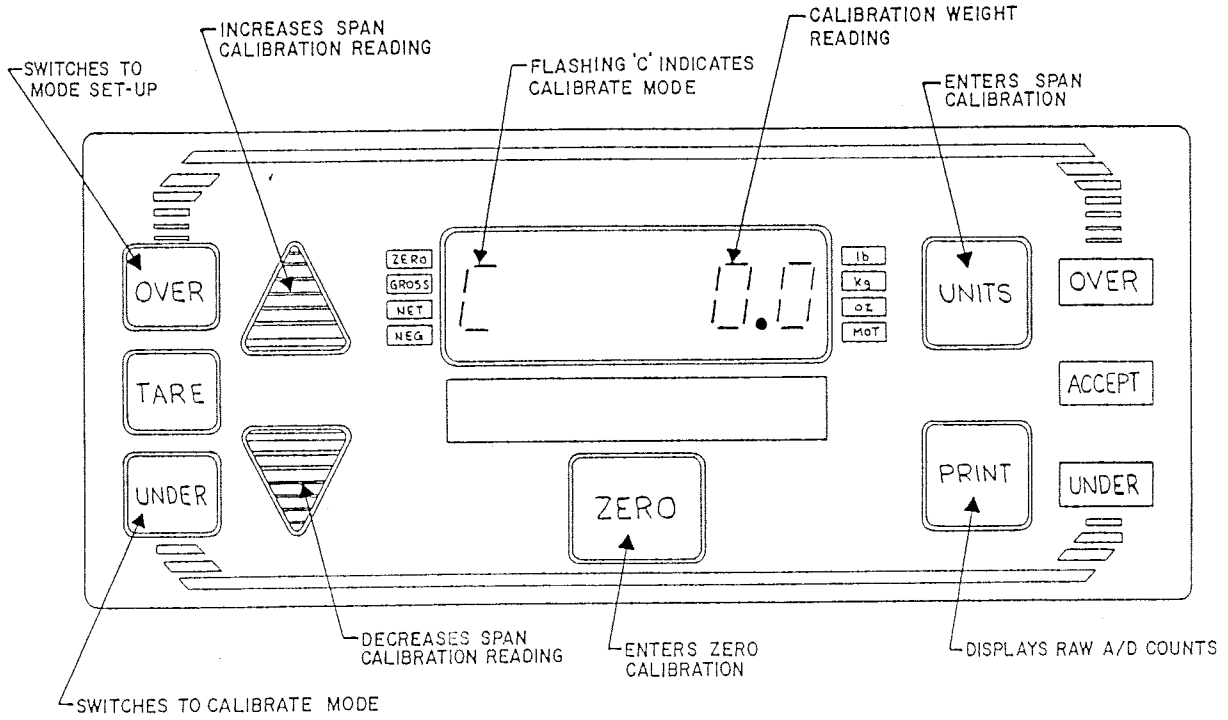
RS-232 Operation: Connect B to C.
A: Leave open.



6. CALIBRATING THE CW40

6.1 INTRODUCTION

The CW40 was designed to make calibration as simple and flexible as possible. All that is needed to calibrate the CW40 is one test weight and some simple manipulation of the front panel pushbuttons.



FRONT PANEL FUNCTIONS
CALIBRATE MODE

6.2 ENTERING THE CALIBRATION MODE

To enter the calibration mode, first remove the rectangular access plate from the rear of the indicator. This is accomplished by removing the two hex head screws that hold the cover in place. Once the panel has been removed, reach into the opening with a non-conductive object, such as a pencil, and flip the red-handled toggle switch on the PCB. This places the CW40 in the programming mode. To enter the calibration mode, press the "UNDER" button. The indicator will flash "C" in the left-most digit of the display and show the actual gross weight on the platform.

6.3 DIGITAL ZERO CALIBRATION

Zero calibration is simply establishing what the output is from the load cell with no load on the platform.

To perform a zero calibration, make sure that the scale platform is empty. Press the "ZERO" button. The CW40 will respond by displaying "Ent 0" for approximately two seconds, signifying that the zero calibration was successful. The display will then go to a zero weight reading with the left-most digit still flashing "C", indicating that the CW40 is now ready for span calibration.

If at any time during this process the CW40 shows an error message ("Er ..." on the display), refer to the error code section at the end of this chapter for causes and remedies.

6.4 ANALOG ZERO SETTING

The CW40 provides a zero potentiometer for zero offset compensation. The switch settings below set the range for the potentiometer.

Zero Settings	SW2	3	4	Range inc. pot.
		0	0	+ or - 60%
		0	1	40% to 160% 0 dn.
		1	0	115% to 235% 0 dn.
		1	1	215% to 335% 0 dn.

Note: 1 = switch closed, 0 = switch open.

6.5 DIGITAL SPAN CALIBRATION

Span calibration adjusts the weight display to equal the value of the applied load on the scale platform.

Upon successful completion of a zero calibration, the CW40 is ready for a span calibration. In order to perform a span calibration, you must have an accurate test weight equal to at least 20% of your scale's capacity. The following is a table of scale capacity vs the minimum recommended amount of test weight that should be used for a span calibration.

6.6 ANALOG SPAN SETTING

Span settings:

SW2	1	2	L/C output
	0	0	2.0mv/v
	1	0	1.5mv/v
	0	1	1.0mv/v
	1	1	0.5mv/v

Note: 1 = switch closed, 0 = switch open

Scale Capacity	Minimum Recommended Test Weight for Span Calibration
5 lb	5 lb
10 lb	10 lb
30 lb	30 lb
60 lb	60 lb
100 lb	100 lb
200 lb	100 lb
300 lb	150 lb
500 lb	250 lb
1000 lb	500 lb
5000 lb	1250 lb

With the CW40 displaying 0 and still flashing "C" in the left-most digit, place the known test weight on the scale platform. The display will show weight of the test load. If the displayed value is not equal to the test load on the platform, it is necessary to adjust the displayed value to make it so. This is done by using the up and down arrow buttons. Adjust the displayed weight up or down until it matches the value of the test weight then press the "UNITS" button to save the span calibration data in the non-volatile memory. Remember that after you adjust the weight reading, you must press "UNITS" to save the calibration; failure to do so will result in improper calibration of your CW40.

When "UNITS" is pressed, the CW40 will display "Ent SP" for approximately two seconds indicating that the span calibration was successful.

If an error message appears when "UNITS" is pressed ("Er ..." on the display), refer to the error code section at the end of this chapter for causes and remedies.

6.7 ABBREVIATED CALIBRATION PROCEDURE

1. Set capacity and counts in menu.
2. Set SW2 positons 1 and 2 for load cell output. Open SW2 positions 3 and 4.
3. Set SW1 to calibrate position. Push **Under**. Display should display a flashing C to indicate the cal. mode has been selected.
4. Push **Print** to view internal count reading. Reading should be between -10000 and -15000 cts. If not, then use pot R16 to adjust to proper reading. If reading is too high, then close switch SW2 positions 3 and/or 4 until it is in range of the pot.

Note: Check internal reading with platter on scale and note weight on platform.

5. Push **Zero** to enter zero (ENT 0).
6. Place full capacity on platform.
7. Use **up** and **down** arrows to set display to equal the test weight on platform.
8. Push **UNITS** to enter span (ENT SP).
9. Switch SW1 to operate position.
10. Remove load from scale, rezero and check calibration.

6.8 EXITING THE CALIBRATION MODE

After successfully completing both a zero and span calibration, you may go back to the "User Set-Up Menu" to review or change the programming of the CW40 by pressing "OVER". To go back to the weighing mode, simply flip the red-handled toggle switch on the PCB back to its original position.

Replace the access panel making sure that all of the gaskets are in place to maintain the CW40's water resistant integrity.

6.9 ERROR CODES

Error Code: "Er nSt" Scale not stable

Cause: Vibration/air currents affecting platform or possible trouble with load cell or PCB.

Remedy: Isolate platform from the source of vibration and /or air currents or replace defective load cell or PCB.

Error Code: "Er C0U" Load cell output too low for Cal 0.

Cause: Negative zero shift of load cell or trouble on PCB.

Remedy: Press "PRINT" button to read what the actual zero offset is. This number should be between -15000 and -9000. Adjust the zero potentiometer and SW1 positions 3 and 4, if necessary to approximately the center of the range (-12000). If this fails, check for a defective load cell. If this does not solve the problem, then contact your RLWS authorized dealer.

Error Code: "Er C0E" Load cell output too high for Cal 0.

Cause: Positive zero shift of load cell or trouble on PCB.

Remedy: Make sure platform is empty. If this is the case then press the "PRINT" button to read the actual zero offset. This number should be between -15000 and -9000. Adjust the zero potentiometer and SW1 positions 3 and 4 if necessary to approximately the center of the range (-12000). If this fails, then check for a defective load cell. If this does not solve the problem, then contact your RLWS authorized dealer.

Error Code: "Er SFO" Load cell output swing too large.

Cause: Load cell is too small for selected scale capacity, load cell defective, or incorrect settings on SW2.

Remedy: Make sure load cell is the right size for the selected scale capacity. Refer to the following chart for CW40 load cell capacities.

CW40 MODEL	LOAD CELL CAPACITY	
CW40-5 lb	5 kg	(11 lb)
CW40-10 lb	10 kg	(22 lb)
CW40-30 lb	30 kg	(66 lb)
CW40-60 lb	50 kg	(110 lb)
CW40-100 lb	100 kg	(220 lb)
CW40-200 lb	200 kg	(440 lb)
CW40-300 lb	300 kg	(660 lb)
CW40-500 lb	500 kg	(1100 lb)
CW40-1000 lb	1000 kg	(2200 lb)

See Section 6.6 for proper span settings on SW2.

Error Code: "Er SFU" Load cell output swing too small

Cause: Load cell too large for selected capacity, defective load cell, or SW2 is set incorrectly.

Remedy: Make sure that the load cell capacity is correct for the selected scale capacity. Refer to the above chart for CW40 load cell capacities. If the load cell capacity is proper, either the load cell or PCB is defective and will have to be replaced.
See Section 6.6 for proper span settings on SW2.

Error code: "Er SPO" Selected span calibration value is over full scale capacity.

Cause: Improper setting of cal-span value or test load too heavy.

Remedy: Recheck test weight value and reset span.

Error Code: "Er SPU" Selected span calibration value is less than 20% of full scale capacity.

Cause: Improper setting of cal-span value or test load too light.

Remedy: Recheck test weight value and reset span.

Error Code: "Er dn" Attempting to adjust cal-span value down with less than 20% of full scale capacity on the platform.

Cause: Test load too light.

Remedy: Use heavier test weight.

Error Code: "Er SP" Span setting negative.

Cause: Improper cal-span setting.

Remedy: Reset span to positive.

Error Code: "Er LO" Attempting span cal in LB & OZ mode.

Cause: Scale set for LB & OZ when cal mode was entered

Remedy: None; The CW40 will convert to decimal lb in cal and revert to LB & OZ when cal is exited.

Error Code: ERRB01 Buffer error.

Cause: Buffer is approximately 90% full.

Remedy: Clear buffer by sending 'Y' or 'H' command.

Error Code: ERRB02 Buffer error.

Cause: Buffer is full and data is being lost.

Remedy: Clear buffer by sending 'Y' or 'H' command.

7. TROUBLESHOOTING

Problem:	**What to Do or Check:**
Weight reading will not repeat or scale does not return to zero when weight is removed.	Make sure that there is nothing caught in the platform under or around the load cell or spider interfering with their movement.
Scale overloads early.	Make sure all four overload stops are properly set- take the platter off of the platform. Invert it and place

	it back on the spider. With 1/2 of the scale's capacity in test weights concentrated over a corner of the platform, there should be approximately 1/32" of clearance between the stop and the bottom of the spider. Check all four corners then re-calibrate the scale. If the problem persists, it is possible that the scale is being shock-loaded causing the load cell's zero to be shifted. Review the cautions in Section 3.0 of this manual.
Scale will not indicate full capacity or go into overload.	Make sure that there is nothing caught in the platform under or around the load cell or spider interfering with their movement. If not then check the overload stops using the above procedure.
Scale will not come to zero when "ZERO" OR "TARE" is pressed.	Make sure that the scale is stable ("MOT" LED is off) when either button is pressed. If the scale is stable, there may be a problem with the touch-panel or PCB, or the scale may be set to H44 mode (1.9% zero bandwidth) and more than 1.9% of the scale's capacity is on the platform and a zero is being attempted. If "TARE" does not operate, verify that the Tare function is set to the "P.t.t." entry mode..
Weight readings don't seem to be correct.	Check the scale's accuracy with a test weight. Re-calibrate if necessary.
Scale drifts off of zero.	Check for air currents and/or vibration around the scale. If that is the cause it may be necessary to set the AZT aperture to a wider setting to compensate (See Section 3.4.2).

Scale reading is bouncing or "flighty".	Check for air currents and/or vibration around the scale. If that is the cause it may be necessary to set the Digital Averaging to a higher setting to stabilize the reading (see Sec. 3.4.1).

If you are still experiencing a problem with your CW40, or if the problem you are having is not covered in the above list, please contact your RLWS authorized dealer.

8. CW40 TECHNICAL SPECIFICATIONS

Indicator:

Dimensions: L: 10" H: 6" D: 1 1/2"
L: 25.4 cm H: 15.3 cm D: 3.8 cm

Weight: 7 lb
3.2 kg

Display: 6-digit red LED, 0.43" high
8 red LED bar type annunciators 0.2"x0.4"
3 LED bar displays for OVER, ACCEPT, UNDER
0.35"x0.75"

Front Panel: Flat membrane touch panel; 0.010" polycarbonate laminated over electrical grade polyester. Deposited silver ink with tactile stainless steel dome contacts for switches; cross linked acrylic adhesive.

Load Cell Excitation: 5 VDC Fixed, 60 mA max.
(4 x 350 ohm load cells)

Analog Input Range: .5mV/V to 2.0mV/V adjustable.

Analog Sensitivity: 0.8 uV/grad minimum.

Internal Update Rate: 12 updates/second typical.

Resolution: 1:30000 internal
1:6000 displayed

Power Requirements: 115 VAC, 50/60 Hz, 0.100 A
220 VAC, 50/60 Hz, 0.050 A (opt)

Fuse: 115VAC - 250VAC, 0.500 Amp PCB mounted fuse.
220VAC - 250VAC, 0.250 Amp PCB mounted fuse.
Fuse is soldered into PCB and is not field replaceable without tools.

Data Communications: RS232C and active 20 mA current loop available at TB1 on PCB.
RS485 available at TB3(option)

Operating Temp. Range: 14 to 104 Deg. F
-10 to 40 Deg. C

9. APPENDIX A.

CLEANING INSTRUCTIONS

1. Unplug the CW40 power cord before starting to clean the unit.

2. USDA publication "Accepted Meat & Poultry Equipment" states that:

   "Equipment shall be designed so that all product contact surfaces can be readily & thoroughly cleaned with high temperature, high pressure water and caustic soap solutions."

   The CW40's product contact surface, the platter, may be removed and cleaned as described above.

3. The remainder of the CW40 may now be washed down with a damp cloth or sponge and a small amount of soap if required.

4. Rinse the cloth or sponge in clean water, squeeze out excessive water and wipe off any soap residue on the scale.

5. When washing the key panel, be particularly careful to use a minimum of water. Do not use an abrasive of any kind as this will damage the surface of the key panel.

6. Avoid getting water on the load cell and load cell cable.

7. Ensure that the CW40 is not washed down with high pressure water or steam during general cleanup. We recommend that it be removed to safe area during general cleanup.

** Warning: DO NOT SUBMERSE THE CW40 IN THE WATER, DOING SO COULD LEAD TO DAMAGE AND/OR SERIOUS INJURY TO THE OPERATOR. **