Avery Weigh-Tronix

BSQ

DIGITAL BENCH BASES

High resolution, robust bench bases designed to give balance accuracy within an industrial environment.

Frequently Asked Questions

1. What is Quartzell™?

Quartzell stands for Quartz Digital Transducer (QDT). It uses true digital signals from quartz crystals that are precisely mounted on an intricately machined aluminum frame. The device converts the oscillating frequencies from two crystals into a digital signal which is representative of the load applied. When profiled, the output signal provides an extremely accurate measurement with a higher resolution than normal strain gauge technology.

2. What are the advantages of using Quartzell over Analog strain gauge load cells?

Unlike a strain gauge load cell, which produces an analog signal that has to be converted to digital, the Quartzell transducer utilizes the change in frequencies from two double-ended tuning-fork quartz crystal sensors to produce a true digital signal measured in frequency. This eliminates the need to convert an analog signal to digital and this significantly reduces errors, while increasing speed and accuracy of the measured signal. The digital signal allows a scale to weigh faster and with greater resolution. The Quartzell uses two quartz crystals, one in compression and the other in tension. This helps reduce the impact of environmental influences, such as changes in temperature and pressure.

3. What is meant by Internal Resolution?

Internal resolution equates to the smallest internal count data bit that can be measured by the Quartzell. The BSQ base can produce over 1 billion internal counts. When compared to our current products, this is a massive jump in performance and accuracy.

Current product	Internal counts
NCI 7800	1:120,000
GSE675	1:1,000,000
PC820	1:2,000,000
PC902/5	1:25,000,000
BSQ base	1:1,000,000,000

4. What is Internal Resolution used for?

Internal resolution is used to calculate an accurate repeatable displayable reading, which is very important when manufacturing and weighing very small components. Having lots of internal counts can help in accurately calculating piece weights, parts or small items that are being weighed.

5. What is meant by Displayed Resolution?

The new BSQ base can display up to 10 million divisions.

Displayable division is not always the same as usable divisions. Usable divisions or readability is the recommended division size that the scale can be used at when filters are set correctly to give a usable stable weight reading.

Displayed resolution is the maximum allowed displayable divisions used from a product. This is normally limited by the allowable display digits shown on the indicator, in most cases this is around 10,000,000 divisions or (9,999,999).

To correctly display any weight division, each displayed division has to be able to be divided by 10 to allow it to be correctly displayed. Most scales do not have enough internal resolution to allow this to happen

Displayable divisions = 10,000,000

Divided by 10 = 100,000,000 minimum internal counts needed

6. What is meant by Readability?

Readability is the maximum recommended stable weight reading the scale can be expected to work at. Depending upon the environment that it is being used in, the new BSQ digital Quartzell base offers a readability resolution of around 3.5 million divisions.

More resolution can be achieved if used in laboratory type environments.

7. What is Repeatability?

Repeatability accuracy is measured by the error seen when a set number of weight/ components are placed on and off

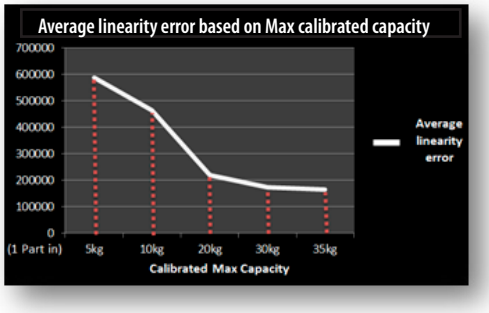
the scale a number of times and the difference between the readings is measured. The average repeatability for the BSQ base is 1:100,000 divisions.

8. What is Creep and what do we expect to see with this new BSQ digital Quartzell base?

The new BSQ base offers excellent creep resistance with less than 1:100,000 divisions creep during a 30 minute time span and 1:200,000 during a 5 minute time span.

9. What is meant by Linearity Average Error -/+ (at room temperature / centre of pan)

The -/+ average linearity error is the average recorded error based off the capacity the scale has been calibrated at. This gives an average linearity error when calibrated to 5 kg (11 lb) on a 35 kg (70 lb) BSQ base of around 1:600,000 divisions, or an overall average linearity error when recalibrated to 35 kg (70 lb) of around 1:170,000 divisions.



Linearity is measured from zero to calibrated max capacity. Hysteresis is measured from max capacity back to zero.

10. How far can the BSQ base capacity be down ranged by?

The BSQ digital base is available in 2 main capacities: 70 lb (35 kg) or 175 lb (80 kg). Due to its high internal resolution this allows the capacity of each base to be down ranged by around 80% subject to the application it is being used in.

70 lb will cover a range from 15 lb to 70 lb,

175 lb will cover a range from 35 lb to 175 lb

11. How accurate is this base?

The BSQ base has a center of pan /room temperature accuracy of 1:100,000 divisions.

12. What is the lowest usable division size the BSQ base can work at?

The recommended lowest usable division size each base can go down to is as follows:

Minimum recommended non verifiable division size

0.000001 lb (0.0005 g) off the 2 lb (1 kg) BSQ base
0.000005 lb (0.002 g) off the 10 lb (5 kg) BSQ base
0.00002 lb (0.01 g) off the 70 lb (35 kg) BSQ base
0.00005 lb (0.02 g) off the 175 lb (80 kg) BSQ base

Minimum allowed verifiable division size (class iii)

0.0002 lb (0.1 g) off the 2 lb (1 kg) BSQ base (1:10,000d approved)
0.0002 lb (0.1 g) off the 10 lb (5 kg) BSQ base (1:10,000d approved)
0.002 lb (1 g) off the 70 lb (35 kg) BSQ base (1:10,000d approved)
0.002 lb (2 g) off the 175 lb (80 kg) BSQ base (1:10,000d approved)

13. What capacity range can I legally set on the 2 lb and 10 lb (1 kg and 5 kg) BSQ base?

Both the 2 lb and 10 lb (1 kg and 5 kg) BSQ base versions are NTEP and Canadian approved to weigh 10,000d per range with up to three multi ranges, as long as the v min is no lower than 0.0002 lb or 0.1 g.

This means the 10 lb (5 kg) base can still be legally set to 2 lb x 0.0005 g single range.

14. Where is the BSQ calibration data saved?

All the metrology data is stored within the indicator head work and not in the base. This data is transferred from the base to the indicator over RS232.

15. Why is the calibration stored in the indicator and not the base?

To allow us to get the maximum resolution from the BSQ base the calibration data is stored within the indicator. This allows us to better utilize the filters and other functions found within our indicators.

16. Where is the filter data stored?

All filter settings are stored and controlled within the ZM223 or ZM400 Series Indicators. To get the best performance from your indicator, we recommend you install the latest version of the ZM223 or ZM400 Series software, which can be found on the secure side of our website.

17. What indicators can be linked up to this base?

This base can be linked to the ZM223 or ZM400 Series Indicators. If a display is not needed, the base can also be linked to a ZM220 Signal Processor.

18. Can I use multi point calibration on this base?

Yes. The base can utilize the same multi point linearization / calibration points as found in the current ZM223 or ZM400 Series Indicator range.

19. Can this base be trade verified?

Yes. This base is NTEP, Measurement Canada and OIML approved to 10,000 divisions' accuracy with up to 3 multi-range steps each allowing 10,000 divisions per range.

The 2 lb (1kg) base will carry a NTEP and Measurement Canada approval, with a minimum interval size of 0.0002 lb (0.1 g) but is not OIML approved.

20. Can I link two BSQ bases together to get a higher capacity?

With a little custom Lua programing and our ZM223 or ZM400 Series Indicators, it is possible to link up two BSQ bases together to perform as one base.

21. How is the base powered?

The BSQ digital base is powered directly from the indicator through the RS232 cable.

22. What is the maximum cable length I can use with the BSQ base linked to a ZM223 or ZM400 Series Indicators?

The maximum cable length the BSQ can operate on without changing the base settings is 50 ft (15 m). Longer distances are possible by lowering the Baud rates within the base. For further information, please contact Technical Support.

23. What is the communication setting from the base to the indicator?

The base communicates through RS232 using SMA protocols. Communications settings are as follows: Bard rate: 115200, D-bits: 8, Party: None, S- Bits:1.

24. Can the base be linked directly to a PC?

Yes. For some custom applications, the BSQ base can be linked directly into a PC. However, at present Avery Weigh-Tronix does not offer a standard PC program to allow this to be viewed or set up from a PC.

25. What is meant by 1100% overload protection?

Ideal for use in industrial applications where other balances will quickly get damaged, this clamshell case design and spring breakaway system help to keep the highly accurate Quartzell fully protected at all times even after being overloaded by 1100% - e.g. 2200 lb (1000 kg) on the 70 lb 175 lb (35 kg to 80 kg) scales.

26. How does the clamshell design improve performance and reliability of the base?

This fully enclosed base design helps to greatly reduce outside environmental influences like drafts and sudden changes in temperature, which can affect the weighing performance within the scale. In addition, the clamshell case design locks together and gets stronger as more weight is applied.

Both our 70 lb (35 kg) and 175 lb (80 kg) bases can easily withstand over 2200 lb (1000 kg) of weight without reducing accuracy of the scale base.

27. What overload protection is there in the 2 lb and 10 lb (1 kg and 5 kg) BSQ base?

Although different to the 70 lb and 175 lb (35 kg and 80 kg) base design, the mechanism in the 2 lb and 10 lb (1 kg and 5 kg) bases still offers 1100% overload protection from its flex suspension system and built in overload stops.

28. What is meant by base Thermal Protection?

Our 70 lb and 175 lb (35 kg and 80 kg) bases have been designed to remain very accurate even when weighing very hot items. This unique base design removes any build-up of heat that is within the top plate and stops it conducting down through the base to the more critical areas of the loadcell. Built-in thermal barriers and heat sink areas keep the cell at a stable temperature.

29. What IP rating is the base?

The base has an IP rating of IP42. However, the clamshell case and unique, suspended cell design with special drip channels ensure that all critical components are well protected from any oils and fluids which might otherwise get inside the scale base.

30. What is the USB connector on the back of the BSQ?

This port can be used for a direct connection to a USB port on a

PC. It requires the use of a USB type A to type B cable, part number AWT25-501988.

You will need to install the Avery Weigh-Tronix USB VCP driver software on the connected PC so that a Virtual Com Port is created when the cable is connected. This software is available to download from www.averyweigh-tronix.com. The USB port on the BSQ only supports SMA protocol.

Documentation on SMA protocol is available in the BSQ Installation Guide and Avery Weigh-Tronix control document SCP-15.

31. What is meant by Multi-Range?

A Multi-Range scale is defined as a weighing instrument having two or more weighing ranges, with each range having a different weight interval (or division) size.

The interval size automatically adjusts when the weight enters a new weighing range, allowing lighter parcels to be weighed using smaller intervals and the heavier parcels using higher intervals.

The BSQ base offers up to three ranges of operation within a single scale. Example: 0- 6 kg is 1 g interval, 6 -15 is 2 g interval and 15 -35 kg is 5 g interval. As the weight is applied the first interval (1 g) would be operable but as the weight exceeds 6 kg, the display will switch to 2 g intervals. Above 15 kg it will switch to 5 g intervals. As the weight is removed, the scale will retain the interval from the highest weight range attained until the weight returns to zero and becomes stable.

32. What is a Ball Top Shroud and where is it used?

The Ball Top Shroud is a specially designed weigh platter that has 10 roller ball bearings mounted within the weigh platter. This allows heavy boxes to be easily rolled on and off the scale, allowing the scale to be used between conveyors or roller tables. The ball top offers a more streamlined design that can accept product from any direction and allows easy repositioning to locate shipping labels or other content information that may be on the sides of the packaging.

This ball top option is only available on the larger 12" x 14" (305 mm x 355 mm) BSQ base sizes.

33. What is the underhook used for?

It is mainly used when calculating the density of an object.

The underhook allows items to be weighed underneath the scale by suspending them from a hook that is mounted directly to the bottom of the load bridge. Once installed, both the underhook and weighing platter can be used to weigh items without needing to change any settings on the scale.

34. What capacities can be used with the underhook option?

At present the underhook can only be installed to the lower capacity 2 lb and the 10 lb (1 kg and 5 kg) BSQ bases.

35. Do I have to order the underhook with the BSQ base or can it be installed at a later date?

The underhook is an aftermarket accessory that can be installed out in the field. It quickly installs to the base without the need for disassembling. The underhook mechanism can easily be attached by removing the two plastic plugs found in the underside of the scale base and accessing the load bridge.

36. What does the draft shield do?

When weighing very small parts or working at a very high resolution any small air movement across the weigh platter can have a big effect on weight reading stability. This can be caused by air conditioning or any kind of movement close to the scale. To help eliminate this, a draft shield option is available on the 2 lb and 10 lb (1 kg and 5 kg) BSQ models. This cuts out unwanted air movement to give a more stable repeatable weight reading, especially when working at very high resolutions.

37. Will I get better accuracy resolution when using a draft shield?

A draft shield can help to achieve greater accuracy resolution. Weighing in a more controlled environment helps eliminate unwanted air movement and to achieve a more accurate zero, resulting in a more accurate weight reading.

38. Can the draft shield be used on all BSQ bases?

No. The BSQ draft shield has been specially designed to be used only on the 2 lb and 10 lb (1 kg and 5 kg) versions. Avery Weigh-Tronix does not currently offer a draft shield for the larger BSQ base capacities. However, there are a number of off the shelf clear acrylic equipment draft shields available on the market if one is required.

39. Is the draft shield made of acrylic or glass?

Acrylic was chosen over the more fragile glass option due to its rugged strength and robustness, an important requirement within the industrial environment. To avoid the possibility of static build up on the acrylic, we recommend that an anti-static spray is used on the draft shield to help remove any static charge which could affect the accuracy of the scales. If a spray is not available, a final wipe down with a damp cloth can also reduce this static build up.

More online

- Technical specifications
- User manuals
- News and information

www.averyweigh-tronix.com/BSQ

Avery Weigh-Tronix

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