**Weighing Scale User and Service Manual**

# Model: CWT7

Please read this manual carefully before operation
----Important safety info
----Warranty

# GRAVITY MEASUREMENT, INC.

## Important Safety Information

**READ ALL INSTRUCTIONS BEFORE USING SCALES TO ENSURE MAXIMUM SAFETY, BEST PERFORMANCE, AND TO GAIN KNOWLEDGE OF OUR SCALE, IT IS ESSENTIAL THAT YOU OR ANY OTHER OPERATOR OF THE SCALE READ AND UNDERSTAND THE CONTENTS OF THIS MANUAL BEFORE OPERATING THE DEVICE.**

When using an electrical device, basic precautions should always be followed, including the following:

1. Please use only the original power cord or DC adapter supplied with the scale. Other cords or adapters may damage the scale.
2. DC adaptor is used to charge the battery, and scale can operate without DC adaptor.
3. Avoid using long power extension cords – this may cause interference
4. Do not use on surfaces or in areas where vibration, air movement or temperature change.
   Do not place in direct sunlight or near air conditioning vents.
5. Avoid high humidity (greater than 80%) that might cause condensation and keep away from direct contact with water and other corrosive chemicals.
6. Static may influence the weighing result. To reduce the static, wipe the pan and scale with anti-static wipes.
7. Don't impact or drop heavy objects on the scale – this may affect accuracy, or cause damage. Do not stack material on the scale when it is not in use.
8. Battery should be removed if the scale is not used for a long period of time. Battery should be recharged every 3 months.
9. Place items to be weighed as close to center of the pan as possible
10. Only use fingers to operate the keypad. Do not press with hard or sharp objects.

# Warranty

Gravity Measurement, Inc. (Schenectady, New York) offers one-year limited warranty (parts and labor) for the components failed due to defects in materials or workmanship. Warranty starts from the date of delivery.

During the warranty period, should any repairs be necessary, the purchaser must inform its supplier or Gravity Measurement. The company or its authorized technician reserves the right to repair or replace the components at any of its workshops depending on the severity of the problems. However, any freight involved in sending the faulty units or parts to the service center should be borne by the purchaser.

The warranty will cease to operate if the equipment is not returned in the original packaging and with correct documentation for a claim to be processed. All claims are at the sole discretion of Gravity Measurement.

This warranty does not cover equipment where defects or poor performance is due to misuse, accidental damage, exposure to radioactive or corrosive materials, negligence, faulty installation, unauthorized modifications or attempted repair or failure to observe the requirements and recommendations as given in this User Manual. Additionally, rechargeable batteries (where supplied) are not covered under warranty.

Repairs carried out under the warranty does not extend the warranty period. Components removed during the warranty repairs become the company property.

## What Is Inside Box

AC/DC adaptor (110V)

CWT7 weighing scale, with adhesive film covered platter. Two parts are separated to protect the load cell during transportation.

Rechargeable battery is installed inside the scale.

Two wire seals. The wire seal is used usually by the inspector of Department of Weight and Measure or authorized dealer. The wire seal is threaded through a metal rode that protrudes through the bottom of the device and through a hole in the scale base adjacent to the metal rode.

## Set up the Scale

Place the scale on a stable, level surface out of the way of air currents. The scale must be level during use. Adjust the feet and use the integrated bubble at the front of the scale to achieve level. Be sure that scale does not rock back and forth. Ensure no weight is on the pan when turning on the scale. Scale is operated using the rechargeable battery or AC adaptor.   is used to charge the battery, and scale can operate without DC adaptor.
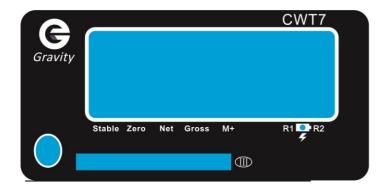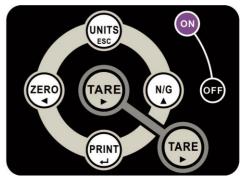
## LCD Display



Size: 130 mm x 46 mm X 2.8 mm

Font height: 30 mm

Segments: 6

# Key DESCRIPTION



**OFF**   Press and hold this key for 2 seconds to turn off the balance.

**ON**   Press this key to turn on the balance

**UNITS** To select the desired weight unit.
**ESC** To exit from setup mode.

**ZERO** To reset the weight to "0", but the display value has to be
lesser than ± 2% of maximum capacity.
◄   To move one space to the left or downward in setup mode.

**TARE** To subtract the container´s weight.
►   To move one space to the right or upward in setup mode.

**N/G**   To view gross or net weight when the balance is on tare status.
All other keys will be disabled when gross weight is activated.
▲   To increase value in setup mode.

**PRINT** Manually transmitting data through RS232 to print.
↵   Confirmation in setup mode.

## BASIC PARAMETER SETTING

To access to functions setting, press the (PRINT) and (TARE) key at the same time in weighing mode, and LCD displays ⊔F- 1. Press (TARE) key to rotate ⊔F- 1 to ⊔F-9

"✱" This flag indicates that the function is locked when "Approval Version".

### ⊔F- 1  A/D count

1. Press the (PRINT) key to view the A/D count.
2. Press the (PRINT) key to view the the battery voltage or press the (UNITS ESC) key to exit back to menu ⊔F- 1
3. To move to next parameter press the (TARE) key.
4. To exit and return to normal weighing press the (UNITS ESC) key.

### ⊔F-2  High / Low limits setting

1. Press the (PRINT) key to enter.
2. The display will show 00.000L (set low limit).
3. Use the keys (TARE) and (ZERO) to move cursor and press the (N/G) to select number.
4. Press the (PRINT) key to confirm.
5. The display will show 00.000H (set high limit).
6. Use the keys (TARE) and (ZERO) to move cursor and press the (N/G) to select number.
7. Press the (PRINT) key to confirm.
8. The display will show ◻ .000 ,look at the remarks below.
9. Use the keys (TARE) and (ZERO) to move cursor and press the (N/G) to select number.
10. Press the (PRINT) key to confirm.

Remarks:      0      0      0

            A      B      C

A --- Buzzer on: 0= Stable not required    1= Stable required

B –- LCD indicator and RELAY on: 0= Stable not required    1= Stable required

C : Buzzer beeps when: 0= Buzzer off      1= OK      2= LO and HI

●   Low limit set as 0 will clear all check weigh values.

●   This function is locked when ⊔F-5 is set as "HoLd 1"

## UF-3  Auto-power off

Modes: AoFF00:   Auto-turn off disabled.

AoFF01 : The balance will automatically turn off after 1 minute of inactivity.

This time can be set up to 99 minutes.

1. Press the (PRINT) key to access to auto-power configuration.
2. Use the keys (TARE) and (ZERO) to move cursor and press the (N/G) to select
   number.
3. Press the (PRINT) key to confirm.

## UF-4  Backlight setting

Modes: l it A  : Automatic

l it on : Backlight on

l it oFF: Backlight off

1. Press the (PRINT) key to access to backlight configuration.
2. Use the (N/G) key to select the desired mode.
3. Press the (PRINT) key to confirm.

## UF-5  HOLD function (*)

Modes: HoLd 0 Disable

HoLd  1 Animal (motion) Hold function

HoLd 2: Peak value hold (when held can press any key to cancel)

HoLd 3 Stable hold (when held can press any key to cancel)

HoLd 4 Stable hold (when held can auto cancel at zero)

1. Press the (PRINT) key to access to hold function configuration.
2. Use the (N/G) key to select the desired mode.
3. Press the (PRINT) key to confirm.

Remarks: HoLd  1 :
1. Press the (PRINT) key will show PCt002

2. Use the keys (TARE) and (ZERO) to move cursor and press the (N/G) to select number, this can set the range from 001 ~ 100 units of the animal hold.

3. Press the (PRINT) key will show **ʁ ιΠΕ 8**

4. Use the (N/G) key to select 1,2,4,8,16,32 or 64 times within the hold range.

5. Press the (PRINT) key to confirm.

## UF-6  RS-232 Output

1. Press the (PRINT) key to enter.

2. The display will show **232    1** .

3. Press the (N/G) key to select the modes.

4. Press the (PRINT) key to confirm,and will show **b  9600** .

5. Use the (N/G) key to select the baud rate.

6. Press the (PRINT) key to confirm.

Modes: **232    0** : RS-232 disable
        **232     1** : Stable output – Format 1
        **232     2** : Stream output – Format 1
        **232     3** : Manual output – Format 1
        **232     4** : Stable output – Format 2
        **232     5** : Stream output – Format 2
        **232     6** : Manual output – Format 2
        **232     7** : Manual accumulate output – Format 3
        **232     8** : Auto accumulate output – Format 3
        **232     9** : Manual accumulate output – Format 4
        **232    10** : Auto accumulate output – Format 4
        **232   11** ~ **232   13** : LP50 printer is used

Baud rate **b    1200** : Baud rate 1200
        **b  2400** : Baud rate 2400
        **b  4800** : Baud rate 4800
        **b  9600** : Baud rate 9600
        **b 19200** : Baud rate 19200
        **b38400** : Baud rate 38400

Remarks:

Format 1 output examples :  | ST, GS, +   1.0001b |

Format 2 output examples :  | +   1.0001b |

Format 3 output examples :

```
S/N      WT/lb
───────────────
0001      2.205
0002      2.205
───────────────
0002      4.410

TICKET NO.0001
G        3.0001b
T        1.0001b
N        2.0001b

TOTAL NUMBER
OF TICKETS 0001
TOTAL
NET       2.000
```

Format 4 output examples :

● Format 3 and format 4 if you want to print the total weight, press the (PRINT) key twice, and the accumulative weight will be removed.
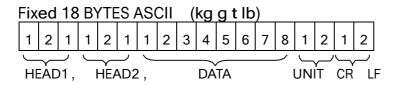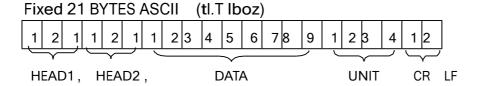
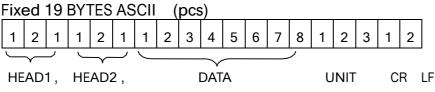Communication Protocol:

UART signal of EIA-RS232 C
Format:
1. Baud rate: 9600
2. Data bits : 8 bits
3. Parity bits: None
4. Stop bits : 1 bit

Format 1 (232　1 – 3):

| HEAD1 (2 BYTES) | HEAD2 (2 BYTES) |
|---|---|
| OL – Overload | |
| ST – Stable | NT – Net weight |
| US – Unstable | GS – Gross weight |

Fixed 18 BYTES ASCII　(kg g t lb)

| 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 1 | 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

HEAD1 ,　HEAD2 ,　　DATA　　UNIT　CR　LF

Fixed 21 BYTES ASCII　(tl.T lboz)

| 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 1 | 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

HEAD1 ,　HEAD2 ,　　DATA　　UNIT　　CR　LF

Fixed 19 BYTES ASCII　(pcs)

| 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 1 | 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

HEAD1 ,　HEAD2 ,　　DATA　　UNIT　CR　LF

## UF-7   Speed setting (∗)

Modes: SPEEd 1: Standard speed
SPEEd2: High speed
SPEEd3: Low speed

1. Press the (PRINT) key to enter.

2. Press the (N/G) key to select the desired mode.

3. Press the (PRINT) key to confirm.

## UF-8   Zero tracking(∗)

Modes: 2P       0 : OFF
2P       1 : One division tracking at zero
2P       2 : Two division tracking at zero
2P       3 : Three division tracking at zero
2P       4 : Four division tracking at zero
2P       5 : Five division tracking at zero

1. Press the (PRINT) key to enter.

2. Press the (N/G) key to select the desired mode.

3. Press the (PRINT) key to confirm.

## UF-9   G Value setting

1. Press the (PRINT) key to display the G value of manufacture place.

2. If set the G value of local press the (PRINT) key and then press the (ZERO) or (TARE) key and (N/G) key to input the new G value.

3. Press the (PRINT) key to confirm.

## Advanced Functions

Warning: Due to regulation by Bureau of Weights and Measures of each State, for the scales legal for trade, weight calibration is conducted by authorized dealers or your local metrology workers using a known standard weight. Weight calibrations are usually locked for end user, and therefore those functions are not accessible (Table). Wrong operation by end user may cause the compliance issue or wrong performance of the scale

### Table: Availability of UF, ECF, and LF Functions with Calibration Switch Location and Type Approval Settings

| Calibration Switch Location | Type Approval LF6 | UF 1-9 | ECF 1-3 | LF |
|---|---|---|---|---|
| OFF | o iℿL | UF5, UF7, UF8, and UF9 are not available | No | No |
| OFF | nonE | UF5, UF7, and UF8 are not available | Yes | Need password |
| ON | o iℿL | UF5, UF7, and UF8 are not available | No | Yes |
| ON | nonE | All functions are available | Yes | Yes |

The following instructions are intended for trained scale dealers/distributors, state inspectors.

### Weight Calibration ECF1-ECF3

To enable weight calibration and other advanced functions, calibration switch inside the scale must be at on position and LF6 has to set to nonE.

1. In weight mode, press the (ZERO) and (PRINT) keys, the display will show $ECF\text{-}1$.

2. Press the (ZERO) or (TARE) key to select $ECF\text{-}1$, $ECF\text{-}2$ or $ECF\text{-}3$.

### $ECF\text{-}1$ Zero and Span Calibration

1. Press the (PRINT) key to enter, display will show $CAL2$.

2. Press the (PRINT) key to calibrate zero point.

3. The display will show the calibration weight $006.000$. Depending on the capacity, your value can be different.

4. Use the keys (ZERO) and (TARE) to select the digit, and press (N/G) key to input the weight value.

5. Put the calibration weight on the platter and press the (PRINT) key to calibrate.

   The scale will return to weighing mode automatically.

## ECF-2   Zero Calibration

1. Press the (PRINT) key to enter, display will show CAL2.

2. Press the (PRINT) key to calibrate zero point.

3. The scale will return to weighing mode automatically.

## ECF-3   Span Calibration

1. Press the (PRINT) key to enter, display will show the calibration weight 0 .

2. Use the keys (ZERO) and (TARE) to select the digit, and press (N/G) key to input the weight value.

3. Put the calibration weight on the platter and press the (PRINT) key to calibrate.

   The scale will return to weighing mode automatically.

**Locked Function (LF) Operations**

CAL switch has to be ON (which is located inside the scale. You have to open the hole at the back to get access to CAL switch. Password required when CAL switch is OFF.

Keep pressing the【ZERO】key (no releasing) while turning on the indicator. After self-checking finishes, it displays `P  0000`. Input the password `P  0020`, and then press 【Print】to enter the parameter setting mode

*Press【ZERO】key or【TARE】key to shift between functions LF-1 ~ LF-8.
*Press 【Zero】【Tare】【N/G】to move and change the digits
*Press 【UNIT/ESC】to quit and the indicator will restart for normal weighing mode

`LF 1`    Weight Calibration

Press【Print】key to enter zero calibration `CAL2`.
Make sure nothing on the platform of the scale and press 【M+】to finish zero calibration
Display the full capacity `0300.00`
*Full capacity weights recommended for calibration of the scale, or at least 60% F.S. to assure the accurate weighing, it's not allowed to do with 1% F.S weight or more than 100%F.S.weight.*
Change the display value to be the same as the test weight.
Press 【Print】, the digits will twinkle
Place the test weights on the platform (example of 300Kg)
Press【Print】until the indicator recognizes the weight correctly.
Finish of calibration.

`LF2`    Parameter Setting

Press【Print】key to enter parameter setting mode and it will display the internal A/D value.
Press【Print】key to set the weight units `110002` (both kg and lb units are enabled with calibration using unit lb)
*110002*
*ABCDEF*

A ......... 0= disabled ... 1=Kg  2=Ton          3=g
B ......... 0= disabled ... 1=lb   2=lb/oz
C ......... 0= disabled ... 1=TW Kg      2=HK kg    3=VISS
D ......... 0= disabled ... 1=PCS off            2=PCS ON
E ......... 0= disabled ... 1=Multi interval       2=Multi range
F ......... 1=Calibration In Kg  2=Calibration in lb

`1 10022` (both kg and lb units are enabled with calibration using unit lb, dual range)

`1 10 122` (In addition, PCS is on, and therefore used as a counting scale)

Press【Print】key to set the capacity of the scale `000300`

Press【Print】key to set the decimal point `dP   0.00`

Using【Zero】key or【Tare】key to shift it from 0.0 until 0.00000

Press【Print】key to set the division `d ıu    01`

Using【N/G】key to shift it between 01/02/05/10/20/50

`LF3`     Linearity Calibration

Press【Print】key to set the linearity calibration `11   0`

*Press 【ON/T】key to enter next step `11    1`*

*Put 1/3F.S. test weight and press【ON/T】to enter next step `11  2`*

*Put 2/3F.S. test weight and press【ON/T】to enter next step `11  3`*

*Put 100%F.S. test weight and press 【ON/T】to enter next step `11  4`*

*Press 【Print】key to exit and back to `LF-3`*

`LF4`     A/D Converting Speed
The same operation as Weighing Speed
*It was blocked when UF-5 set of HOLD 1
*1=15Hz   2=30Hz   3=7.5Hz

`LF5`     Zero Tracking
The same operation as `UF  8` Zero Track
*It was blocked when `UF-5` set of HOLD 1(animal weighing)

`LF6`     Type Approval
`nonE` is for non-certified scales, and `o ıⅡL` is for NTEP (United States) or OIML (Europe)

`LF7`     Gravity Adjustment

The same operation as `UF  9` Gravity Adjusting

`LF8`     Zero
Press【Print】key to set the initial zero function `SEt2  Y`

`Y`........Reset of the zero point each time when the scale switches on

`n`........Disable resetting zero when switching on the scale

## Error Messages and Troubleshooting

| Error Display | Meaning | |
|---|---|---|
| *hhhhhh* | Overload | Weight on pan exceeds maximum capacity |
| *LLLLLL* | Weight is too low | Weight is too low at the negative |
| ------ | Price is out of range | Total price exceeds 999999 |
| *Err n* | Weight unstable | Vibration or varying load on the pan during switch-on |
| *Err H* | Initial zero too high | Scale turned on with weight > 10% of maximum capacity already on the pan |
| *Err L* | Initial zero too low | Scale turned on with upward force > 10% of maximum capacity acting on the pan |
| Battery symbol visible | Battery voltage is lower than 5.6 V | Battery neds charging. Connect to main adaptor. Press 【 T 】 and 【 6 】 together to view battery voltage. Press 【 CE 】 to return to weighing mode |
| Battery symbol flashing | Battery voltage is lower than 5.5 V | Battery needs charging. Connect to main adaptor |
| Scale automatically shuts off | Battery voltage is lower than 5.4 V | Battery needs charging. Connect main adaptor |

## Table: List of UF, ECF, and LF

| Function | Description |
|---|---|
| UF1 | Display A/D count, Battery Voltage |
| UF2 | High / Low limits setting |
| UF3 | Auto-power off |
| UF4 | Backlight setting |
| UF5 | HOLD function |
| UF6 | RS-232 Output |
| UF7 | Speed setting |
| UF8 | Zero tracking |
| UF9 | Gravity Adjustment |
| ECF1 | Zero and Span Calibration |
| ECF2 | Zero Calibration |
| ECF3 | Span Calibration |
| LF1 | Weight Calibration |
| LF2 | Parameter Setting |

| LF3 | Linearity Calibration |
|-----|----------------------|
| LF4 | A/D Converting Speed |
| LF5 | Zero Tracking |
| LF6 | Type Approval |
| LF7 | Gravity Adjustment |
| LF8 | Zero |

Order information

| Model | Capacity(kg) | Readability(g) | Capacity(lb) | Readability(lb) | Division |
|-------|--------------|----------------|--------------|-----------------|----------|
| CWT7-3 | 3 | 0.1 | 6 | 0.0002 | 30000 |
| CWT7-6 | 6 | 0.2 | 15 | 0.0005 | 30000 |
| CWT7-15 | 15 | 0.5 | 30 | 0.001 | 30000 |
| CWT7-30 | 30 | 1 | 60 | 0.002 | 30000 |
| CWT7-3D | 1.5/3 | 0.5/1 | 3/6 | 0.001/0.002 | 3000 |
| CWT7-6D | 3/6 | 1/2 | 6/15 | 0.002/0.005 | 3000 |
| CWT7-15D | 6/15 | 2/5 | 15/30 | 0.005/0.01 | 3000 |
| CWT7-30D | 15/30 | 5/10 | 30/60 | 0.01/0.02 | 3000 |

Certificate Number: 17-053
Page 1 of 3

NATIONAL TYPE EVALUATION PROGRAM

*Certificate of Conformance*

*for Weighing and Measuring Devices*

**For:**
Computing Scale
Non-computing Scale, Load Cell Electronic,
Multi-Range, Single-Range
Model: CWTxx & CPTxx
$n_{max}$: 3000
$e_{min}$: See table on page 2
Capacity: See table on page 2
Platform: 320 X 230 mm Stainless Steel
Accuracy Class: III

**Submitted By:**
Gravity Measurement, Inc.
17 Sterling Heights Drive
Clifton Park, NY 12065
Phone: 518-526-5942
Contact: Z. Rick Pang
Email: Pang@gravitymeasurement.com
Web site: www.gravitymeasurement.com

**Standard Features and Options**

Automatic Zero Tracking (AZT)
Initial Zero Setting Mechanism (IZSM)
Semi-Automatic Zero (Push Button)
Semi-Automatic Tare (Push Button)
Keyboard Tare
Programmable Tare
Price Computing (CPTxx models)
Weighing (CWTxx models)
Counting (CWTxx models)

AC Power Supply
DC/Battery Power Supply
Customer Display (Dual) (CPTxx models)
Liquid Crystal Display (LCD)
   RS-232 Communication Port
   Single Range
   Multi (Dual) Range

Load Cells Used: ZEMIC Model L6D Series (NTEP Certificate of Conformance number 11-012)
or other metrological equivalent and NTEP certified

Temperature Range: -10 °C to 40 °C (14 °F to 104 °F)

This device was evaluated under the National Type Evaluation Program and was found to comply with the applicable technical requirements of "NIST Handbook 44: Specifications, Tolerances and Other Technical Requirements for Weighing and Measuring Devices." Evaluation results and device characteristics necessary for inspection and use in commerce are on the following pages.

Kristin Macey
Chairman, NCWM, Inc.

Jerry Buendel
Chairman, National Type Evaluation Program Committee
Issued: May 2, 2017

1135 M Street, Suite 110 / Lincoln, Nebraska 68508

The National Conference on Weights and Measures (NCWM) does not approve, recommend or endorse any proprietary product or material, either as a single item or as a class or group. Results shall not be used in advertising or sales promotion to indicate explicit or implicit endorsement of the product or material by the NCWM.

Parts

LCD display Part # 20351006

Leoch Maintenance-free Sealed Lead-acid Rechargeable Battery
DJW6-5.0 (6V 5.0AH)
Constant voltage charge
    Standby use: 6.75-6.90 V
    Cycle use: 7.2-7.5 V
Initial current: less than 1.5 A

Leoch Maintenance-free Sealed Lead-acid Rechargeable Battery
DJW6-4.0 (6V 4.0AH)
Constant voltage charge
    Standby use: 6.75-6.90 V
    Cycle use: 7.2-7.5 V
Initial current: less than 1.2 A

AL-FURAAT Valve regulated Sealed Lead-Acid Rechargeable Battery
AF4.5-6 (6V, 4.5AH)
Constant voltage charge
    Standby use: 6.75-6.90 V
    Cycle use: 7.2-7.5 V
Initial current: less than 1.35 A

# GRAVITY MEASUREMENT, INC.