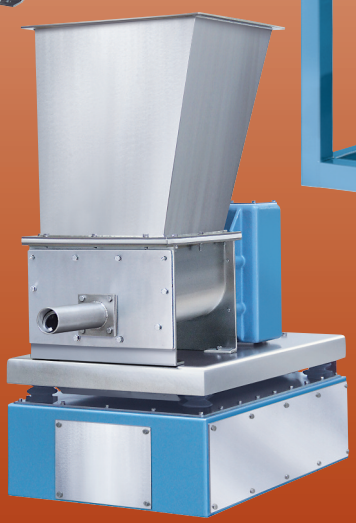
Acrison®

Weighing Systems



Theory of Operation

Functional Insight

Acrison®
Weighing Systems

Theory of Operation and Functional Insight

During the initial design phase associated with Acrison's pioneering development of a continuous 'weight-loss' weigh feeder back in the 1969-1971 time-frame, first and foremost was the need to select a viable means to accurately and reliably weigh an entire dry solids metering mechanism, its supply hopper, and the product contained within. And because of their low cost and ease of implementation, electronic load cells were initially selected for evaluation.

However, after scores of trials with different manufacturers' devices, it was determined that load cells were too temperamental and problematic for use with a high quality 'weight-loss' weigh feeder intended for strong, continuous operation. Consequently, Acrison decided to design a weighing system specifically for use with its 'weight-loss' feeder under development that would not only circumvent all of the difficulties experienced with load cells, but also, one that would possess the ability to operate with a variety of dry solids metering mechanisms.

Ultimately, Acrison's pioneering efforts to develop such a weighing system proved extraordinarily successful. And today, this same weighing system concept is utilized with all Acrison weigh feeders and weighing equipment.

And even though many present-day weigh feeders are designed with load cell weighing systems of sorts, it's certainly not because load cells are the ideal weighing means for use with such equipment. Rather, it's because they're inexpensive and generally easy to implement, although definitely delicate, maintenance intensive, and restrictive.

Since the vast majority of manufacturing processes utilizing weigh feeders operate 24/7, the feeders must be accurate and reliable, and remain as such without the need for periodic calibration and/or maintenance, which would require the feeders be shut down. In fact, scores of processors utilizing weigh feeders equipped with a load cell (or cells) for sensing weight, particularly 'weight-loss' feeders, find it necessary, as a matter of routine maintenance, to periodically check the calibration of the load cell(s) to ensure good metering performance.

Regardless of the supposed sophistication of the load cells presently utilized by weigh feeder manufacturers, the well-known difficulties associated with their operation remain, with certain manufacturers employing misleading indicators with respect to how a weigh feeder is actually operating on a 'real-time' basis. Unfortunately, much too often, inaccurate metering isn't realized until process difficulties (e.g., off-spec product) are experienced.

Unique Features of Acrison Weighing Systems

- Time-proven since the early 1970s, Acrison weighing systems ('weight-loss' and otherwise) utilize technologically advanced, ruggedly constructed lever networks employing strong, highly sensitive stainless steel flexures for all pivotal connections. These patented, frictionless weighing systems require bare minimal maintenance, and possess the uncanny ability to remain accurate indefinitely without the need for calibration, recalibration or adjustment.
- The flexures, designed and manufactured by Acrison, are fabricated of alloy stainless steel not subject to wear or functional deterioration over time. They are one-piece in construction, and provide totally rigid pivotal attachments for the weighing systems' lever networks both in the horizontal and vertical planes. And they're totally adjustment-free.
- Acrison weighing systems are also counterbalanced so that only the net weight of product within the metering mechanism (and its supply hopper) is weighed. This greatly enhances weighing sensitivity while providing the ability to counterbalance metering mechanisms that differ in weight.

Model 407X-105X

- The physical sensing element associated with Acrison's Ratiometric Digital Weight Resolver System is a precision transducer that precisely senses movement of the lever network without physically contacting it. Therefore, it cannot be damaged by any amount of overload or shock the weighing system may experience.
- Weight sensing resolution is 1 part in 1,048,576 without any amplification of the weight signal whatsoever, which can be visually observed on the weigh feeder controller's display. It should be noted that the designed base resolution of a weight sensing device cannot be amplified for a higher degree of resolution; however, certain weigh feeder manufacturers do this, an inappropriate misleading undertaking.
- Unlike load cell weighing systems, Acrison weighing systems are specifically designed to produce a high signal to noise ratio, eliminating the need for signal integration (averaging the weight signal), which suppresses the signal such that it doesn't provide real time data. And depending upon the magnitude of integration, the signal can be delayed significantly. The output of Acrison's Ratiometric Weight Resolver is not integrated to enhance stability; it is inherently stable.
- In operation, as weight is added to, or subtracted from an Acrison weighing system, the flexures connecting the various members of the lever network rotate (or pivot) radially about their central axis in a perfectly linear relationship to that weight. In turn, the lever network 'moves' accordingly.
- This movement (or displacement) is precisely measured by the Ratiometric Digital Weight Resolver System, and instantaneously converted into a highly accurate signal directly proportional to weight by its computational logic. The output is in the form of a count ranging from 0 to 1,048,576 (or 20 bits of data).

Acrison's various weighing mechanisms have been designed with a displacement much greater than load cells (as much as 45 to 360 times greater depending upon the type load cell) for several very important reasons:

a), to produce a high signal-to-noise ratio that greatly enhances the ability of Acrison's various weighing systems to cope with extraneous disturbances and vibration, and to enable the use of positive mechanical means (hydraulic) to assist dampening-out such disturbances;

b), to eliminate the need to integrate the weight signal, which all load cell based weighing systems require;

c), integrating (averaging) the weight signal delays signal response, often significantly, which adversely affects weigh feeder timing for correction purposes (the weight signal doesn't operate on a real-time basis);

d), by eliminating integration of the weight signal, the weighing system can respond instantaneously to changes in weight in order to ensure the highest degree of metering performance.

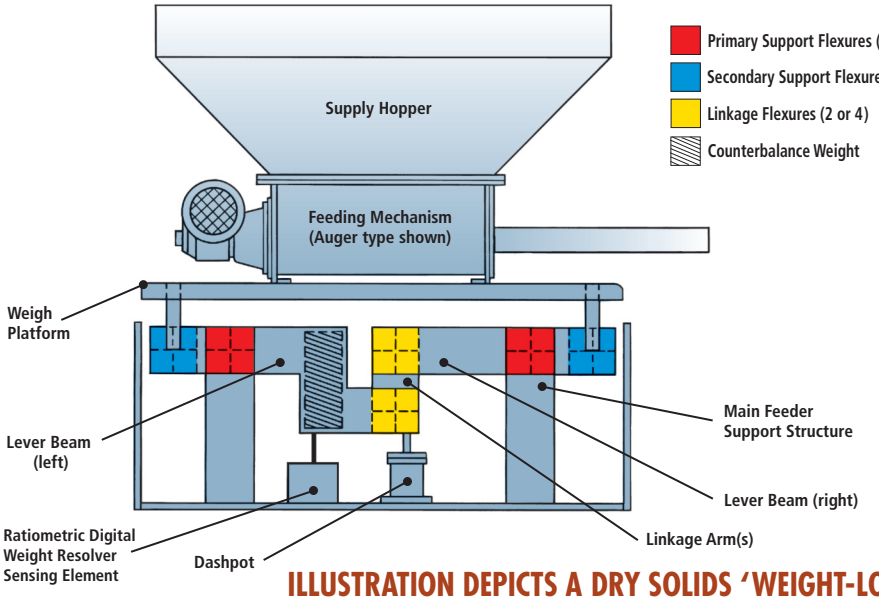
Regardless of the model, size and capacity rating, all Acrison weighing systems are user-friendly and virtually maintenance-free; longevity is inherent in their design. They are designed to operate over an ambient temperature range of -20 to 150 degrees Fahrenheit, and their integral metering mechanisms are capable of operating with a product temperature not exceeding 180 degrees Fahrenheit.

Factory calibration of an Acrison weighing system is accurate and permanent, eliminating the need for any field adjustment and/or calibration. In fact, provisions for adjustment are neither provided, nor do any exist. Calibration weights (or test weights) are also not required or provided.

Model 403-105Z

Model 402-105Z

Acrison's '*Split-Beam*' Platform Weighing System



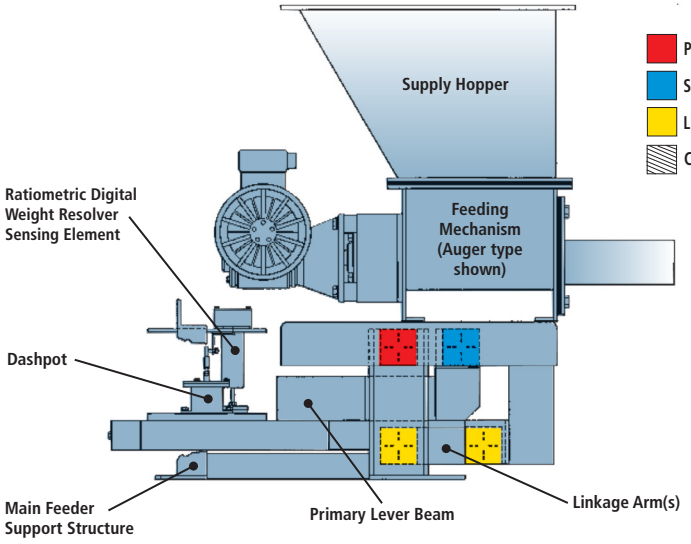
Model 402-105Z
Utilizes an Acrison
'Split Beam'
Weighing System

ILLUSTRATION DEPICTS A DRY SOLIDS 'WEIGHT-LOSS' FEEDER

NOTE: For liquid feeders, the dry solids supply hopper is replaced with a tank and the dry solids metering mechanism with a pump.

Acrison weigh feeder models bearing the prefixes 402, 402X, 404, 404X, 404Z, 404BZ, 405, 406, 407X, 408, 410 and 260 utilize a ***'Platform'*** type weighing system designed with a ***'Split-Beam'*** lever network. With this particular configuration, the actual weighing system is located beneath the equipment being weighed; the metering mechanism of a dry solids unit, or the tank of a liquid unit, mounts onto the ***'Platform'*** of the weighing network (except for the Model 260). This particular type weighing system, designed and manufactured by Acrison, utilizes either ten or twelve frictionless flexures for all pivotal connections. Please reference the illustration.

Acrison's '*Single-Beam*' Platform Weighing System



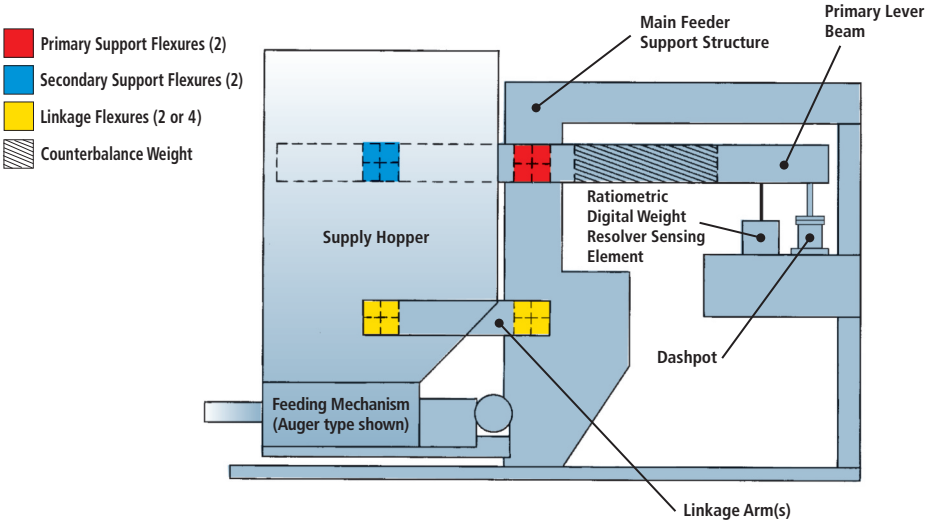
Model 407X-101-1
Utilizes an Acrison
'Single Beam'
Weighing System

ILLUSTRATION DEPICTS A DRY SOLIDS 'WEIGHT-LOSS' FEEDER

NOTE: For liquid feeders, the dry solids supply hopper is replaced with a tank and the dry solids metering mechanism with a pump.

Acrison's Model 407X 'Weight-Loss' Weigh Feeder is a ***'Platform'*** weighing system utilizing a ***'Single Beam'*** lever network. With this configuration, the actual weighing system is located beneath the equipment being weighed; the metering mechanism of a dry solids unit, or the tank of a liquid unit, mounts onto the ***'platform'*** of the weighing network. This particular weighing system, designed and manufactured by Acrison, utilizes either six or eight frictionless flexures for all pivotal connections. Please reference the illustration.

Acrison's 'Overhead' Weighing System



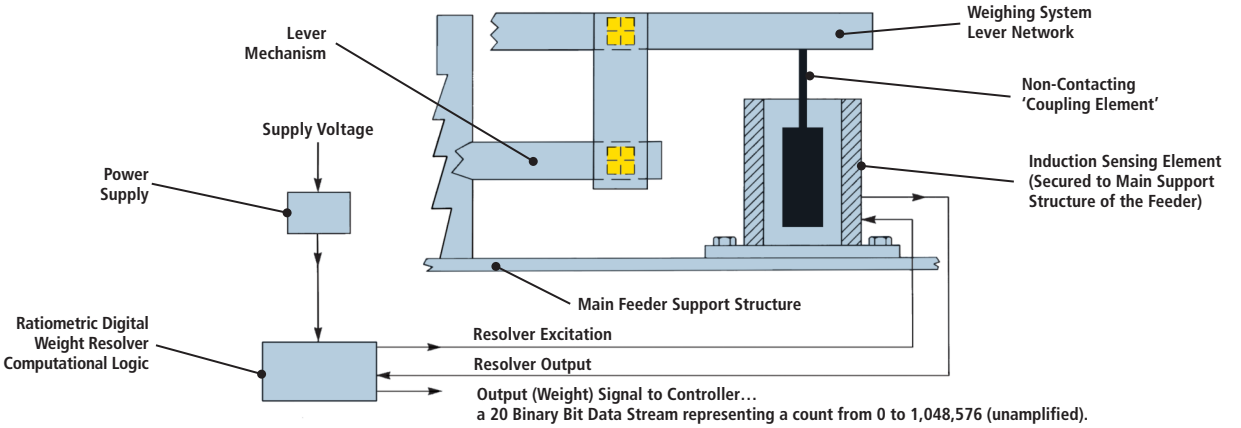
Model 403-BDF-2.5
Utilizes an Acrison *'Overhead'* Weighing System

ILLUSTRATION DEPICTS A DRY SOLIDS 'WEIGHT-LOSS' FEEDER

NOTE: For liquid feeders, the dry solids supply hopper is replaced with a tank and the dry solids metering mechanism with a pump.

Acrison weigh feeders and weighing equipment bearing the prefixes 270 and 403 utilize an ***'Overhead'*** type weighing system designed with a modified parallelogram lever network. With this configuration, the physical weighing mechanism is located above the equipment being weighed, with the metering mechanism of a dry solids unit, or the tank of a liquid unit, physically attached to (and an integral part of) the overall weighing system. This particular weighing system, designed and manufactural by Acrison, utilizes either six or eight frictionless flexures for all pivotal connections. Please reference the illustration.

Ratiometric® Digital Weight Resolver System



Acrison's Ratiometric Digital Weight Resolver is a uniquely innovative, extremely precise weight sensing system used with all Acrison weighing mechanisms, a time-proven, technologically advanced, highly reliable weight sensing system that is both adjustment and calibration-free.

Well suited for operation in the toughest environments, and regardless of the model, size and/or capacity of a given Acrison weighing mechanism, the Ratiometric System is always identical. It consists of a sensor and its computational module, which together, generate 20 binary bits of unamplified, non-integrated, real-time digital data (or the equivalent resolution of 1 part in 1,048,576) for processing by Acrison's various multiprocessor controllers.

Unlike load cell based weighing systems, especially those for use with weigh feeders, and in particular, 'weight-loss' weigh feeders, Acrison's Ratiometric Digital Weight Resolver Weight Sensing System is based on the measurement of the ratio of two signals, not their absolute values. Also, the Ratiometric System does not require linearization or temperature compensation, and is totally calibration and adjustment-free. It will operate over a temperature range of -20 to 150 degrees Fahrenheit.

In addition, the unique non-contacting design of the Ratiometric System ensures that it will be totally unaffected by any magnitude of shock or overload that the weighing mechanism may experience. The Ratiometric Digital Weight Resolver is FM (Factory Mutual) Approved and Listed for operation in hazardous environments, Classes I, II and III; Divisions 1 and 2; Groups C, D, E, F and G, and also complies with hazardous area classifications ATEX 3D or IECEX (Zone22), 3G (Zone 2) and 2D (Zone 21).

Discover the difference!

We cordially invite you to witness a test in Acrison's state-of-the-art Customer Demonstration Facilities handling your actual product(s) with the specific equipment we recommend for the application. Usually, there is no cost or obligation for this service.

Discover the difference in technology, quality and performance of Acrison equipment.

Empire Boulevard Facility
Moonachie, NJ USA

Joseph Street Facility
Moonachie, NJ USA

Acrison products...

- Models 101 and 130 Volumetric Feeder Series
- Models V-101 and V-130 Volumetric Feeders
- Model 1015 Volumetric Feeder Series
- Model 105 Volumetric Feeder Series
- Model W-105 Volumetric Feeder Series
- Model 120 Volumetric Feeder
- Model 140 Volumetric Feeder Series
- Model 170 Volumetric Feeder Series
- Model 905-18 Volumetric Feeder
- Bin Discharger Feeders
- Model 200 Weigh Belt Feeder Series
- Model 203B Weigh Auger Feeder Series
- Model 270 In-Line Weigh Feeder Series
- Models 402 and 404 Series, 405, 406, 407X, 408 and 410 'Weight-Loss' Weigh Feeders
- Model Series 403 'Weight-Loss' Weigh Feeders
- Model 403B(D) Batch/Dump Weighing Systems
- Model 404BZ(BU) Bulk Bag Unloader Batch Weigher
- Models 350 and 301 Continuous Blenders and Blending Systems
- Multiple Auger Bin Dischargers and Multiple Auger Bin Discharger Hoppering Systems
- Vibratory Bin Discharger Hoppering Systems
- Model 170-BD-30 Bin Discharger
- Model 800 Series Bulk Bag Unloaders
- Models 500, 515, 530, and 580 Polyelectrolyte Preparation Systems
- Water and Waste Water Treatment Systems
- Volumetric and Gravimetric Feeder Controllers and Control Systems
- Silo Systems
- Accessory Equipment for Acrison Products
- Systems Engineering

"Visibly Different... Measurably Better"

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