

THAYER SCALE

PROCESS MEASUREMENT & CONTROL EQUIPMENT

BRIDGE BREAKER CONTROLLER



- CUTS OPERATIONAL COSTS
- SOLVES SPECIAL DISCHARGE PROBLEMS
- MINIMIZE ENERGY USE
- OPTIMIZE BIN DISCHARGER PERFORMANCE

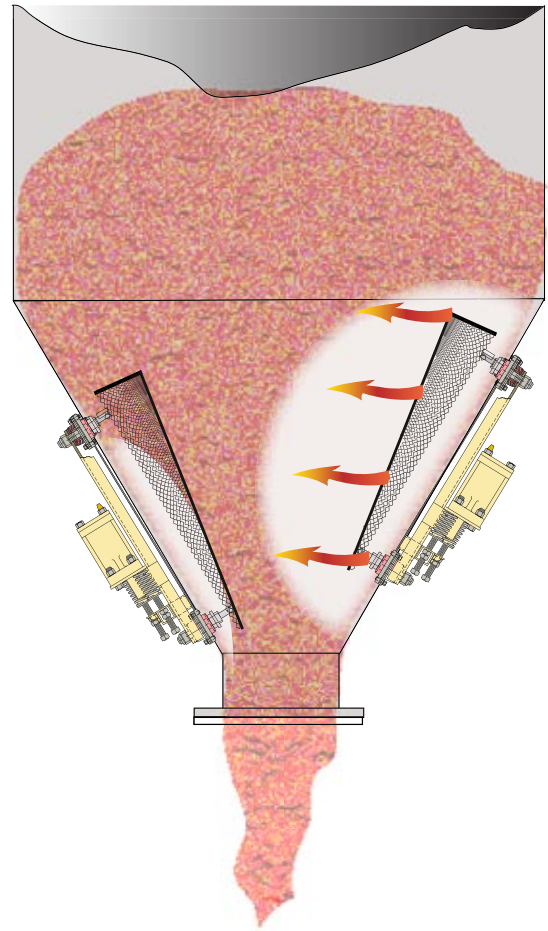
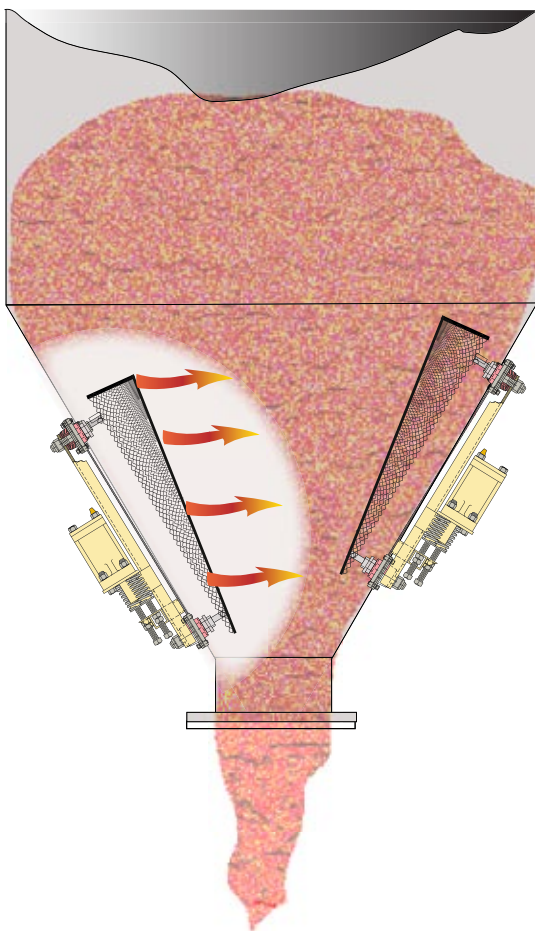




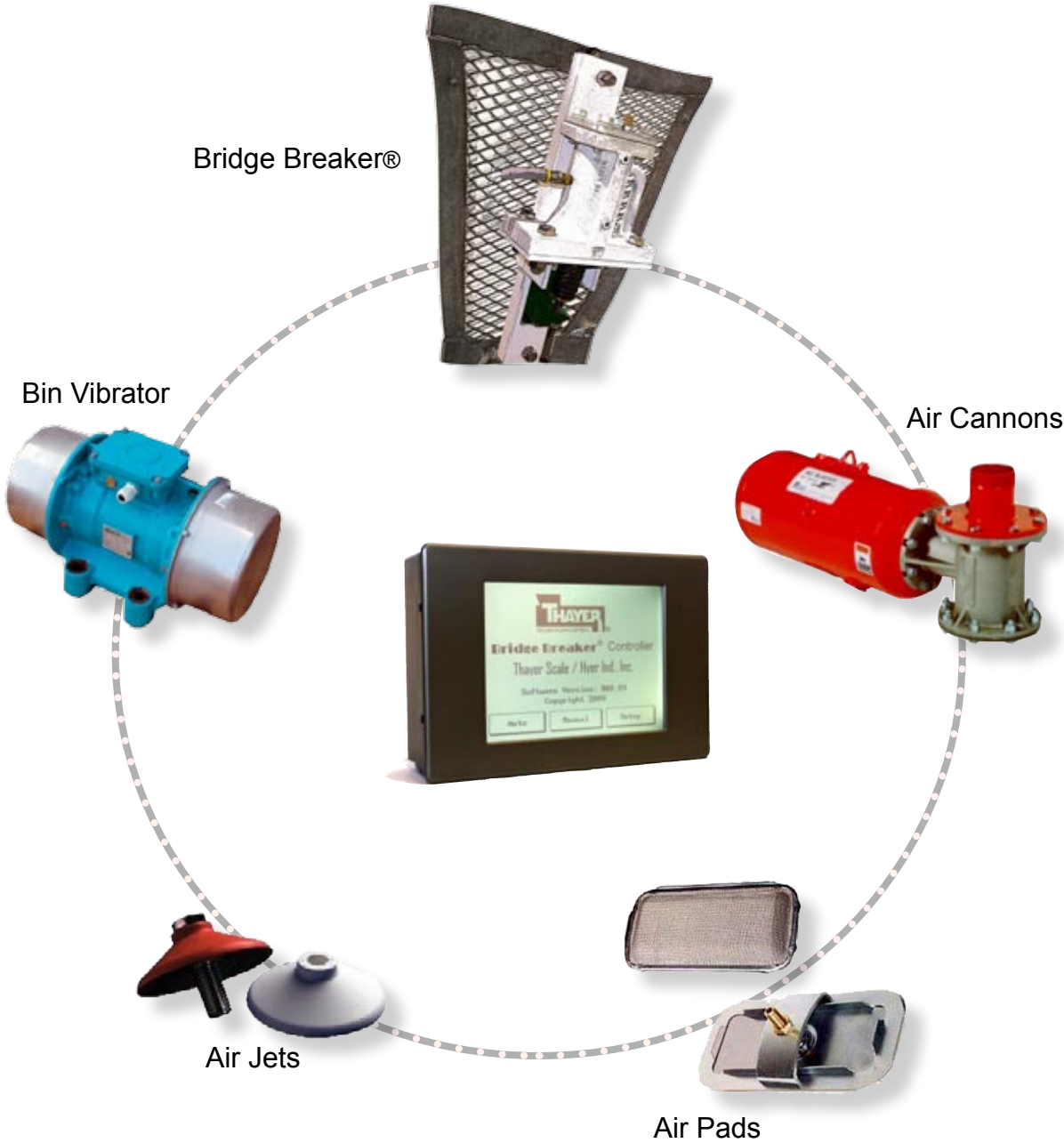
The Bridge Breaker® Controller (BBC) is a self-contained unit capable of operating a variety of Flow Aid devices (FADs) for the purpose of insuring material flow thru hoppers, silos chutes or vessel. It can control various devices such as Thayer's Bridge Breaker®, vibrators, Air Cannons, Air Pads, etc. or combinations thereof.

An advantage of Thayer's BBC is the ability to finely control the ON/OFF time of the FADs. In particular, the BBC has the ability to adjust the time between activating the FADs proportional to a signal from an external device such as a feeder. This way, the FADs are activated only as often as is necessary. Using a FAD too often can cause problems with the material as well as being a tremendous waste of energy. The BBC can also tie (link) channels together, which allows cascading of the FADs to effectively and efficiently keep the material moving.

Each channel is capable of controlling up to two solenoid operated air valves, each of which can operate one or two Bridge Breaker screens or other Flow Aid Devices. It is important to understand that a flow aid device doesn't move material, gravity does. The function of a flow aid device, such as a Bridge Breaker, is to break down the formation of "arches" that support the material bearing down from above. When the arches are broken, the material must have a place to go, otherwise serious over-compaction can result.



The Bridge breaker Controller has the ability to control the on/off time of various types of Flow Aid Devices



The Importance of Interlocking the Control System:

To insure that the material has some place to go, two external sensors (interlocks) can be used to detect if the material is flowing properly. Each input is programmed to the state of the switch when the FADs can be used (open or closed). Each interlock also has a programmable hysteresis parameter which prevents a momentary state change from causing the process to stop, provided the interlock returns to the proper state within the programmed time.

Since two interlocks are available, the BBC has a feature that the selection for the interlock is independently programmable per channel. This allows two vessels to be controlled by one BBC, each with a separate interlock. For example, one or more channels could be used on one vessel with interlock #1 and the remaining channel(s) could be used on another vessel with interlock #2.

Each of the four channels can act independently, can be tied together (linked) or be linked to an external device. The On time of each channel is always a fixed programmable value. The OFF time is determined by one of three methods:

1. The simplest method is a fixed time. This way, each programmed channel has fixed On and Off times and each channel runs independently of the other channels. This method requires:

- No Link
- Programmed OFF time

2. When a channel is linked to another channel, the OFF time is then determined by when the master channel has performed a programmed number of cycles (specified by the 'Mult' parameter). The slave channels' OFF time will vary depending on the action of the master. This method requires:

- Link to another channel
- Programmed Multi-parameter

3. An external signal can be fed to the controller to set the OFF time of a channel. The most common source of this signal is the flow rate or totalizer pulses from another instrument. This allows the flow aid device cycle to be proportional to the rate at which the material is being feed. This method requires:

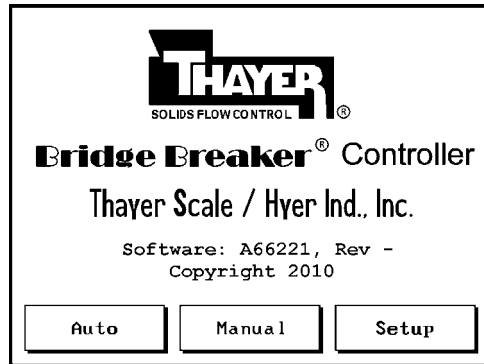
- Link to External device
- An external signal related to flow rate or totalizer pulses.
- Programmed Count and External Frequency @ 100% (Hz) parameters. These are required to determine the OFF time.

Please note that when using a Link to External in the Auto screen, the OFF time shown will be the extrapolated time based on the current rate of pulses from the external device. If the flow rate of the external device changes, the OFF time will change accordingly.

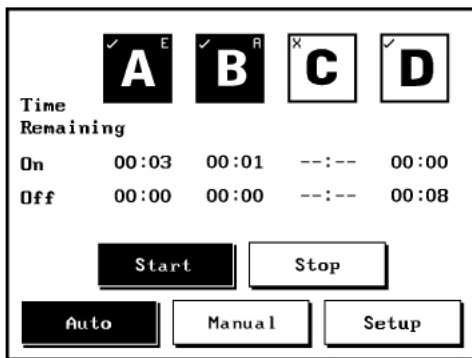
Built in Help:

All setup parameters have a help screen associated with them. If a piece of text has a faint underline, simply press on the text and the help screen will be displayed. Each screen describes the setup entry and provides limits if the entry is numeric.

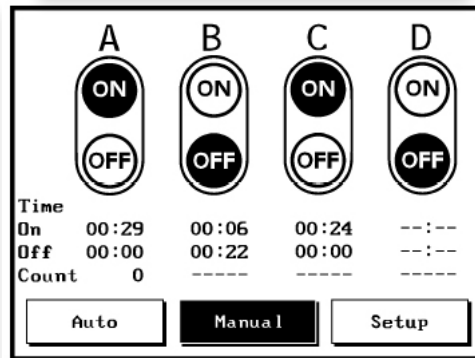
Bridge Breaker Controller is an intuitive device that allows precise control of bin discharging equipment through multi-layered menu selection.



Main Screen



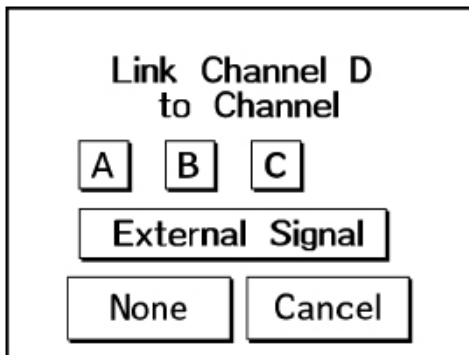
Automatic Mode Screen



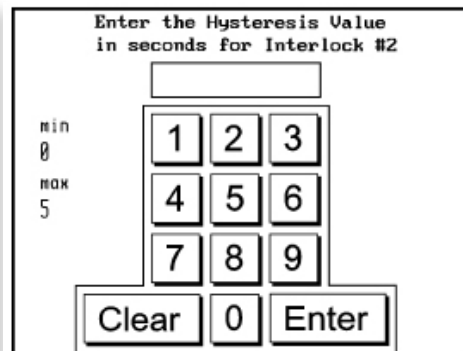
Manual Mode Screen

	Time On	Time Off	Link	Mult	Count	ILock
A	10s	-	E	-	253	1
B	19s	-	A	5	-	2
C	0s	1s	-	-	-	None
D	0s	1s	-	-	-	None

Set Up Screen #1



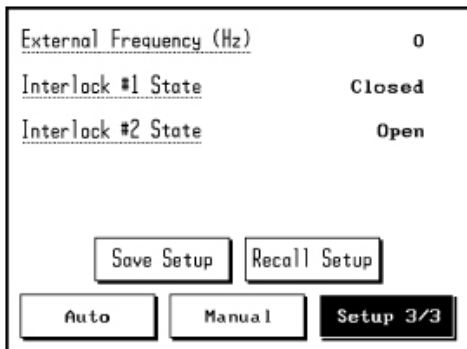
Set Up Screen #1A



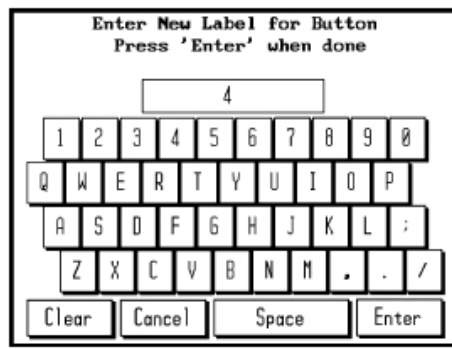
Data Entry Screen

Manual Timeout (Min)	5	
Auto Start on Power On	No	
External Frequency @ 100% (Hz)	100	
Interlock: #1	#2	
Activated State	Closed	Open
Hysteresis (Sec)	1	2

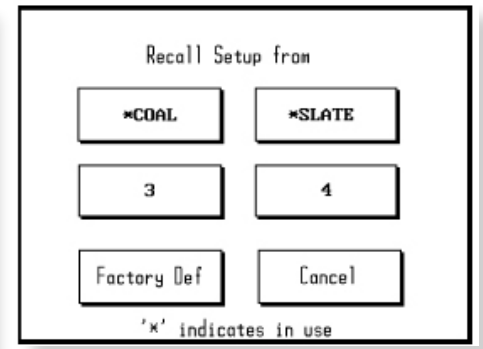
Set Up Screen #2



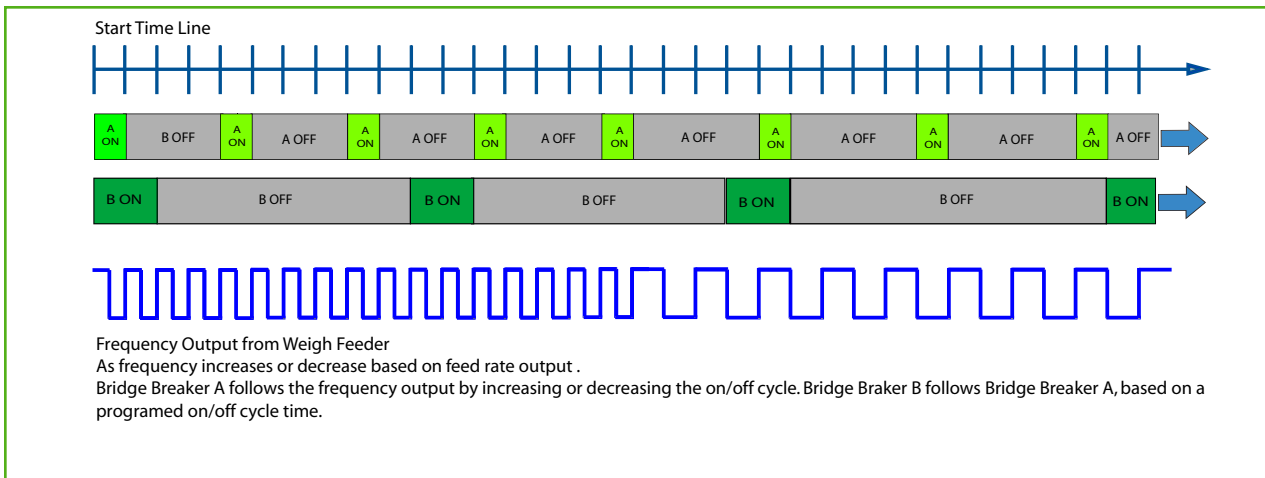
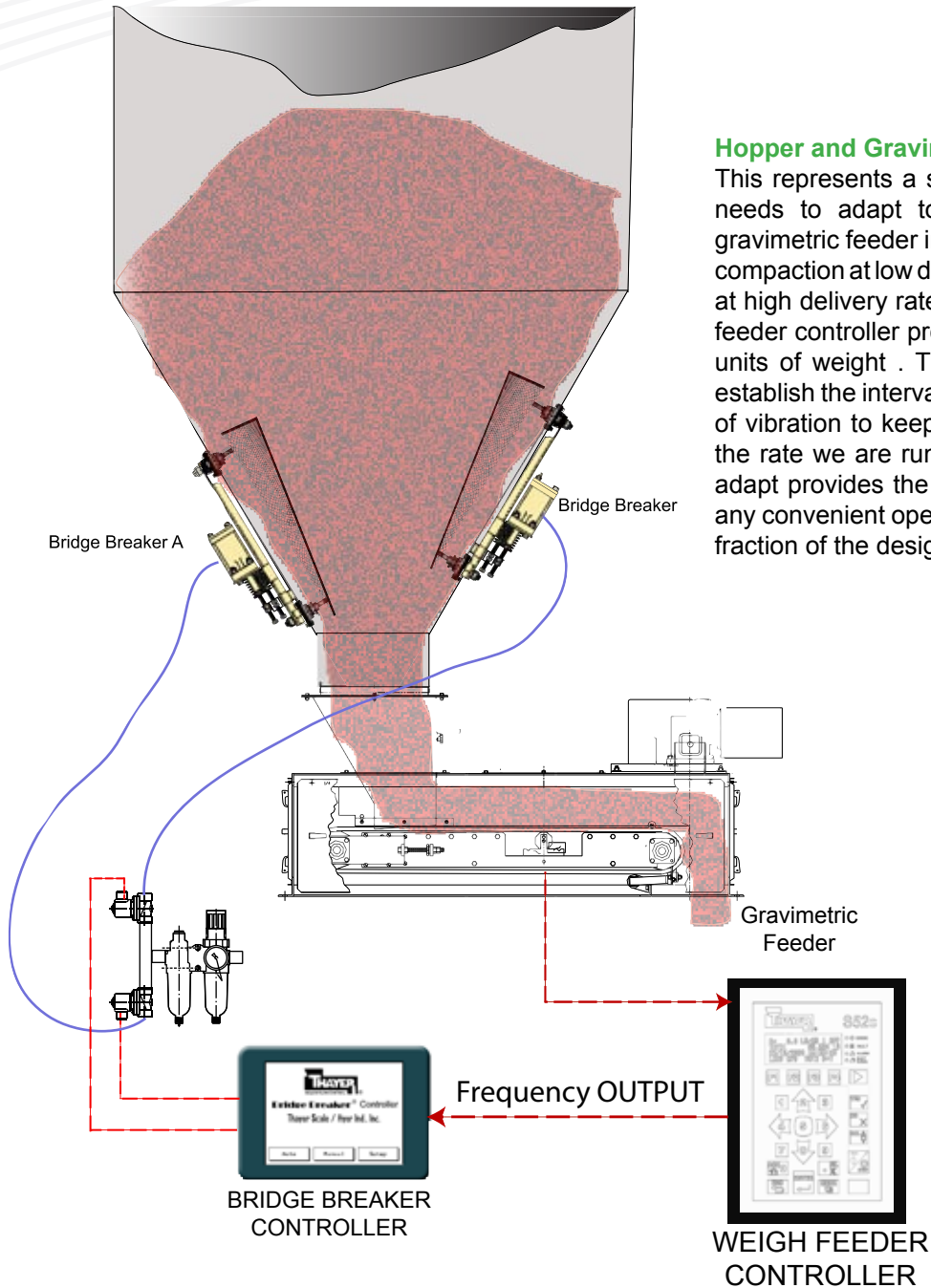
Set Up Screen #3

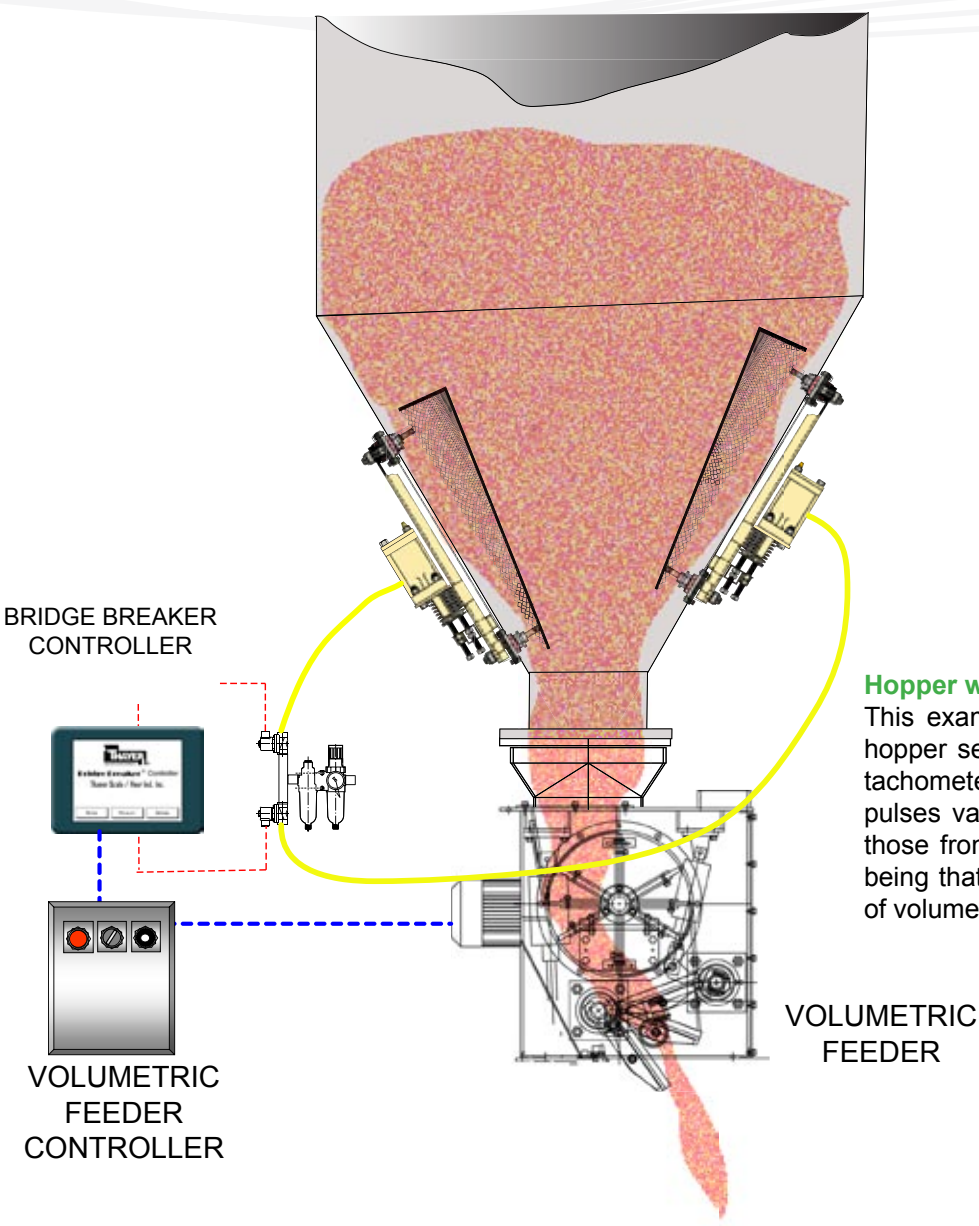


Keyboard Entry



Recall Setup



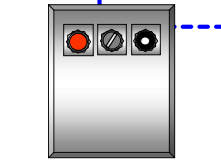


Hopper with variable speed rotary feeder

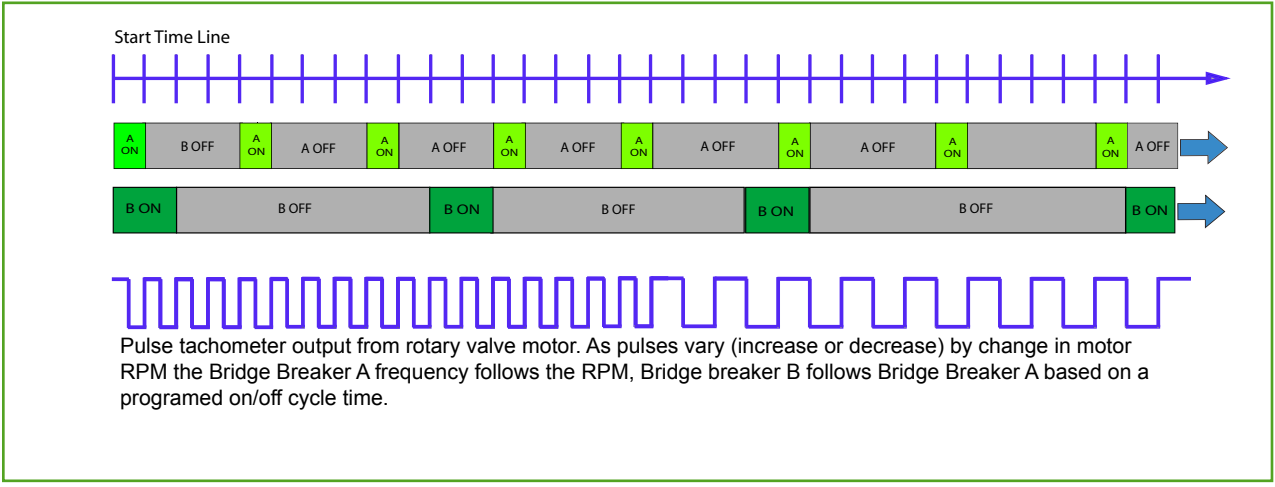
This example is similar to the gravimetric feeder and hopper set up except the external signal from a pulse tachometer on the rotary feeder gearmotor. These pulses vary with discharge rate in a similar fashion to those from the gravimetric feeder. The only difference being that here we have pulses representative of units of volume instead.

VOLUMETRIC FEEDER

BRIDGE BREAKER CONTROLLER



VOLUMETRIC FEEDER CONTROLLER



Microprocessor	Dual Core Atmega 128@ 18.432 Mhz
Program Memory (flash)	80 KB
Data Memory	24 KB Basic + 4 KB Ladder Logic
(EEPROM)	4KB EEPROM
Basic Execution Speed	95,000/sec
Ladder Scan time	10 ms
Serial Ports for Communication	2 High-speed hardware independent serial ports Configurable Baud rates: 2400 bps to 230,000 bps
Digital Inputs	32 opto-isolated inputs 97.7 to 30 VDC) 17 TTL 5v input/output configurable 1 TTL 5V input
Digital Output	32 opto-isolated 24 volt DC TR outputs
Analog Inputs	8 channel 10-bit ADC's Configurable voltage 0 to 5V or 0 to 10 V
Analog Outputs	6 channel 16-bit PWM or DAC Output voltage Range: 0 to 5V configurable frequencies for PWW: 35 hz to 1.15 Mhz
External Interrupts	4 Channels
High speed Counters	2 Channels 16-bit Counters
Power	Required Power: 24 VDC Current Consumption w/ports unloaded: CT 1720 Currant Consumption @24V w/Backlight on: 170 mA @24V w/ Back Light off: 70 mA
RTC (real time clock)	Yes
Timers	1 user Configurable Timer Configurable Interval Units-10 ms
Data Memory Back-up	yes, a 1 Fahrad rechargeable super-conductor is included
Package	Integrated Touch-screen Panel w/2 mm Headers and 2.5mm RCABLE Headers
Operating Temperature	0 degree C to 70 degree C
Size	7.36" x 5.00" x 1.71' Viewing Area (Touch sensitive): 4.5" x 3.4" (5.6" diagonal)