

Senaco AS100 Acoustic Sensor

Reliable Continuous Protection
For Bulk Solids Flow



 **MILLTRONICS**
Mass Dynamics Division



Reliable Continuous Protection for Bulk Solids Flow

The Senaco AS100 sensor helps to prevent serious problems in solids flow processes caused by abnormal flow, sudden blockages, product absence or equipment failure, such as burst filter bags. It reacts instantly to changes in flow of pellets, powders or most bulk solids in pipes, chutes, vibratory feeders, pneumatic conveyors and gravity flow systems.

Any sudden blockage which prevents product flow, or rupture which increases flow as product escapes from a pipe or bag, is immediately detected by the AS100. This enables an operator to take early preventative action, avoiding expensive damage.



Broken Filter Bag Detection

Early Warning of Flow Problems

The friction and impact of bulk solids flow in pipes, chutes and conveyors all generate high frequency sound waves, noises that are often inaudible to the human ear. The Senaco AS100 detects deviations in these sound waves caused by changes in solids flow rates, and warns of impending problems.

Operation Unaffected by Plant Environment Noise

The AS100 uses unique Acoustic Emission (AE) technology to detect high frequency sound waves generated by equipment and materials in motion. These sound waves travel readily through solids materials, but are strongly attenuated when travelling through air. Consequently the AS100 is immune to interference from airborne noise and low level structural vibration, providing a non-invasive method of process monitoring.

As the AS100 operates in a high frequency broad band, it is immune to competing background noise generated by machines and other processes. Audible noises and low frequency vibrations are screened out.

Simple, Low Cost Installation

The non-invasive sensor can be installed without any shut down of process or equipment. In minutes, the compact unit may be attached to a flat surface, pipe, flange, elbow or joint, where Acoustic Emission levels are potentially highest.

The lightweight unit weighs only 0.4 kg (1lb.), and is easily positioned. A range of installation options are available to suit your needs. Installation may be via a clearance hole and bolt, drilling and tapping, mounting disc or an extension tab. The unit may be screwed in, bolted on, or bonded in place. Once installed, simply connect the power supply and alarm output, set the alarm level and the unit is fully operational.



Route Verification

How It Works

The AS100 sensor uses Acoustic Emission (AE) technology, a completely non-invasive technique. The sensor monitors high frequency sounds or structure borne acoustics generated by friction and impact of powders, granules and solids in motion. Monitoring this AE activity provides the basis for the AS100 sensor's exceptional trouble-shooting capabilities, which are further extended by its dual range of operation.

Processes and operating equipment naturally generate sounds which span a wide range of frequencies. Low frequency sounds - whether airborne or structure borne - are often masked by irrelevant sounds from adjacent plant or machinery. This can prevent the activity of interest from being monitored. However, at the high frequencies of Acoustic Emission, these problems are greatly diminished.

The AS100 is most responsive to the 'diffuse-field' component of this AE activity: it senses the acoustic sound wave's reverberation as it propagates through the component being monitored.

As a result, positioning and orientation of the sensor are not critical, as generally signals are readily detected at all points and orientations for a particular

24 Hour Protection in Tough Environments

With no moving parts and a type 304 stainless steel housing sealed against dust and moisture, the AS100 provides continuous protection around the clock, and requires little or no maintenance.

Because the AS100 is mounted outside the process, it is completely non-invasive. In hazardous or hygienic food environments, this is a great advantage as there is no need for constant cleaning, and concerns about product contamination are eliminated. The Senaco AS100 is also unaffected by abrasive applications.

The standard sensor operates effectively from -20° to 80°C (-4° to 176°F), with an extended temperature option offering sensing from -40° to 85°C (-40° to 185°F).

Field Proven Detection

The Senaco AS100 monitors a wide range of granular and bulk solid materials including:

- Sugar (granulated or powder)
- Coal (slugs to dust)
- Polyethylene pellets
 - Cocoa beans
 - Fibreglass
 - Wood chips
 - Cement
 - Grain
 - Sand

Applications include:

- Solids flow sensing
- Flow/no flow, high flow/low flow
- Inflow blockage detection
- Cyclone blockage detection
- Filter monitoring and switching
- Burst filter bag detection
- Route verification



Blocked Chute Detection



Flow/No Flow Detection

Ease of Use

The AS100 system combines a highly sensitive acoustic sensor with controls that are easily set up. Powered by 20 Vdc to 30 Vdc, the sensor provides a dc analog voltage that can be monitored by the dedicated Senaco CU 02 control unit, or a PLC that accepts a 0-10 Vdc input signal.

Control Options

With a Senaco CU 02 control unit, the system can be readily configured for set points indicating such conditions as high flow, low flow or no flow, or it can be added to a control loop via a 4-20 mA output.

Two relays are fully programmable and independent of each other, and can be used to operate an alarm or switch device. The control unit can be mounted up to 500m (1500 ft.) from the sensor.

The signals are amplified and processed by the AS100 sensor to provide the level of AE activity as a function of time.

With a CU 02 as part of the system, two relays, an LCD and 4-20 mA outputs are provided. The sensor output can also be fed directly to a PLC accepting a 0-10 Vdc signal.

The sensor may also be operated independently of the control unit by providing an external supply.

The output is fed into a control panel, chart recorder, data logger or programmable logic controller with a suitable input.



application. By detecting AE activity, the AS100 sensor differentiates between normal and abnormal states in a given process.

A sensitive piezo-crystal inside the AS100 sensor converts surface displacements of the structure, associated with the travelling acoustic wave.

It converts them into an electric signal which is amplified and processed to produce the level of AE activity as a function of time.



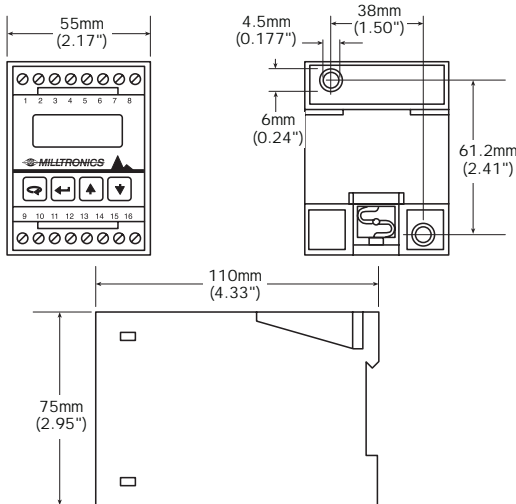
Specifications

Senaco Control Unit - CU 02

Power Supply Required	100, 115, 200, 230 Vac \pm 15% 50/60 Hz (factory set)
Excitation	26 Vdc nominal, 70 mA maximum
Power Consumption	10 VA maximum
Analog Input	0-10 Vdc, from sensor
Analog Output	4-20 mA, isolated output, 750 ohms max.
Switched Output	2 Form 'C' relays, latching or non-latching 5 Amp @ 250 Vac non-inductive
Alarm Delay	Adjustable from 0 to 999 seconds
Start up Delay	Adjustable from 0 to 999 seconds
Operating Temperature	-20°C to 50°C (-4°F to 122°F) - Ambient
Ingress Protection	IP 20
Housing	Polycarbonate
Weight	550 grams (18 oz.)
Size	55mm W x 75mm H x 110mm D 2.17" W x 2.95" H x 4.33" D
Mounting: Din Rail	DIN 46277 or DIN EN50022
Wall Mount Display	LCD - 3 digits + symbols

CU 02 Approvals: CSA general purpose and CE.

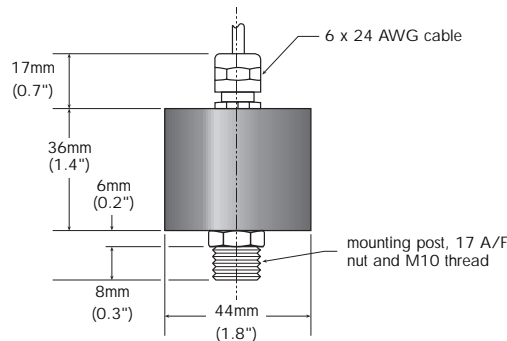
Dimensions



Senaco AS100

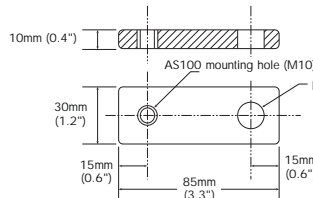
Standard	Standard operating temperature range
Extended	Extended operating temperature range
Power	20 to 30 Vdc, 18 mA typical
Operating Temperature	
Standard	-20 to 80°C (-4 to 176°F)
Extended	-40 to 85°C (-40 to 185°F)
Relative Sensitivity	0.5%/°C average, over the operating range
Output	Analog, 0.08 to 10 Vdc nominal, 100 K Ω minimum load impedance
Construction Housing	304 stainless steel
Cable	Standard: 4m (13 ft.) cable, PVC jacketed, 3 twisted pairs, 24 AWG, shielded Extended: 4m (13 ft.) cable, thermoplastic elastomer jacketed, 6 conductor, 24 AWG, shielded
Ingress Protection	IP 68 (waterproof)
Weight	400 grams (1lb.) including cable
Mounting Options	Screw in, bolt on, weld or bond in place

AS100 Approval: CE.

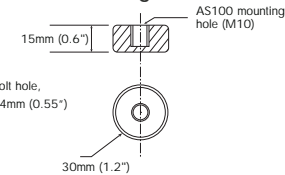


Mounting Options

Extension Tab



Mounting Disc



Our continuous program to improve our products may result in changes to design and specification without notice.

Y2K Compliant - Year 2000 Compliant

Mass Dynamics is dedicated to the sales and development of continuous weighing and motion sensing instrumentation. Launched in 1997 as a new business division of Milltronics Ltd., Mass Dynamics offers a range of belt scales, solids flowmeters, weighfeeders, acoustic sensors and motion sensing equipment. Designed to withstand the sustained rigours of heavy primary industries, these products have proven their reliability in a wide range of harsh applications including the mining, mineral processing and cement industries. They are also used extensively in wet and dry food processing and petrochemicals.



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A joint venture in Singapore, a sales office in Brazil and distributors in 56 countries.

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Printed in Canada

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