Acrison®

Model SBC-2000®
Family of Weigh Feeder Controllers

Microprocessor Controllers
for Acrison Weigh Feeders

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

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Introduction

The SBC-2000 Family of Controllers has been specifically designed with an emphasis on performance, reliability, compact size and overall ease-of-use. Offered in three models to more effectively address the wide range of user requirements, the SBC-2000 Family of Controllers marks an evolutionary change for Acrison, encompassing the integration of new technologies, features and functions, and at lower cost than previous generation Controllers.

General Description

The SBC-2000 Family of Controllers includes three distinct models, with all having identical weigh feeder control capabilities:

Model SBC-2000 CM Circuit Board

1) Model SBC-2000 CM: For control of a single Acrison weigh feeder. The Model SBC-2000 CM consists of a single circuit board that can be provided in a panel or plate-mounted card rack, or loose for user mounting. This model is designed primarily for applications that utilize a central computer, PLC or DCS for monitoring and control, and do not require a local operator interface. (An option is available for a local or remote keyboard display unit [KDU], if desired.)

2) Models SBC-2000 DSP and SBC-2000 DSP/C: For applications that require a local operator interface, the Model SBC-2000 DSP integrates a Model SBC-2000 CM Controller with a monochrome LCD graphics display and a Lexan membrane keypad. The Model SBC-2000 DSP/C Controller includes a metallic console designed with a TFT color graphics display and piezo electric keypad.

Model SBC-2000 DSP

Model SBC-2000 DSP/C

3) Model SBC-2000 MFC (Acri-Data® System): For applications that utilize Multiple Weigh Feeders, but may not have central computer control, this model consists of one or more (20 maximum) SBC-2000 CM or DSP Controllers plus a 15" (up to 6 Controllers) or 17" (up to 20 Controllers) Color Touchscreen for total remote monitoring and control of the feeders.

Model SBC-2000 MFC Screen

All SBC-2000 Controller models include multiple serial communications ports for customer use, as well as both a built-in 10Base-T Ethernet port and a Profibus DP port as standard features.

The Controllers support operation with either AC variable frequency or SCR/DC motor controllers, using serial or analog interfaces.

The Model SBC-2000 Controllers may be optionally packaged in a variety of ways depending on user preference. Wall-mounted and free-standing enclosures are available, as are plate-mounted and loose configurations.

The VME-style card racks typically provided to hold SBC-2000 CM Controllers (three sizes are available to accommodate 2, 7 or 18 Controllers and option modules, respectively) can be supplied with rear flanges for plate mounting (such as when installed in an optional enclosure), with front flanges for mounting directly into a user's panel, or on the front of an enclosure, or as a 19" rack mount. When mounted using front flanges, an aesthetic bezel is provided.

Basic SBC-2000 Controller Design

The three SBC-2000 Controller models share many design features and include identical weigh feeder control software because of their identical core components. The core electronics is the computational heart of all of the Controllers in the SBC-2000 Family. It provides non-volatile program memory and non-volatile set point storage using state-of-the-art, low power, flash memory technology, eliminating the need for less reliable battery backup. In addition, the Controller Program can be quickly updated using a PC or laptop, if required.

The use of today's advanced technologies enables the SBC-2000 Family of Controllers to utilize a single program that is configurable to control any Acrison Weigh Feeder Model. The program also includes, as standard, all serial/network interface protocols and all languages currently available from Acrison, thereby providing complete compatibility between the various functions and options.

In order to reduce wiring requirements between the feeder and controller, and to provide increased expandability, each SBC-2000 Controller contains a dedicated internal network. This network is used for communication between the controller and the applicable scale and motor controller, and permits expanded analog and/or digital I/O capability.

SBC-2000 Advantages

Many of the most significant design benefits of the various Model SBC-2000 Controllers are not visible. Some of the most noteworthy are:

- Minimized hardware design for both high reliability and economy of space. One 19" card rack can hold up to 18 feeder controllers (modules).
- Minimal connection points from the Controller to the feeder. Fewer connectors provide better reliability.
- "Hot Swap" design and front-accessible modules permit easier maintenance SBC-2000 CM Modules can be replaced without turning the power off.
- Low power CMOS logic and over-specified power supplies provide cool running electronics for a longer product life.
- Redundant power supply option available for extra high reliability.
- Standard Controller has UL, CSA and IEC (CE) certifications.
- Electrically isolated serial and digital I/O are standard.

Standard Operating Features

SBC-2000 Controllers offer many functions and features derived from over three decades of experience with microprocessor-based weigh feeder controllers. While all functions are fully described in the Operating and Instruction Manual, the following abbreviated list highlights some of them.

- Controllers are totally adjustment-free.
- Continuous or batch mode operation in volumetric or gravimetric mode.
- Internal, external or communications-based set points.
- Ratio-proportioning and master-slave control capability.
- Auto/manual hopper refill operation (Loss-In-Weight [LIW] feeders).
- Recipe storage and retrieval (in Controller) augments host recipe storage.
- "Bumpless transfer" between operating modes.
- Auto-Tuning.
- SPC information (Mean, CV , CpK, σ).
- Proprietary Acri-Lok® (LIW feeders) and Batch-Lok® scale disturbance protection.
- Automatic compensation for external factors.
- User programmable alarms can also be "latched".
- Dual, individually clearable product totalizers.
- Delayed run and delayed stop functions for blending applications.
- Maximum motor speed threshold settings and alarm.

- Selectable auto stop of feeder on hopper (or tank) empty or refill time-out (LIW feeders).
- Auto pacing during refill (LIW feeders).
- Configure using Web browser.
- Language selection: English, German, French, Spanish.
- Alarm Log (SBC-2000 DSP/C and SBC-2000 MFC only).
- Built-In Infrared Port (SBC-2000 DSP/C only).
- Four user-programmable digital outputs. Typical parameters available for LIW feeders are:

Off	Power On	Run	Stop
Acri-Lok	±Dev	-Dev	+Dev
Dev Alarm*	Scale Alarm*	No Scale	Low Level
Overfill	No Tach	Refill	Refill Pulse
Refill Timer[3]	High Level	Empty	Alarm2*[2]
Alarm*[1]	Vol Mode	Overload	Batch Done
Batch Delay	Batch Run'g	Ext Mode	Batch Dev.
No Batch	Dribble	Batch-Lok	Ramping
Power On	Batch Mode	Fast Start	Not Dribble

[1] Acri-Lok, +Dev, -Dev, Overfill, Empty, No Tach, Refill Timer or Overload
[2] Any alarm except Acri-Lok and Overfill
[3] Ten second activation
* Multiple parameters

- Four user-programmable digital inputs. Parameters are feeder model-dependent and can be selected from the following:

Off	Clear Total	Delayed P. Run	260 Belt Mistracked
Remote Run	Alarm Ack	Start Refill	260 Belt Mistracking
Permissive Run	Jog Feeder	Batch Abort	Int/Ext Grav Change
Grav/Vol Change			

Hardware Features

- Four electrically isolated, open-collector, user-programmable digital outputs rated 30 VDC, 125 mA maximum. Additional hardware available to operate higher power devices.
- Four electrically isolated, user-programmable, dry contact closure inputs.
- One 10Base-T Ethernet port supporting Ethernet/IP and Modbus TCP applications protocols. Embedded RJ45 connector.
- Internal Modbus channel operating at 19,200 baud connects the SBC-2000 Controller, scale and motor controller, and serves as the analog and digital I/O expansion channel.
- One Profibus-DP Serial Channel capable of 12 MBaud operation. Embedded DB9 female connector.

- Two electrically isolated, general purpose, RS-422/485, user-configurable channels, typically for host communications. RS-422 to 4,000 feet. Protocols available for use on these channels include:

ASCII DB	Modbus RTU	Modbus 984
Allen Bradley DH/DHP[1]	Modbus Plus[1]	Modbus RTU/32
TDC-3000 PLCG/DHP*	Fisher EIC*	Siemens 3964R
TDC-3000 APM/SI*	Fisher IDI	Allen Bradley DeviceNet[1]
Wireless 802.11x (Wi-Fi)[1]	IrCOMM (Infrared)[1]	Bluetooth[1]

[1] Requires additional hardware
* Certified protocol

Optional Equipment Features

The following options are available for SBC-2000 Controllers:

- **Redundant power supplies:** Featuring automatic switchover in case of failure of the primary power supply.
- **RS-232 to RS-422 Converter Module** (1 channel).
- **Acrison Data Concentrator:** Provides improved communications performance and allows data highway multidropping to 32 controllers.
- **Network Gateway:** Used with Profibus DP and DeviceNet networks. Allows communication with up to 32 controllers. Uses one of the controller's built-in channels.
- **Profinet Gateway:** A DIN rail mounted, multi-drop-connected device that provides a Profinet-to-Modbus protocol conversion for communicating from one Profinet Master to as many as 20 Acrison Controllers. The gateway is powered by 24 VDC. Configuration software is provided to allow customers to create custom configurations.
- **NetENI Gateway:** Provides protocol conversion between the Allen Bradley Ethernet protocol and the DF-1 protocol using either RS-232 or RS-422. Presently, the primary use of this gateway is for implementation with an Acrison Data Concentrator.
- **Bluetooth Gateway:** Allows communication with up to 32 controllers using Bluetooth from a handheld device. Uses one of the controller's built-in channels.
- **System I/O Module:** Provides system level and blender digital inputs and outputs, plus 1 analog input and 1 analog output for the SBC-2000 MFC Controller, as follows:
  INPUTS:
  1. Remote Run System (starts and stops)
  2. System Permissive Run (enables Run)
  3. Blender Zero Speed Switch (enables Run)
  4. Supervisor Key
  OUTPUTS:
  1. System General Alarm
  2. System Running
  3. Blender On
  ANALOGS (Total Throughput only)**:**
  1. IN: 0-5 VDC
  2. OUT: 0-2.5 VDC

Optional Equipment Features (cont'd)

- **Remote KDU:** A graphics KDU (keyboard/display unit) modified to interface up to 20 SBC-2000 Controllers.
- **Acri-Data® Supervisory Software:** A Microsoft® Windows™ based program that allows a PC or laptop to communicate with up to 20 SBC-2000 Family Controllers.
- **Analog Expansion Module:** A DIN rail-mounted module having 4 analog outputs and 2 analog inputs; user programmable. For SBC-2000 Family of Controllers (4-20mA or 0-10VDC input and output).

Specifications

SBC-2000 CM

- **Power:** Logic +5 VDC @ 260 mA and Isolated +5 VDC @ 140 mA.
- **Temperature:** Operating: -10° to 70° C (14° to 158°F). Storage: -20° to 100° C (-4° to 212°F).
- **Humidity:** Maximum 95% relative, non-condensing.
- **Weight:** Card rack with 6 SBC-2000 CM Controllers and 2 rack-mounted power supplies is approximately 3.1 Kg. (7 lbs.). Module: 128 gm. (4.5 oz.).
- **Dimensions:** Module: 100 x 160mm (3.9" x 6.3"). Front Plate: 128mm x 20mm (5" x 0.78").

SBC-2000 DSP

- **Power:** Logic +5 VDC @ 550 mA and Isolated +5VDC @ 100 mA.
- **Temperature:** Operating: 0° to 50° C (32° to 122°F). Storage: -20° to 70° C (-4° to 158°F).
- **Humidity:** Maximum 95% relative, non-condensing.
  Weight: Controller (Less P.S.): 794 gm. (28 oz.).
- **Dimensions:** Overall: 221 mm (W) x 169mm (H) x 45mm (D) 8.7"(W) x 6.7"(H) x 1.77" (D).

SBC-2000 DSP/C

- **Power:** Logic +5 VDC @ 990 mA and Isolated +5VDC @ 14 mA.
- **Temperature: Operating:** 5° to 60° C (41° to 140°F).
- **Humidity:** Maximum 95% relative, non-condensing.
- **Gasketing:** NEMA 4X, IP 66. Display: TFT, 320 x 240, 5.7" diagonal.
- **Construction:** Aluminum 6061 T6.
- **Weight:** Controller (Less P.S.): 993 gm. (2 lb. 3 oz.).
- **Dimensions:** Overall: 173 mm (W) x 217mm (H) x 40.6mm (D) 6.81"(W) x 8.54"(H) x 1.6" (D).

SBC-2000 MFC

- **Power:** Logic/Isolated: Color Touchscreen +24 VDC @ 4.5A (nominal), 12A (peak for 10 mS worst case).
- **Temperature:** (Color Touchscreen):
  15" Color Touchscreen Operating 0° to 50° C (32° to 122° F). Storage: -20° to 60° C (-4° to 140° F)
  17" Color Touchscreen Operating 0° to 45° C (32° to 113° F). Storage: -20° to 60° C (-4° to 140° F).
- **Humidity:** For 15" and 17" Color Touchscreen 10-95% relative, non condensing.
- **Weight (varies by enclosure and configuration):**
  15" Color Touchscreen Assembly: 5.5 kg (12.13 lbs.)
  17" Color Touchscreen Assembly: 8 kg. (17.66 lbs.)
- **Dimensions:** Overall (varies by enclosure and configuration):
  15" Color Touchscreen: 383mm (W) x 307mm (H) x 65mm (D), 15" (W) x 12" (H) x 2.5 (D).

  17" Color Touchscreen: 414mm (W) x 347mm (H) x 93mm (D), 16.25: (W) x 13.66" (H) x 3.66 (D).

Certifications

SBC-2000 Controllers are certified to meet the following standards when supplied in suitable enclosures, with approved Power Supplies:

- US Safety: UL 61010-1
- Canada Safety: EN61010-1 Differences
- European Safety: EN61010-1
- European EMC Directive (89/336/EEC): EN61326, EN55011, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-11, EN61000-3-2, EN61000-3-3.
- Ethernet/IP CONFORMANCE TESTED™ is a certification mark of ODVA.

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**

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 905-14 Volumetric Feeder**
- **Bin Discharger Feeders**
- **Model 200 Series Weigh Belt Feeders**
- **Model 203B Series Weigh Auger Feeders**
- **Model 270 Series of In-Line Weigh Feeders**
- **Models 402, 404, A405, 406, 407 and 410 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 170-BD-30 Bin Discharger**
- **Model 800 Series Bulk Bag Unloaders**
- **Model 500 Series 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**

**Joseph Street Facility
Moonachie, NJ USA**

"Visibly Different... Measurably Better"

Acrison,® Inc.

20 Empire Blvd., Moonachie, NJ 07074
201-440-8300 • Fax: 201-440-4939
Toll Free: 800-4ACRISON
Email: informail@acrison.com

www.acrison.com