FEATURES AND SPECIFICATIONS

Model	WS5-150	WS5-300	WS5-600	WS5-1200	WS5-1500	WS5-3000
Capacity (g)	150	300	600	1200	1500	3000
Division (g)	0.005	0.01	0.02	0.02	0.05	0.1
Resolution	1/30000	1/30000	1/30000	1/60000	1/30000	1/30000
Calibration Weight	100g	200g	500g	1000g	1000g	2000g
Pan Size	Round 116mm dia			Rectangular 144 x 124mm S/S		
Selectable Units	G, ct, lb, oz, dr, GR, ozt, dwt, MM, tl J, tl T, tl H, t					
Power Source	4 x AA dry Batteries (not supplied) or AC Adaptor 9v DC (supplied)					
Overall Size	226 x 175 x 63mm					
Draft Shield	Standard					
Display type	LCD 16mm high					
Calibration	Simple calibration using front panel controls and a calibration weight (not supplied)					
Protection	Double overload protection					
Counting	Standard					
Percent Weighing	Standard					
Auto Power Off	Standard					
RS232	Bi directional RS232 Standard					
Display Back light	Standard					
Tare	100%					
Tare Adding	Yes					
Tare Subtraction	Yes					

Note: Recent models show improved resolution eg 300g x 0.005

FEATURES – WHAT THEY DO AND HOW THEY WORK

SITING THE BALANCE

Locate the balance on a firm stable bench that is protected from vibration shocks and wind effects. Avoid locating the balance in direct sunlight as the heating effects will affect accuracy. Don't forget to remove the transport protection screw from the side. The balance should be calibrated (simple calibration) once sited.

WEIGHING

Make sure the balance is level, use the adjusting feet to bring the level bubble inside the inner ring. Remove any weight from the pan, turn on the balance and allow to warm up for 15 – 20 minutes. Place any product to be weighed into the centre of the pan to minimise any off centre loading errors.

TARE

This function is used to subtract the weight of container or to subtract the weigh of product already on the pan. When the weight is stable press the tare key. The display will show 0.000 (decimal places depend on the model).

TARE ADDING

A useful function often used to make up a recipe of ingredients. Here each ingredient is added to the pan/container to the required weight. Once at the required weight and the weight is stable press the tare button to zero the weight reading. Repeat the process with each ingredient in turn

TARE SUBTRACTION

This works in a similar way to Tare Adding except the product is being removed from the container in sub amounts. For example the operator may need to take out eight lots of 10g of product from a bulk container of a greater amount. This function aids the measuring process.

COUNTING

This balance can do simple counting. Press the **Mode** key so the display shows 'C 10 pcs'. If there is to be a container, place the empty container on the pan and press the **Tare** key. **Use** the **Sample** key to toggle through the available number of pieces in the sample, (10, 20, 50, 100, 200), and select one of them. Put that number of pieces into the container, or on the pan if no container is used, and press the **Enter** key. The balance will calculate the unit weight and display the number of pieces you said was there. Add all of the pieces to be counted to the pan or container, the display will show the count. Press the **Mode** key to exit back to normal weighing. The balance remembers the last unit weight and recalls that each time the counting function is selected until a new unit weight is entered.

PERCENT WEIGHING

The balance can display the weight of the product as a percentage of a standard. This is useful where the customer wants to check that product is within a give percentage of a target, say, 95% to 105% of a given nominal or target weight weight. It is also used where the recipe expresses a mixture as a percentage. The **Tare** key can be used where a container is used but is not part of the weight. Press the **Mode** key twice and the display will show '100%'. Use the **HR** key (High

Resolution) to switch between one and two decimal places. Place the standard, ie the weight that represents 100%), on the pan and press the **Enter** key. The balance will calculate out and display 100.0% or 100.00% depending on whether high or low resolution is selected. Remove the standard and place the other samples on the pan in turn. The display will show a the weight as a percentage of the standard. Again the balance will remember the last standard used and will default to that until a new standard is set.

SIMPLE CALIBRATION

This balance can be simply calibrated by the customer using a suitably accurate weight and the front panel controls. There is no need to open up the balance to access calibration locks. This calibration is a single point calibration and assumes the linearity, Gravity value, and temperature calibration are OK. The balance should be On, level and warmed up before this process. To activate press and hold the **Enter** key until the balance flashes the required calibration weight. Place an accurate weight of this value centrally in the pan and wait. Once the display becomes stable the balance will automatically calibrate and return to weighing mode. The value of the calibration weight is set by the factory and cannot be changed. A suitable weight is of OIML Class F2 for 1/30000 resolution balances and OIML Class F1 for 1/60000 resolution is a minimum standard of accuracy. (the classes in descending order of accuracy are E1, E2, F1, F2, M1, M2, M3. A 100g weight of class E2 has a tolerance of ±0.16mg, ±0.5mg for class F1, ±1.6mg for class F2, and ±5mg for class M1.) Sell a suitable weight with the balance.

SELECTABLE UNITS

g	Gram	
ct	Metric Carat	0.2g
lb	Avoirdupois Pound	453.59237g
oz	Avoirdupois Ounce	28.349523g
dr	Avoirdupois dram	1.7718451g
GN	Grain (UK)	0.0647989g
ozt	Troy Ounce	31.103476g
dwt	Pennyweight	1.5551738g
MM	Momme (Japan)	3.749996g
tl J	Hong Kong Jewelry Tael	37.429002g
tl T	Tael (Taiwan)	37.49995g
tl H	Tael (Hong Kong)	37.799375g
t	tola (India)	11.663804g

HOW DOES IT PERFORM.

I drew an example at random from stock, ie wandered into the store and stole one off the shelf. I managed to pick a WS5-150, 150g x 0.005g, assembled it without the draft shield, warmed it up, and performed a simple calibration. I then performed a ten point repeatability test, first at 100g and then at 150g, (same weight on and off ten times), Checked for corner error at 100g, (does it matter where on the pan the load is placed), A hysteresis check at 50g, (does it weigh the same with decreasing weights as it does with increasing weights) and finally a five point weighing error check (divide the capacity into five roughly equal parts and test the accuracy at each fifth, (one fifth, two fifths etc)).

The repeatability test at 100g gave me a 2 division difference between the highest and lowest readings, while the 150g repeatability gave also gave a two division difference. This is generally within accepted tolerances.

The Corner error test showed only a one division difference between any corner of the pan and the centre. This is within tolerances.

The Hysteresis test showed only one division difference between increasing to the weight and decreasing to the test weight, again within tolerance.

The five point weighing error test showed a one division error between the reading and the nominal of the test weights through the range. This is within tolerances.

I then tested the counting functions. I placed a 1.7g object on the pan and told the balance that was 200 pieces. This makes the unit weight 8.5mg or just over one division. The balance repeated the count accurately and correctly counted multiples of the same object. A unit weight of less than one division does not result in an accurate count.

For a load cell based balance this unit has performed well and with a tolerance that I would expect for this type of balance.

The unit looks quite good and has a good standard of construction and finish.

APPLICATIONS

Hobby jewelers and craft folk.
Factory fine accuracy check weighers
laboratories
some food manufacturing
QA checks