Industrial Electronic Balance

Operating instruction

Contents

1 Introduction

Thanks for purchasing QL-C series industrial electronic balance.

1.1 Models of QL series electronic balance

Model	QL8K	QL12K	QL16K	QL20K	QL30K	QL50K	QL50KA	QL60K	QL60KA
Max.Capacity	8kg	12kg	16kg	20kg	30kg	50kg	50kg	60kg	60kg
Readability	0.1g	0.1g	0.1g	0.1g	0.1g	0.5g	1g	0.5g	1g
Repeatability	±0.2g	±0.2g	±0.2g	±0.2g	±0.2g	±1g	±2g	±1g	±2g
Linear Error	±0.2g	±0.2g	±0.2g	±0.2g	±0.2g	±1g	±2g	±1g	±2g
Pan size	310 mm *370 mm								
DC adaptor	Input: AC 220V /50Hz; Output: DC 7.5V /600mA								
External size	310 mm * 370 mm *135 mm								

1.2 Industrial balance features

A.Unit conversion: gram, carat, ounce, etc

B. Parts counting and percentage determination

C. External weights calibration

D. Standard RS232 communication port

E. All-metal structure, sturdy and durable

F. Overload protection

G. Weight checking function

H. Super-large LCD display

1.3 Keyboard functions

TARE: Taring or zeroing

CAL: External weights calibration

UNIT: Convert weighing units

%: Percentage weighing

COUNT: Parts counting, select a reference piece number

MENU: Enter menu settings

PRINT: Output the displayed message to printer or other devices

1.4 Display

OK: Display of stable weighing value

g: Weighing unit "gram"

Oz: Weighing unit "ounce"

Ct: Weighing unit "carat"

dwt: Weighing unit "pennyweight"

%: Application of percentage determination

PCS: Application of parts counting

------: Currently reading stable weighing value

UNABLE: Illegal operation

HHHHHH: Overload—weight of sample exceeds the rated capacity of the balance

LLLLLL: weighing pan not properly installed or removed

2 Installation

Attention:

※ Select an appropriate location to install the industrial electronic balance, as far as possible away from radiator, vibration or air flow.

※ The temperature fluctuation in the working environment of the balance should not exceed 5℃ per hour.

1. Install the weighing pan support assembly: Use 4 screws to fix the weighing pan support on 4 corresponding sealing columns, and check that the weighing pan support is evenly located in the center of the housing.
2. Leveling: Level balance with 4 foot screws until the bubble level of the balance is in the prescribed circle.
3. Install the weighing pan on weighing pan support and ensure the weighing pan is in full contact with the gasket and away from the housing. Plug the data connection cable of the display unit in the corresponding interface located at the backside of the electronic balance.
4. Power on: Plug the transformer cable into a 220V/50Hz AC outlet and the other end of the transformer into the power socket located at the backside of the electronic balance.
5. Power-on-self-test: Turn on the power and the balance enters into the self-test program. After the model of the balance is displayed, the balance enters into countdown. The balance is automatically set to zero after the self-test is over.

Attention:

※ Before power on, make sure the display unit is connected to the balance. Otherwise the balance will show blank white screen and you need to unplug and replug the cable.

※ In order to obtain accurate weighing results, the balance should be preheated for at least 25 minutes before first use or calibration.

3 Calibration

Aim: the accuracy of the balance is determined by measuring the difference between the displayed value on the balance and the actual weight on the weighing pan.

※ The balance can only adjust the calibration process when the following conditions are satisfied:

-----No load on the balance

-----The balance is set to zero

-----Internal signals are stable

-----The deviation of the displayed value of the sample weight from the standard weight does not exceed 5%.

External calibration procedure:

1. Level the balance and preheat it for 25 minutes.
2. Press **TARE** key to set the balance to zero.
3. Press **CAL** key and the screen displays (30000). Press **TARE** key continuously and the balance will display corresponding external calibration points (20000, 10000, ...).
4. Select a calibration point that requires external calibration. Load a corresponding standard external calibration weight and press **CAL** key, the balance starts calibration process and displays **ACAL**.
5. The external calibration process is over. The balance displays the indicating value of the standard external calibration weight.

4 Basic Operation

4.1 Basic weighing

1. Preheat the balance for at least 25 minutes before use.
2. Remove the objects on the weighing pan.
3. Press **TARE** key to set the balance to zero.
4. If other weighing units are needed, press **UNIT** key until the desired weighing unit appears on the screen.
5. Place the object to be weighed on the weighing pan.
6. Wait for "**OK**" indicator on the display and read weighing results.

4.2 Weighing with tare

1. Place the empty container on the weighing pan.
2. Press **TARE** key to set the balance to zero.
3. Wait for the "**OK**" indicator, place or pour the object or liquid to be weighed into the container.
4. Wait for "**OK**" indicator on the display and read the weighing results.

4.3 Parts counting

1. Press **TARE** key to set the balance to zero. If tare weighing is required, place the container on the weighing pan and then press **TARE** key.
2. Press **COUNT** key, and the screen displays "**QTY 10**". Press **COUNT** key repeatedly, and the screen will display "**10, 25, 50, 100, 500, 1000**" in sequence. The greater the number of samples is, the higher the accuracy becomes.
3. Place as many counted pieces as required by the set reference piece number on the weighing pan or into the container. Press **UNIT** key and the screen displays the sample number. The balance is now in parts counting mode and the displayed unit is "**PCS**".
4. Place the sample to be counted on the weighing pan or into the

container, wait for "**OK**" indicator on the display and read the weighing results.

Attention:

Press **UNIT** key to switch between parts counting mode and weighing mode.

PCS: number of pieces

g: the weighing unit is gram

Oz: the weighing unit is ounce

ct: the weighing unit is carat

dwt:the weighing unit is pennyweight

4.4 Percentage determination

To calculate the percentage by which the sample to be weighed varies from the reference object, follow the procedure below:

1. Press **TARE** key to set the balance to zero.
2. Place the reference object on the weighing pan. Wait for stable display and press **%** key, the screen will display "**100.000**" or "**100.00**" , depending on the accuracy of the balance, with a **%** indicator simultaneously.
3. Remove the reference object and the screen displays "**0.000**" or "**0.00**'.
4. Place the sample to be weighed on the weighing pan.
5. Wait for "**OK**" indicator on the display and read the weighing results. The displayed value is the ratio of the sample to the reference object in percentage.
6. Press **UNIT** key and the balance returns to normal weighing mode.

If filling percentage weighing is needed, follow the procedure below:

1. Place an empty container on the weighing pan and press **TARE** key to set the balance to zero.
2. Fill the empty container with standard objects.
3. Press **%** key, "**100.000**" or "**100.00**" will appear on the screen after stable display.

4. Remove the container filled with standard objects and place another empty container, the screen displays "**0.000**" or "**0.00**'.
5. Fill the empty container with sample to be weighed. Wait for "**OK**" indicator on the display and read the weighing results. The displayed value is the ratio of the sample to the reference object in percentage.
6. Press **UNIT** key and the balance returns to normal weighing mode.

4.5 Weight checking

To determine whether or not the sample weight falls within a specific range, the upper and lower limits of the sample weight need to be set.

1. Set the upper and lower weight limits of the standard object and start up weight checking mode. (please refer to Chapter 5.6)
2. Press **TARE** key to set the balance to zero.
3. Place the sample to be weighed on the weighing pan.
4. When the sample weight is lower or higher than the lower or upper limit value, a balance alarm will be triggered, and "**OK**" indicates that the sample weight is within a specific range.

4.6 Print out

The balance is designed to print out the displayed data when connected to a thermal serial port printer.

1. Connect the printer to the balance via RS232 interface.
2. Turn on the printer.
3. Refer to Chapter 5 and set the balance accordingly.
4. Press **RPINT** key to print out the required data.

4.7 Computer interface

Please use a standard RS232 serial data cable (2-2, 3-3) to realize the bidirectional communication between the balance and the computer.

5 Setting

The balance can be optimized by setting the function parameters. Press **MENU** key to enter the menu. Press **TARE** key to view the current menu items, and press **COUNT** key to confirm the selected options. To exit the menu, press **TARE** key at any time to display "**ESC**" on the screen and press **COUNT** key to confirm.

5.1 Print setup

There are 3 print modes for the electronic balance.

Stable output (**STABLE**): output of stable weighing values.

Instant output (**INSTANT**): output of current weighing values after pressing **PRINT** key.

Interval output (**INTERVAL**): output of weighing values after a preset time interval.

Users can set the number of line feed for label printing.

Attention:

The line feed number should be set after the print mode is set up.

To set the print mode, follow the procedure below:

1. Press **MENU** key and then press **TARE** key until the screen displays "**PRINT**".
   Note: To exit the program at any time, press **TARE** key until the screen displays "**ESC**", then press **COUNT** key to confirm.
2. Press **COUNT** key to enter the print menu, and the screen displays "**STABLE**". The factory setting is stable output.
   A. **Stable printing**: Press **COUNT** key to select the stable print mode. The balance will return to normal weighing mode.
   B. **Instant printing**: Press **TARE** key to display "**INSTAN**" and then press **COUNT** Key. The balance will return to normal weighing mode.
   C. **Interval printing**:Press **TARE** key twice to display "**INTER**" and then press **COUNT** Key for confirmation. The balance enters into

interval printing mode and displays "**0 SEC**" (continuous output). Press **TARE** key repeatedly to check the preset time intervals and press **COUNT** key to confirm.

D. **Line feed printing**:Press **TARE** key three times to display "**LINEFD**" . The balance enters into the line feed printing mode. Press **TARE** key repeatedly to check the preset line feed numbers (1-18) . Press **COUNT** key to confirm the selected line feed number. The balance returns to normal weighing mode.

5.2 Setting baud rate and parity

1. Press **MENU** key to display "**BAUD**". The balance enters into the menu setting mode.
2. Press **COUNT** Key to enter the baud rate setting menu. The screen displays "**300**".
3. Press **TARE** key repeatedly to view other baud rates. Press **COUNT** key to confirm the desired baud rate and the screen displays "**PARITY**".
4. Press **COUNT** key to start the selection of parity check. The screen will first display "**NONE**" (no parity check).
5. Press **TARE** Key to display other options of parity check. "**ODD**" stands for odd parity check and "**EVEN**" represents even parity check.
6. Press **COUNT** key to confirm the displayed parity check. The balance returns to normal weighing mode.

5.3 Weighing unit setup

This setting can enable or disable the displayed units during operation. The specific procedure is shown below:

1. Press **MENU** key to display "**BAUD**".
2. Press **TARE** key repeatedly until the screen displays "**UNITS**".
3. Press **COUNT** key to display "**g yes**", indicating the weighing unit

gram is enabled and then press **COUNT** key for confirmation. To void this weighing unit, press **TARE** key to display "**g no**" and press **COUNT** key for confirmation.

4. Repeat step 3 to enable or void weighing units like Oz, Ct, dwt, etc.

5.4 Restore default settings (factory settings)

Restoring default settings can revert the capacity and setting parameters of the balance back to factory settings.

To restore default setting, follow the procedure below:

1. Press **MENU** key and then press **TARE** key to display "**BAUD**". The balance enters setup menu.
2. Press **TARE** key repeatedly until the screen displays "**INITIA**".
3. Press **COUNT** key to confirm and the screen displays "**BUSY**" and returns to normal weighing mode.

5.5 Backlight setting

1. Press **MENU** key to display "**BAUD**". The balance enters setup menu.
2. Press **TARE** key repeatedly until the screen displays "**BLIGHT**". Press **COUNT** key and the screen displays "**1 NIN**" to start the setting of backlight auto-off time.
3. Press **TARE** key repeatedly to select backlight time. Options are **1, 2, 3, 5, 10, 15, 30, 60**, indicating the backlight auto-off time from 1 minute to 60 minutes.
4. Press **COUNT** key to confirm the desired time. The balance returns to normal weighing mode.

5.6 Weight checking setting

To set the upper and lower limits of weight, follow the procedure below:

1. Press **MENU** key to enter the menu.
2. Press **TARE** key repeatedly until the screen displays "**INSPCT**".

3. Press **COUNT** key to confirm and the balance enters weight limits setting menu and displays "**SET HI**" (setting the upper limit).
4. Press **COUNT** key for confirmation and the screen displays "**0.0/0.00**".
5. The initial value displays, press **COUNT** key to add value, press **TARE** key to minus.
6. When the desired ideal value is displayed, press **CAL** key and the displayed value flickers, if you want to change the setting value, press **TARE** key for modifications, if confirmed, press **CAL** key and the value flickered, then press **COUNT** key and balance displays "**SET HI**".
7. Press **TARE** key to display "**SET LO**" (setting the lower limit). Method ibid.
8. In order to avoid no-load (less than lower limit value) alarm, press **COUNT** key to confirm and the balance enters the weight limits setting menu and displays "**SET HI**". Press **TARE** key repeatedly until the balance displays "**NONRES**" and press **COUNT** key to enter into alarm setting range. The default initial value is 50% of the lower limit. Press **COUNT** key to increase or press **TARE** key to decrease the percentage. Press **CAL** key after setting and the setting value flickers. Press **COUNT** key to confirm.
9. To enable/disable weight-checking settings: To start up weight checking mode, press **TARE** key repeatedly until the balance displays "**ENABLE**" and press **COUNT** key for confirmation. The weight checking mode is enabled. If the weight checking mode is not required, press **TARE** key repeatedly until the balance displays "**DISABL**" and press **COUNT** key to return to normal weighing mode.

6 Appendix

6.1 Data communication between PC and the balance

For the data communication of a peripheral device (computer) the balance is

as per series equipped with a RS232-interface, which enables some keyboard functions.

The following commands are available:

U:**UNIT** .....unit conversion
T: **TARE** .....zeroing
C: **CAL** .....external calibration with a standard weight
P: **PRINT** .....printing
%: .....percentage
#: .....instant printing
M:**COUNT** .....parts counting

When a balance is connected to a computer, it is suggested that instant printing (#) be used. In response to this command, the balance will transmit whatever number or message appears on the display to the computer.

The string format is shown below:

A B C D E F G H I J K L M

A: +/- Sign, normally positive value will not be displayed and represented by a blank, negative value will be displayed.

B~G: Digit, the decimal point is also transmitted. Numbers less than six digits long are replaced by spaces.

H~I: Space

J: Unit, the unit of the number being transmitted. The balance will display g for grams.

K: Stable, this corresponds to the "OK" indicator on the display. S means stable data and space represents unstable data.

L: Carriage return character.

M: Feed line number, the preset feed line number of the balance.

6.2 RS232 interface

Only the data transmission line and receiving line with standard interface

are used for RS232 interface of this balance.

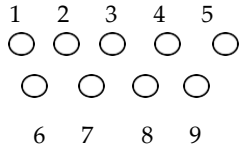
The data format is

1 start bit

8 data bits, including parity, the inspection method is subject to the setting of the balance.

1 stop bit

For the connection of a peripheral device with the balance



RS232-shape pin

Pin	Function
2: TXD	data transmission line of the balance
3: RXD	data receiving line of the balance
5: GRD	signal ground

Attention:

※"Handshake" signals, such as **CTS (CLEAR TO SEND)** are not used. The peripheral devices must have a minimum buffer of at least 15 characters.

※The maximum recommended cable length is 15 meters. The load impedance of the peripheral device should fall within the range of 3.000 - 7.000 ohms with no more than 2500 pF capacitance.

6.3 Maintenance and troubleshooting

Daily maintenance

- Remove the weighing pan and thoroughly clean (top, bottom and edges) to get rid of any stain or dirt which may have accumulated.
- It is recommended to use alcohol or soft solvent, instead of water, to erase the grease and dust on the surface of the balance.

- After cleaning, be careful to keep the weighing pan, weighing pan support away from the housing.

Attention:

When you remove the weighing pan and weighing pan support, be careful not to allow any liquid or solid particles through the pan mounting hole into the balance.

Troubleshooting:

The following displayed messages show some common faults:

--------	The testing result is unstable
HHHHHH	Sample weight exceeds 5% or more of the rated capacity of the balance.
LLLLLL	a. Weighing pan not installed, install the weighing pan and press **TARE** key to set the balance to zero. b. There may be sundries underneath the weighing pan. Check and make sure the weighing pan is kept away from the housing.
NOCAL	Calibration can not be performed. Refer to Chapter 3 and check whether or not the calibration weight is accurate and intact or there is sundries underneath the weighing pan.
UNABLE	The electronic balance can not perform the desired functions due to the lack of data or incorrect data.