

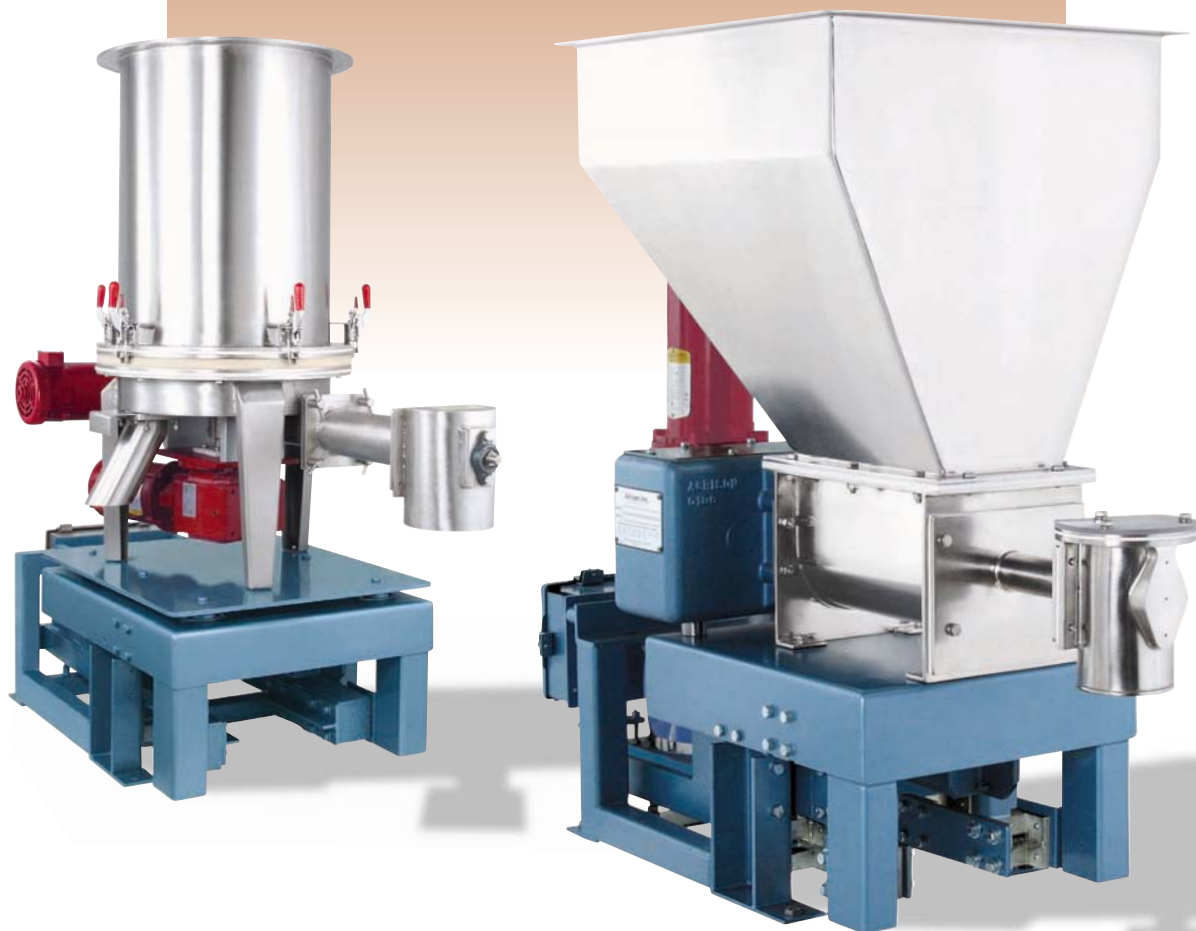
# Acrison®

## WEIGH FEEDERS

Model 407 Series

*“Weight-Loss-Differential”*

*For Dry Solids*



*Advanced design technologies for superior performance, quality and reliability.*

# WEIGH FEEDERS Model 407 Series

*“Weight-Loss-Differential”  
 (“Weight-Loss”)*

## **For Continuous or Batch Weigh Feeding Applications**



Model 407-170-00



Model 407X-101-1

**Proven in thousands of installations world-wide, Acrison’s “Weight-Loss” Weigh Feeders, with their exceptionally *precise and reliable weighing technology and leading edge controls*, provide users with superior operational performance, lowest maintenance requirements and unexcelled longevity.**

### **Model 407 Weigh Feeders**

The Model 407 is a low profile, economically priced weigh feeder employing Acrison’s advanced “Weight-Loss-Differential” weigh feeding concepts and designs for accurately and reliably metering a wide variety of dry solid (and liquid) ingredients at feed rates ranging from approximately one pound to several thousand pounds per hour.

Encompassing strong, field-proven weighing technology, specifically developed by Acrison for “weight-loss” weigh feeding applications, the Model 407 consists of a uniquely configured, open “platform” type lever weighing system where the selected metering device “mounts” onto a weigh platform.

The robustly constructed lever weighing network is in itself a “scale,” utilizing frictionless stainless steel flexures for all pivotal connections. As weight (product) is added to or removed from the weigh platform (metering mechanism), the lever network “moves” in a direct relationship to that weight. This movement is precisely sensed by Acrison’s Ratiometric Digital Weight Resolver and instantaneously converted into a highly accurate digital signal directly proportional to weight.

Analogous to the weighing mechanisms used with all of Acrison’s various model “weight-loss weigh feeders, Model 407 Weighing Systems are also permanently calibrated and will remain precise without the need for recalibration and/or adjustment. In addition, these weighing mechanisms are not in any way delicate and/or temperamental and will operate over an ambient temperature range of -10 to 140 degrees Fahrenheit. Optionally, they can be furnished in all stainless steel construction.

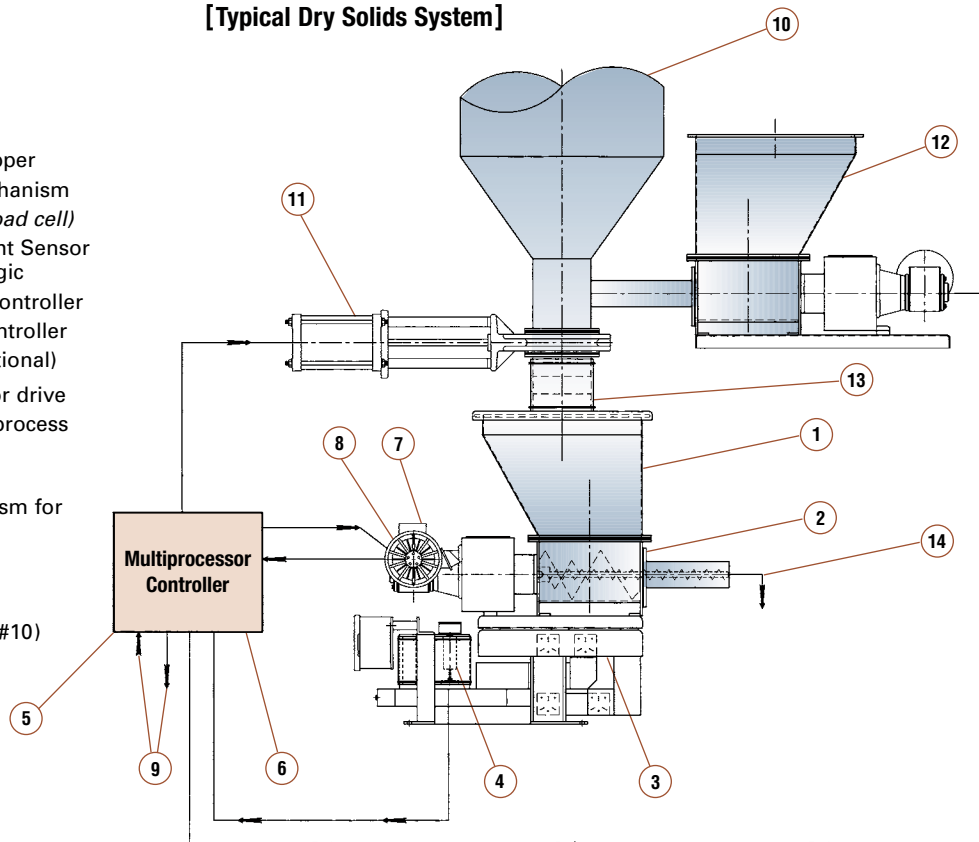
Unlike “weight-loss” weigh feeders that incorporate weighing systems designed with one or more load cells...well known for their temperamental behavior and calibration drift...Acrison weighing systems do not use load cells or any other type force measurement device for sensing weight.

Model 407 Weigh Feeders are available with various model and size Acrison dry solids metering mechanisms, typically as outlined in this Bulletin.

# Model 407 Series of Weigh Feeders

## Basic Functional Diagram [Typical Dry Solids System]

1. Weigh feeder supply hopper
2. Dry solids metering mechanism
3. Weighing system (*non-load cell*)
4. Ratiometric Digital Weight Sensor and its computational logic
5. Parallel multiprocessor controller
6. Variable speed motor controller
7. Digital speed sensor (optional)
8. Variable speed gearmotor drive
9. Input/output signals for process control interfacing
10. Product storage supply
11. Automatic refill mechanism for product supply to feeder
12. Refill feeder (#12) in lieu of refill mechanism (#11) – can also attach to product storage supply (#10)
13. Flexible connection
14. Weighed output



## Principles of Operation

As product discharges (feeds) from the scale-mounted metering mechanism, the Ratiometric Digital Weight Sensing System transmits precisely derived “loss-of-weight” information numerous times per second to the feeder’s controller. The controller then instantaneously calculates the rate at which product is discharging and compares that rate to the feed rate selection. Simultaneously, the control system adjusts the variable speed drive of the metering mechanism to accurately maintain the specified feed rate, while continuously monitoring all aspects of feeder operation. Response of the metering mechanism is instantaneous, thus achieving smooth short-term performance with the highest possible degree of long-term accuracy.

The “weight-loss” principle for continuous weigh feeding requires periodic refilling of the feeder’s supply hopper (or tank for liquid applications) as an operational requirement, which is usually a completely automatic function. The frequency of refills is determined by the feed rate throughput relative to the size of the supply hopper (or tank) within realistic parameters necessary to maintain optimum weigh feeder performance in the gravimetric mode.

All Acrison “Weight-Loss” Weigh Feeder control systems also include “Acrid-Lok<sup>®</sup>”, an Acrison patented feature which ensures accurate product delivery, should the feeder’s weighing system sense an abnormal disturbance during operation.

Acrison weigh feeders provide users with maximum return on their investment and an extremely low cost-of-ownership. With very easy and quick start-up, exceptional longevity and low maintenance requirements, these weigh feeders offer remarkable durability and can withstand the harshest industrial environments. Their field proven *non-load cell* weighing systems are unsurpassed in dependability, precision and ruggedness; they are also permanently calibrated and virtually maintenance-free.

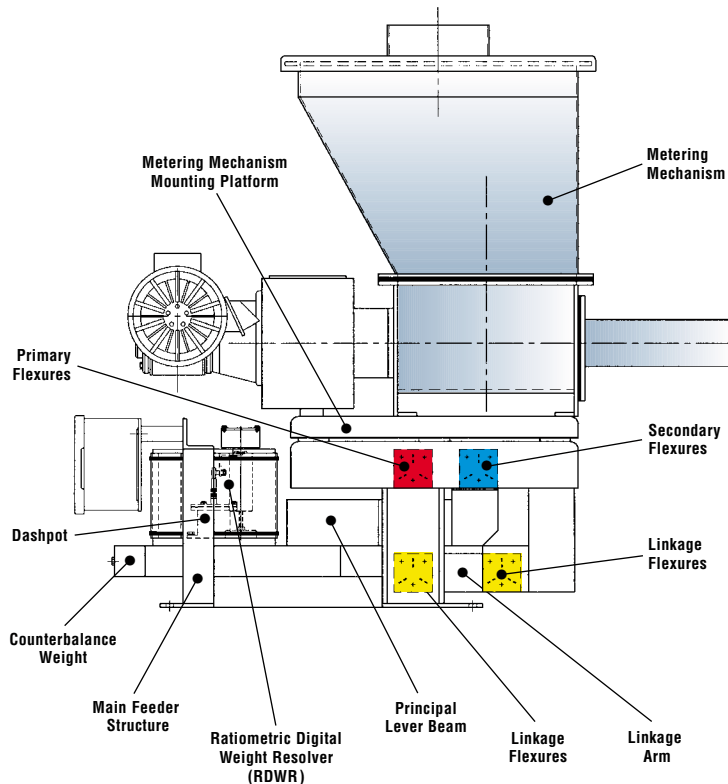
The output weight signal of an Acrison weigh feeder is not “integrated” (averaged) or in any way “manipulated” for stabilization purposes; the weight signal is inherently stable and directly usable by the feeder’s controller. (Integration of a weigh feeder’s weight signal slows-down weight sensing response time and, in turn, adversely affects feeder performance, especially short-term accuracy.)

*The entire weighing mechanism of any Acrison weigh feeder, including its Ratiometric Digital Weight Sensor (and associated electronics), is guaranteed for five years.*

**Continuous metering accuracy typically ranges between +/- 0.25 to 1 percent or better (error) at two sigma, based on a given number of consecutive one minute weighments.**

# Model 407 Series of Weigh Feeders

## Weighing System with Acrison's exclusive Ratiometric® Digital Weight Resolver



The weighing mechanism used with Acrison's Model 407 Weigh Feeders is a technologically advanced, innovatively designed lever network utilizing stainless steel flexures for all connecting (pivotal) requirements. It is frictionless in operation and mechanically counterbalanced to "offset" the weight of the metering mechanism (mounted onto it), greatly enhancing weighing sensitivity.

As noted in the illustration, two Primary Flexures (one on each side) connect the Principal Lever Beam to the Main Feeder Structure. Two Secondary Flexures (one on each side) connect the Metering Mechanism Mounting Platform to the Principal Lever Beam. Two Linkage Arms, each employing two additional Flexures (one on each end), connect the lower portion of the Lever Network to the Main Feeder Structure.

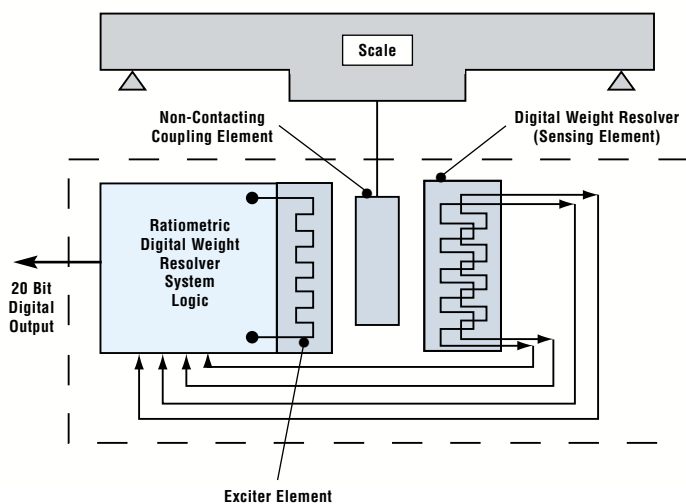
These time-proven flexures, designed and manufactured by Acrison, provide optimum structural rigidity of the lever network in both the horizontal and vertical planes, and ensure permanence of the weighing system's calibration and accuracy producing capability. The flexures do not wear or change over time, never require adjustment, and are completely unaffected by ambient temperature variations over the designed operating temperature range of the weigh feeder.

The lever weighing mechanism is in itself a "scale", extremely durable and very precise in producing *unamplified* resolution of better than one part in one million. Operationally, as weight is added or removed from the metering mechanism and its supply hopper (or tank), the lever network "moves" in an extremely precise relationship to that weight. In turn, this movement (or displacement) is sensed by Acrison's Ratiometric Digital Weight Resolver (RDWR), instantaneously converting movement into an equally precise signal directly proportional to weight.

Unlike other "weight-loss" weighing systems, the physical weight sensing element (of the RDWR) does not attach to any part of the weighing mechanism's lever network and therefore, cannot be damaged by any amount of overload or shock and/or abuse that the weighing system may experience.

*The entire weighing mechanism of the weigh feeder, including the RDWR, is completely calibration and adjustment-free and guaranteed for five years.*

## Ratiometric® Digital Weight Resolver System (RDWR)



Acrison's exclusive Ratiometric Digital Weight Resolver (RDWR) System, used with all Acrison weigh feeders, computes the linear movement of the lever mechanism (scale) into a true binary coded, serially transmitted data stream having a discrete resolution of 20 bits (or the ability to sense 1 part in 1,048,576). This highly precise and advanced electronic displacement measuring technique basically consists of a sensing element and its computational logic.

The physical sensing component is composed of a series of windings collated on a common element that are equally affected by environmental changes and therefore, self-compensating. In addition, because the computational logic of the RDWR System compares relative measurements, rather than absolute values, its input power source can vary up to  $\pm 30\%$  without affecting the output. Also, all non-weight data, both cyclic and random in nature that may be super-imposed on the actual data, are cancelled-out.

The RDWR System is linear to within 0.01 percent, repeatable to 0.005 percent, possesses long term stability of 0.005 percent (10,000 hours) and carries a 40,000 hour MTBF.

Acrison's RDWR System 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. This weight sensing system also complies with European hazardous area classifications EEx ia IIB T4 and EEx d [ia] IIB T6.

# Model 407 Series of Weigh Feeders

## Model 407 with a Model 101-0 Metering Mechanism Model 407X with a Model 101-1 Metering Mechanism

**To reliably meter a wide variety of free-flowing, granular materials at feed rates ranging from several pounds to approximately 72 cubic feet per hour.**

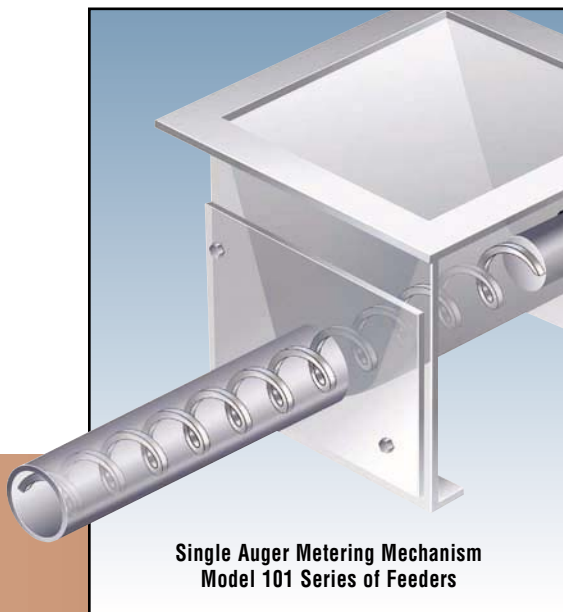
### Model 101 Series Metering Mechanisms

The Model 101 Series of Feeders are single auger metering mechanisms specifically designed to meter free-flowing dry solid ingredients, primarily those of a granular nature. These simplistic, yet rugged-duty mechanisms are limited to those applications where the material is typically pelletized and/or flows very freely, but is not hygroscopic, moist, pressure sensitive and/or sticky. The feeders are powered by a single variable speed gearmotor drive.

The Models 101-0 and 101-1 Feeders are available with a number of different size hoppers, with selection based on the feed rate requirements and on the physical handling characteristics of the material.

An optional discharge gate, located at the bottom of the feed chamber, is available to allow rapid emptying (see photo page 10).

*For additional information on the Models 101-0 and 101-1 Feeders, please reference Equipment Data Specifications 1-200-0479.*



**Single Auger Metering Mechanism  
Model 101 Series of Feeders**



**Model 407-101-0**

# Model 407 Series of Weigh Feeders

## Model 407 with a Model BDFM Metering Mechanism Model 407X with a Model BDF-1 Metering Mechanism

To reliably meter a wide variety of amorphous materials at feed rates ranging from about one pound to approximately 19 cubic feet per hour.

### Model BDF Metering Mechanisms

The Model BDF Series of Feeders feature a novel combination of Acrison's dual agitator bin discharging (hoppering) mechanism and a metering auger to ensure both positive flow and feed of even the most stubborn-handling dry solid materials.

In operation, the action created by the dual agitators enhances gravity flow of material out of the feeder's integral supply hopper and into its feed chamber, while ensuring that the centrally positioned metering auger is effectively and uniformly "filled" with product of a consistent state for accurate and highly dependable metering performance.

The internal design of Acrison's Bin Discharger Feeders (BDF) also eliminates any type of convergence that could prove detrimental to product flow and feed. Mechanically, the two slower speed agitators, and the smaller higher

speed metering auger, are geared together to operate at proportional, but *dissimilar speeds*, powered by a common variable speed gearmotor drive.

The Models BDFM and BDF-1 Feeders are available with a number of different size hoppers, with selection based on the feed rate requirements and on the physical handling characteristics of the material.

*For additional information on the Models BDFM and BDF-1 Feeders, please reference Equipment Data Specifications 1-200-0482.*



Dissimilar Speed  
Auger/Agitator Metering Mechanism  
Model BDF Series of Feeders



Model 407-BDFM

# Model 407 Series of Weigh Feeders

## Model 407 with a Model 105 Metering Mechanism Model 407X with a Model 105X Metering Mechanism

To reliably meter a wide variety of semi-free-flowing materials at feed rates ranging from several pounds to approximately 72 cubic feet per hour.

### Model 105 Series Metering Mechanisms

The Model 105 Series of Feeders utilize Acrison's dissimilar speed, *Double Concentric Auger Metering Mechanism*, universally recognized for its inherent ability to accurately and dependably meter an extremely broad variety of dry solid ingredients.

In operation, the unique "*Inter-Auger-Action*" produced by the rotation of the Double Concentric Augers, very effectively "*conditions*" dry solid materials to a consistent state while effectively and reliably filling the centrally positioned metering auger from "*a full 360 degrees.*" The result is an exceptionally high degree of materials-handling versatility and superior all-around metering performance. The larger "*conditioning auger*" (Intromitter), and smaller metering auger,

are mechanically geared together to operate at proportional, but *dissimilar speeds*, powered by a common variable speed gearmotor drive.

The Models 105 and 105X Feeders are available with a number of different size hoppers, with selection based on the feed rate requirements and on the physical handling characteristics of the material.

*For additional information on the Model 105 Series of Feeders, please reference Equipment Data Specifications 1-200-0480.*



Dissimilar Speed Double  
Concentric Auger Metering Mechanism  
Model 105 Series of Feeders



Model 407-105

# Model 407 Series of Weigh Feeders

## Model 407 with a Model 170-00 or 170-0 Metering Mechanism Model 407X with a Model 170-1 Metering Mechanism

**To reliably meter a wide variety of amorphous materials at feed rates ranging from about one pound to approximately 51 cubic feet per hour.**

### Model 170 Series Metering Mechanisms

Acrison's Model 170 Series of Feeders consist of circular, full-throat opening, "Flat Bottom" feed chambers that attach directly to the outlets of mating supply hoppers. Within the feed chamber, a slowly rotating horizontal "conditioning" agitator ensures positive flow of product out of the supply hopper and into the feed chamber. Beneath the feed chamber, housed in a trough offset to one side, the feeder's metering auger is efficiently, completely and reliably filled with product by the sweeping rotational action of the uniquely configured agitator. All areas within the feed chamber and metering trough are active; dead zones do not exist and consequently, product stagnation cannot occur anywhere within the feeder.

With only a few moving parts, Model 170 Series Metering Mechanisms have the unique ability to "self-empty" - when permitted to feed until empty, or to "empty-quickly" - when the need to empty the feeder rapidly exists. The latter is accomplished by means of a novel discharge port located in the flat bottom of the feed chamber opposite the metering auger trough. *Clean-out is extremely fast, simple and complete.*

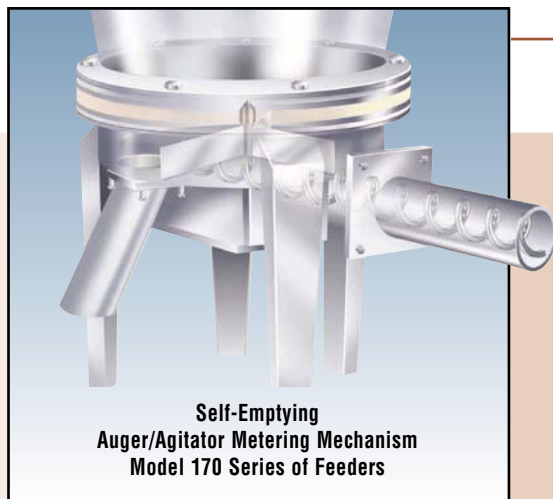
As standard, the Model 170 Series of Feeders utilize two separate drives - one for the agitator and one for the metering auger. The slow speed agitator is usually powered by a constant speed gearmotor, and the metering auger by a variable speed gearmotor drive. However, depending upon application parameters, both the agitator and metering auger may be powered by variable speed drives, operating in a proportional ratio (adjustable) to each other.

### Optional "Active Hopper" Design

As an option, based on product handling characteristics, Model 170 Feeders may be equipped with Acrison's exclusive "Hopper Isolation Pad", which allows the feeder's integral supply hopper to become *uniformly active* when a gentle, high frequency vibration is applied to it. In turn, positive flow of even the most difficult-handling products out of the feeder's supply hopper and into its feed chamber is ensured.

The Models 170-00, 170-0 and 170-1 Feeders are available with a number of different size hoppers, with selection based on the feed rate requirements and on the physical handling characteristics of the material.

*For additional information on the Model 170 Series of Feeders, please reference Equipment Data Specifications 1-200-0525.*



**Self-Emptying  
Auger/Agitator Metering Mechanism  
Model 170 Series of Feeders**



**Model 407X-170-1**



# Model 407 Series of Weigh Feeders

**Model 407 Series Weigh Feeders with Model 170 Metering Mechanisms**  
High performance, self-emptying dry solids weigh feeders in a space saving, compact design.

Model 407-170-0



- Very easy clean-out
- Compact design
- Superior performance
- Highly reliable
- Very low maintenance
- Exceptional longevity
- Economical



Model 407X-170-1

# Model 407 Series of Weigh Feeders

Reliable, robust, high performance dry solids weigh feeders  
in low-profile packages

- Compact design
- Highly reliable
- Superior performance
- Very low maintenance
- Exceptional longevity
- Economical



Model 407X-BDF-1



Model 407-101-0  
(with optional product discharge gate)



Model 407X-105X

# Weigh Feeder Controllers and Control Systems

Acrison Weigh Feeder Controllers and Control Systems are universally recognized for their design superiority, unparalleled versatility, ease-of-use and operational reliability. From basic single weigh feeder controllers to complex multi-feeder supervisory control systems, the technologically advanced designs of these devices, including their cutting-edge software

routines, provide users with unexcelled weigh feeder performance to satisfy the most demanding metering requirements across a broad spectrum of applications. With a wide range of options, accessories and interfacing capabilities, these controllers and control systems are also available in a number of different packaging configurations.

## Acrison Weigh Feeder Controllers

Acrison Weigh Feeder Controllers will operate in either a continuous or batch mode, gravimetrically or volumetrically, and/or in a master/slave or ratio proportioning mode. They are available with a variety of keyboard or graphic touch-screen color displays in various languages and can be provided with recipe storage capabilities as well as with a wide range of I/O interfacing options (i.e., analog, digital, modem, infrared, wireless, serial and network I/O).

For decades, Acrison Weigh Feeder Controllers have provided state-of-the-art performance for thousands of users worldwide. Leading edge products such as the Models C-702, BC-702, SBC-2000® and MD-II Family of Controllers, including the MD-II MFC® (Multi-Feeder Controller) and the Acridata® Supervisory System Controller, have gained universal acceptance throughout all sectors of the Processing Industries, and are highly recognized for their versatility and reliability.

## SBC-2000 Weigh Feeder Control Module

Acrison's ongoing investment in research and development continues to result in the evolution of the Company's Controls and Control Systems' capabilities with the launch of the technologically advanced Model SBC-2000 Weigh Feeder Control Module. This new, small and powerful module, encompassing the latest in microcomputer logic and functional algorithms, provides an unprecedented number of standard and optional features, along with broad-scope flexibility for single and multi-feeder control requirements in a compact and cost-effective assembly, particularly those applications that require central computer control, minimal hardware and which do not necessarily require a local user interface or keyboard/display. The advanced SBC-2000 Weigh Feeder Controller can be supplied with various display options if so required.

## Multiple Weigh Feeder Control Systems

Model SBC-2000 Controller Modules, when configured for multi-feeder operation, offer unprecedented ease-of-operation, maximum user flexibility and outstanding performance capabilities. When SBC-2000 Modules are combined with Acrison's Acridata Supervisory Control and Software package, it is possible to operate and monitor up to 20 Acrison weigh feeders, while providing rapid data and screen updates, including recipe storage and retrieval, all of which are selectable and operable from the Acridata display.

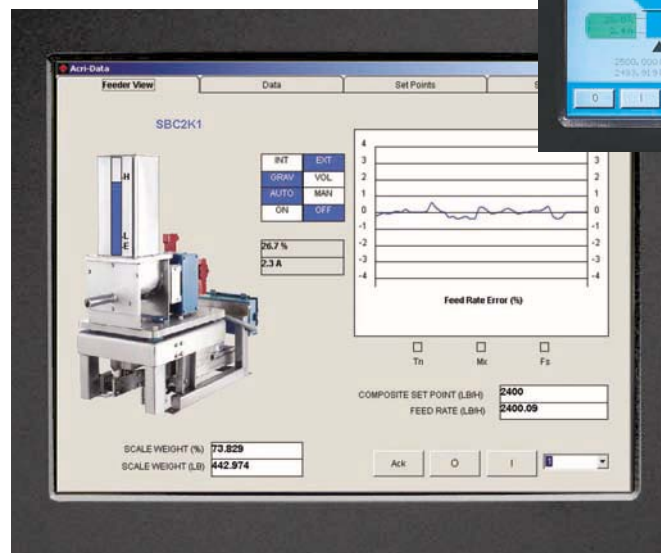
*Reference Design Specifications 1-200-113, 1-200-342, 1-200-0601, 1-200-602, 1-200-627 and 1-200-642 and Bulletin 949.*



◀ Single Feeder Keyboard Display



▲ Single Feeder Color Touchscreen Display



◀ Acridata Color Touchscreen Display

All Acrison controllers are certified to UL, CSA and EC specifications.

## 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.



## Acrison products...

- Models 101 and 130 Volumetric Feeders
- Models V101 and V130 Volumetric Feeders
- Model 1015 Volumetric Feeder Series
- Model 105 Volumetric Feeder Series
- Model W105 Volumetric Feeder Series
- Model 120 Volumetric Feeder
- Model 140 Volumetric Feeder Series
- Model 170 Volumetric Feeder Series
- Bin Discharger Feeders
- Model 200 Series of Weigh Belt Feeders
- Model 203B Series of Weigh Auger Feeders
- Model 270 Series of In-Line Weigh Feeders
- Models 402, 404, A405, 406 and 407 Series ("Weight-Loss-Differential") Weigh Feeders
- Model Series 403 ("Weight-Loss-Differential") 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 Dischargers
- Model 500 Series of Polyelectrolyte Preparation Systems
- Water and Waste Water Treatment Systems
- Volumetric and Gravimetric Feeder Controllers and Control Systems
- Accessory Equipment for Acrison Products
- Systems Engineering

"Visibly Different... Measurably Better"

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