8 Process Protection

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You can download all instructions, catalogs and certificates for Process Protection free of charge at:
www.siemens.com/processprotection

Overview

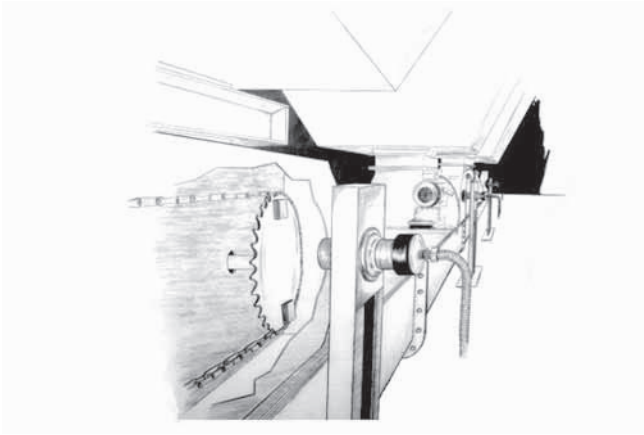
	Application	Device description	Page
Acoustic sensor for pump monitoring			
	Acoustic diagnostics unit for flow valve leakage monitoring in oscillating displacement pumps or for material flow monitoring of bulk solids in pipes, conveyors or raceways.	**SITRANS DA400** • 4 inputs for structure-born noise sensors • 4 universal inputs • 6 digital outputs • With PROFIBUS DP or PROFIBUS PA • Sensor degree of protection IP66/IP68	8/5
Acoustic sensors for material flow monitoring			
	Acoustic sensor for solids flow detection	**SITRANS AS100** • Non-invasive • Screw in, bolt on, weld, or bond in place • Analog output • High and low sensitivity range of operation	8/10
	Alarm control unit for use with SITRANS AS100 acoustic sensor to provide reliable continuous protection for bulk solid flow It processes signals from the sensor, providing relay and analog outputs for interface into a process.	**SITRANS CU02** • 3 digit LCD display • 4 to 20 mA output • Two programmable relays • Adjustable independent time delay for each relay • DIN rail mounting provides easy installation	8/14
Motion sensors			
	Highly sensitive single set point motion sensor alarm unit, used with MSP and XPP probes	**Milltronics MFA 4p** • Probe/target separation up to 100 mm (4") • Minimum velocity of moving ferrous target: 1 cm/sec. (2 fpm)	8/17
	Heavy-duty 2-wire motion sensor providing solid state switch output to PLCs between 18 to 135 V AC or DC	**Milltronics Millpulse 600** • Provide pulse output to PLC input when monitoring speed of rotating, reciprocating or conveying equipment	8/21
	Heavy-duty zero speed alarm switch	**Milltronics ZSS** • Detects the absence or presence of motion of rotating or reciprocating or conveying equipment	8/23

Overview

Process protection devices act as early warning systems to avoid costly process interruptions and breakdowns of equipment. Non-contacting motion sensors detect changes in motion and speed of conveying, reciprocating and rotating machinery.

Non-invasive acoustic sensors detect inaudible, high frequency acoustic emissions generated by friction and impact, caused by materials in motion. They can detect conditions of flow/no flow or high/low flow, to warn of blockages, product absence or equipment failure. They are located outside of the process, accurately detecting conditions without wear on the sensor.

Motion sensors can warn in case of equipment malfunction and shut down machinery in case of a slowdown or failure. They are rugged and perform even in harsh industrial conditions. All of the MFA 4p motion sensing probes as well as the Millpulse 600 can be mounted up to 100 mm (4") from the ferrous target, reducing the chance of damage to the probe and the equipment. The probes are not affected by moisture or dust build-up.



Motion sensing on drive shaft of rotary feeder

Mode of operation

- Acoustic Sensing

Acoustic sensors monitor high frequency emissions generated by friction and the impact of flowing material or mechanical parts. The sensors can also sense the turbulence of gases or liquids leaking through valves and flanges. When matter vibrates between 0 Hz and 200 kHz, it creates acoustic energy. Sound energy between 20 Hz and 20 kHz can be detected by humans. Acoustic sensors detect high-frequency acoustic energy between 75 kHz and 175 kHz. Acoustic energy travels quickly through dense materials (metal) and poorly through less dense materials (air). Because the acoustic sensors are mounted directly to the external wall of the chute work, other plant noises are well below 75 kHz and effectively ignored by the sensors.

The acoustic sensors contain a specialized piezocrystal and filter circuit that responds effectively to the high-frequency band between 75 kHz and 175 kHz. As the crystal is excited by the acoustic energy, it produces a continuous electrical signal in direct proportion to the level of acoustic energy received. The sensor output of 0 to 10 V DC can be applied to a PLC or to an optional control unit for a programmable alarm relay or 4 to 20 mA signal output.

- Motion sensing

Siemens Milltronics probes work on the principle of Faraday's Laws of Electromagnetic Induction. When a ferromagnetic object enters the probe's permanent magnetic field, it distorts the flux, causing its coil windings to generate a voltage. This voltage is proportional to the strength of the magnet and the number of wire turns in the coil (constant in the probes) and the speed at which the ferrous target passes through the flux. The generated voltage is also inversely proportional to the square of the distance between the target and the probe.

The robust motion sensors provide the contacts to shut down machinery whenever under-speed, over-speed or plant equipment failure occurs. On belt, drag and screw conveyors, or on bucket elevators, fans and pumps, the speed alarm option can warn instantly of equipment malfunction. Some probes may be linked to a programmable logic controller to monitor equipment.

Technical specifications

Process Protection Selection Guide

Criteria	SITRANS DA400	SITRANS AS100	Milltronics MFA 4p	Milltronics Millpulse 600	Milltronics ZSS
Typical Industries	Non-metallic minerals, mining, water/waste water, chemicals/petro-chemicals	Aggregates, grain, cement, food process-ing, power generation, steel processing	Aggregates, cement, mining, waste water, grain	Aggregates, cement, mining	Aggregates, cement, mining
Typical Applications	Oscillating displace-ment pumps such as diaphragm piston pumps, piston pumps and hose-type diaphragm piston pumps. Monitoring of flowing bulk solids in pipes, conveyors or channels.	Pipes, pneumatic con-veyors, aerated gravity flow systems, burst fil-ter bag detection	Tail pulleys, driven pul-leys, motor shaft sens-ing, screw conveyor flights, bucket eleva-tors	Tail pulleys, driven pul-leys, motor shaft sens-ing, screw conveyor flights, bucket eleva-tors	Tail pulleys, driven pul-leys, motor shaft sens-ing, screw conveyor flights, bucket eleva-tors
Operation	Acoustic detection of cavitation, optionally acoustic detection of impact noises of high frequency	Acoustic sensing	Motion sensing	Motion sensing	Motion sensing
Enclosure	Electronics housing, Makrolon IP65, sensor, stainless steel material number W.-Nr. 1.4571 (316Ti SST)	Compact 304 or 303 stainless steel, IP68	Type 4X/NEMA 4X/IP65 polycarbonate	Type 4X/NEMA 4X/IP67 aluminum	Phenolic/aluminum
Sensor Mounting	Screw to outside of pump housing. For material flow monitor-ing on the outside of pipes, channels, chutes or raceways	Sensor non-invasive: glue or weld-on disc, bolt or weld-on tab, drill and tap	Non-contacting probes secured with supplied flange	Non-contacting, secured with supplied flange	Non-contacting, secured with supplied flange
Operating Temperature	Electronics -20 °C to +60 °C (-4 °F to +140 °F) Sensor -20 °C to +110 °C (-4 °F to +230 °F)	-20 to +80 °C (-4 to +176 °F)*	-20 to +50 °C (-4 to +122 °F)**	-40 to +60 °C (-40 to +140 °F)	-40 to +60 °C (-40 to +140 °F)
Power Requirements	19 V to 36 V DC, < 100 mA	20 to 30 V DC, 18 mA	100/115/200/230 V AC ± 10% 50/60Hz, 15VA	Switch 18 to 48 V AC/DC or 60 to 135 V AC/DC	115 or 230 V AC ± 10% 50/60 Hz, 10 VA
Approvals	CE, PROFIBUS DP and PROFIBUS PA con-form, Ex protection to ATEX 1G or 1D	CE, CSA/FM Class II, Div. 1, Group E, F, G optional, ATEX II 3D optional	$CSA_{US/C}$, CE	$CSA_{US/C}$, CE	CSA General Purpose, NOT CE compliant

* Extended temperature model -40 to +125 °C (-40 to +257 °F) available (CE version)

** Probes available for -40 to +260 °C (-40 to +500 °F)

Overview

Acoustic diagnostics unit SITRANS DA400 and sensor

The SITRANS DA400 acoustic diagnostic unit acoustically measures the structure-borne noise

- in the version for pump monitoring; on oszillating displacement pumps
- in the version for material flow monitoring; on pipes, conveying equipment or channels.

It compromises an electric diagnostic unit and up to four acoustic sensors.

Benefits

Benefits when pump monitoring

- Increased availability of the system through:
  - Advanced maintenance planning thanks to early recognition of defective components
  - Reduced downtimes (no fault location necessary)
  - Increased maintenance intervals
  - Greater pump reliability
- Prevention of expensive consequential damage
- Increased safety of critical applications
- Early recognition of a reduction in power
- Increased productivity

Benefits when material flow monitoring

- Detection of insufficient or excessive inflow of material in a liquid or gas flow
- Detection of blockages or clogging
- Reduction of down times
- Increased product quality
- Increased availability
- Guaranteed operational safety
- Increased productivity

Application

In the version for pump monitoring, the SITRANS DA400 allows continuous, simultaneous and independent monitoring of up to four flow control valves in a pump for leaks. In addition, another four inputs are available for monitoring standard signals (e.g. diaphragm and temperature monitoring). This means that the condition of an oscillating displacement pump is monitored in every phase of its operation.

The SITRANS DA400 is used in all industries where a oscillating displacement pump is used.

The version for material flow monitoring monitors the material flow in liquids or gases that is usually as a result of impact or friction, e.g. againgst the pipe or channel wall.

If the acoustic diagnostic unit is used in potentially explosive areas, the sensors as well as the acoustic diagnostic unit can be installed in the Ex-zone.

If using the unit in potentially explosive areas, you have two options:

- Operation of the sensors over the ex-barriers or
- Operation of the sensors over the SITRANS DA400 with explosion protection.

Function

Product features

Continuous and independent status monitoring:

- of the flow control valves, for leaks
- of the membranes, for material fatigue
- of the temperature loading of the hydraulic oil
- of flowing bulk solids in pipes, conveying equipment or channels

Communication of the status to superordinate process control systems:

- via digital outputs
- digitally, via PROFIBUS DP or PROFIBUS PA

Simple to operate and parametrize:

- Locally, via digital display and keys
- PROFIBUS DP and PROFIBUS PA

Mode of operation

Principle of measurement

Leaks in the flow control valves of oscillating displacement pumps are flows in which cavitation occurs. This results in sound waves that are transmitted to the valve housing, where they are recorded by the structure-borne sound sensor in the SITRANS DA400 on the outside.

The SITRANS DA400 utilizes the fact that with both an open valve and a closed intact valve, no cavitation occurs and the measured sound level thus corresponds to the operating noise of the pump. By contrast, with a closed defective valve cavitation does occur, which can be identified by a period increase in the sound level (see figures). The measured value from the SITRANS DA400 corresponds exactly to this increase in the sound level.

In the version for material flow monitoring, SITRANS DA400 continuously detects high-frequency acoustic oscillations by means of structure-born noise sensors.

The oscillations are created by:

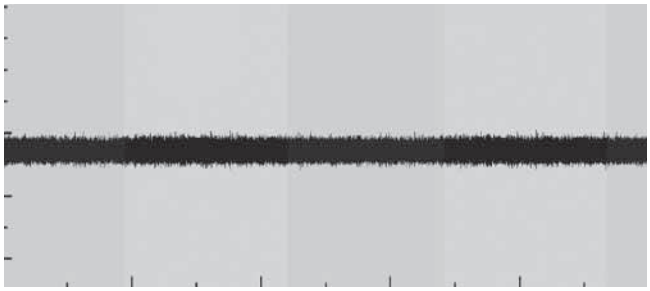
- Friction and impact of bulk solids in:
  - pipes, raceways or channels
  - chutes
  - conveyors
- Friction and impact of mechanical parts
- Bursting of bubbles
- Caviation
- Turbulences in gas and liquid flows

The measurement is carried out exclusively in the ultrasonic range. This filters out the operating noise of the pump and the closing noise of the valves.

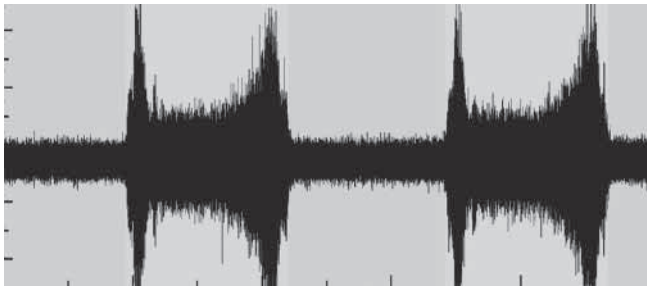
Acoustic sensor for pump monitoring

SITRANS DA400

The following shows an example of signal levels at an oscillating displacement pump.



Signal from structure-borne sound sensor with intact valve



Signal from structure-borne sound sensor with defective valve

Sensor operation

The structure-borne sound sensor works on the piezoelectric principle. The structure-borne sound is injected into the sensor via the sensor base (mounting surface) and inside it is converted into an electrical voltage by a piezo-ceramic element. This is amplified in the sensor and transmitted via the cable.

The sensor frequency range lies in the ultrasonic range (> 20 kHz). The sensor is non-directional, i.e. the angle at which the sound wave is incident on the sensor base is not important.

Mode of operation of the safety barrier

The safety barrier comprises intrinsically-safe circuits. These circuits serve to operate intrinsically-safe components such as sensors and to isolate safety from the non-hazardous area with the STIRANS DA400 diagnostics unit.

Technical specifications

SITRANS DA400	Without Ex prot.	With Ex protection
Input		
Acoustic channels	4	
• Cycle time	10 ms	
Only for connection to intrinsically safe sensors with:		
• Max. voltage U_o	-	≤ 5.5 V
• Max. current I_o	-	≤ 70 mA
• Max. power P_o	-	≤ 100 mW
• Internal capacitance C_i	-	≤ 1.2 µF
• Internal inductance L_i	-	Negligible
Universal inputs	4	
• Cycle time	80 ms	
• Low pass filter time	1 s	
Universal analog current input		
• Load	< 105 Ω	< 12 Ω
• Resolution	0.1%	
• Accuracy	0.5%	
• Fault signal	> 21 mA or < 3.6 mA (at 4 ... 20 mA)	
• Alarm monitoring hysteresis	0.5%	
• Static destruction limit	40 mA, 4 V	-
For connection with approved intrinsically safe circuits with:		
• Max. supply voltage U_i	-	≤ 30 V
• Max. short-circuit current I_i	-	≤ 100 mA
• Max. power P_i	-	≤ 1 W
• Internal capacitance C_i	-	≤ 11 nF
• Internal inductance L_i	-	≤ 70 µH
Universal input 24 V digital signal		
• Input resistance	> 19 kΩ	
• Signal level Low	< 4.5 V or open	
• Signal level High	> 7 V	
• Hysteresis	> 1 V	
• Static destruction limit	± 40 V	-
For connection with approved intrinsically safe circuits with:		
• Max. supply voltage U_i	-	≤ 30 V
• Max. short-circuit current I_i	-	≤ 100 mA
• Max. power P_i	-	≤ 1 W
• Internal capacitance C_i	-	≤ 11 nF
• Internal inductance L_i	-	≤ 70 µH
Universal input closing contact		
For connection to closing contact with the maximum values:		
• Max. voltage U_o	-	≤ 10 V
• Max. current I_o	-	≤ 1 mA
• Max. power P_o	-	≤ 5 mW
• Internal capacitance C_i	-	≤ 11 nF
• Internal inductance L_i	-	≤ 70 µH
8.2 V source for NAMUR signal (EN 60947-5-6)		
• Open circuit voltage	8.2 V ± 0.3 V, short circuit-proof	-
• Input resistance	< 950 Ω	-
• Static destruction limit for incorrect wiring	+20 V/-10 V	-
Output		
Digital outputs	6	6 (applicable for NAMUR switch hardener)
• Semiconductor relay	Individually isolated, short circuit-proof	-
• Switching voltage	24 V AC/36 V DC, any polarity	-
• Destruction limit	35 V AC, 50 V DC	-
• Max. switching current	100 mA	-
• Signal status Low (no response)	-	≤ 1.2 mA (Source: DIN 19234)
• Signal status High (response)	-	≥ 2.1 mA (Source: DIN 19234)
For connection with an intrinsically safe switching amplifier to DIN 19234 with:		
• Max. supply voltage U_i	-	≤ 15.5 V
• Max. short-circuit current I_i	-	≤ 25 mA
• Max. power P_i	-	≤ 64 mW
• Internal capacitance C_i	-	≤ 5.2 nF
• Internal inductance L_i	-	Negligible

	Without Ex prot.	With Ex protection
Conditions of use		
Installation conditions	Vertical wall mounting, cables fed in from below	
Climatic class	Class 4K4 according to EN 60721-3-4	
Mounting location	-	Zone 1 or zone 2
Permissible ambient temperature	-20 ... +60 °C (-4 ... +140 °F)	-
• Temperature class T5 – T1		-20 ... +60 °C (-4 ... +140 °F)
• Temperature class T6		-20 ... +50 °C (-4 ... +122 °F)
Mechanical load	Class 4M3 according to EN 60721-3-4	
Type of protection to EN 60529	IP65	
Electromagnetic Compatibility		
• Emitted interference and noise immunity	To EN 61326 and NAMUR NE 21	
Usage limits for water		
• Delivery side	≥ 10 bar a	
• Number of strokes	min. 4 min^{-1}, max. 10 ... 500 min^{-1}	
Design		
Weight (without options)	Approx. 2.5 kg	
Dimensions (W x H x D) in mm (inch)	172 x 320 x 80 (6.8 x 12.6 x 3.2)	
Housing material	Macrolon (polycarbonate + 20% glass fiber)	Macrolon (Polycarbonate + 20% glass fibers), surface attenuated with CrNi layer and painted
Electrical connection via screw terminals	• Rigid 2.5 mm (0.984 inch) • Flexible 1.5 mm (0.59 inch) • Flexible with connector sleeves 1.5 mm (0.59 inch)	
Cable inlet via plastic cable joints	• 2 x Pg 13.5 • 5 x Pg 11	
Power supply		
Rated voltage	24 V DC	16 V DC
Operating range	19 ... 36 V DC	15 ...17 V DC
Current consumption	< 100 mA	< 40 mA
For connection with approved intrinsically safe circuits with:		
• Max. supply voltage U_i	-	≤ 17.4 V
• Max. short-circuit current I_i	-	≤ 191 mA
• Max. power P_i	-	≤ 1.35 W
• Internal capacitance C_i	-	≤ 33 nF
• Internal inductance L_i	-	≤ 28 µH
Certificate and approvals		
Explosion protection to EN 50014, EN 50020 and EN 50021		
Intrinsic safety "i"	-	TÜV (German Technical Inspectorate) 06 ATEX 2952
Marking	-	II 2(1) G EEx is [ia] IIC T6
Communication		
PROFIBUS DP	RS485, switchable terminating resistor	

	Without Ex prot.	With Ex protection
Protocol	Cyclic with Master C1 and acyclic with Master C2	
Power supply	-	Bus-powered
Bus voltage	-	9 ... 24 V
Current consumption	-	10.5 mA ±10%
Bus connection with FISCO supply unit, ia/ib group IIC or IIB	-	Yes
Layer 1 and 2 from PROFIBUS PA, transfer technology from IEC 1158-2		
• C2 connections	-	4 connections are supported in master class 2
• Device profile	-	PROFIBUS PA-profile V3.0 Rev. 1, Class B
• Device address	-	1 ... 126 (126 factory-set)
PC software parameters	SIMATIC PDM (not included in delivery)	

Sensor for SITRANS DA400	
Setup	• Piezoceramic sensor with preamplifier • Encapsulated electronics • 4-wire cable with anti-kink sleeve
Conditions of use	
Permissible Ambient Temperature	-40 ... +110 °C (-40 ... +230 °F)
Type of protection to EN 60529	IP66/IP68
Mechanical load	Class 4M7 according to DIN EN 60721-3-4
Climatic class	Class 4K4 according to DIN EN 60721-3-4
Design	
Housing material	Stainless steel 1.4571 (316Ti SST)
Cable	Ends with wire protectors and cable shoe for connection to the SITRANS DA400
Weight	125 g (0.276 lb)
Mounting location	Zone 0/1 or zone 20/21/22
Dimensions (W x H x D) in mm (inch)	26 x 29 x 40 (1.02 x 1.14 x 1.57)
Power supply	Powered fed from device
Certificate and approvals	
Explosion protection	
Intrinsic safety "i"	TÜV 2005 ATEX 2876 X
Marking	II 1 G EEx ia IIC T6/T5/T4 or II 1 D EEx ia D 20/21/22 T160
Permissible ambient temperature	
• Category 1G	
- Temperature class T4, T5	-20 ... +60 °C (-4 ... 140 °F)
- Temperature class T6	-20 ... +50 °C (-4 ... 122 °F)
• Category 2G	
- Temperature class T4	-40 ... +110 °C (-40 ... 230 °F)
- Temperature class T5	-40 ... +80 °C (-40 ... 176 °F)
- Temperature class T6	-20 ... +65 °C (-4 ... 149 °F)
• Category 1D or 2D	
- Temperature class T160	-40 ... +110 °C (-40 ... 230 °F)

Acoustic sensor for pump monitoring

SITRANS DA400

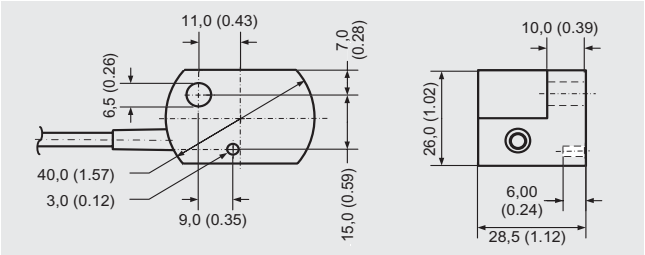
Ex barriers for sensors	
Application area	For the intrinsically safe supply of the acoustic sensors in Zone 1; the safety barriers must be installed between the SITRANS DA400 acoustic diagnostic unit and the sensor if only the sensors are being operated in the Ex-zone.
Input	A maximum of two sensors can be connected.
Conditions of use	
Type of protection to EN 60529	IP20
Permissible Ambient Temperature	-20 ... +60 °C (-4 ... +140 °F)
Design	
Weight	115 g (0.254 lb)
Housing material	Plastic, polyamide
Type of installation	Installation on mounting rail NS 32 or NS 35/7.5. The acoustic diagnostic unit SITRANS DA400 and the safety barrier must be operated outside the Ex-Zone.
Dimensions (W x H x D) in mm (inch)	68 x 77 x 42 (2.68 x 3.03 x 1.65)
Certificates and Approvals	
Explosion protection	
Intrinsic safety "i"	TÜV 05 ATEX 2917 X
Marking	II (2) G [EEx ib] IIC

Selection and Ordering data

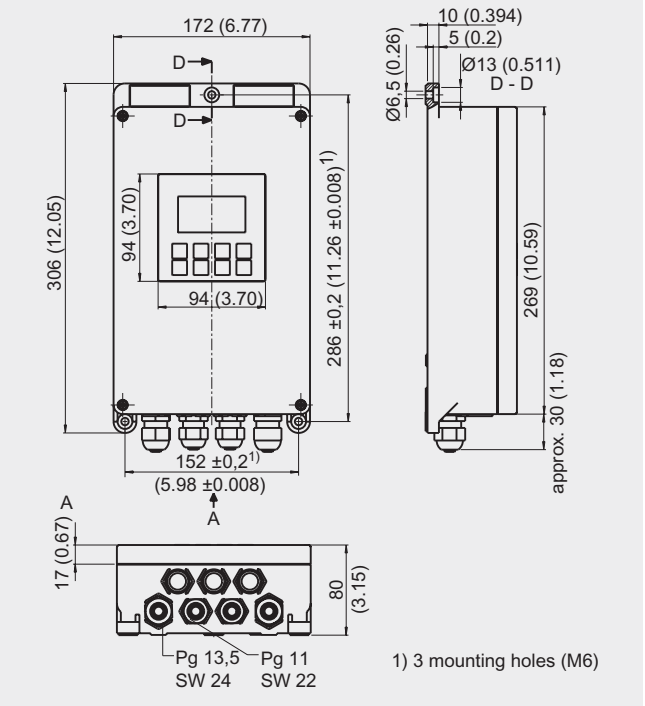
	Order-No.
Acoustic diagnostics unit SITRANS DA400 with local programming and display	**7MJ2400-** ■ ■ **A0** ■
Communication	
• PROFIBUS DP	**1A**
• PROFIBUS PA	**2B**
Explosion protection	
• without	**A**
• with EEx ia/ib to ATEX[1]	**B**
Application software	
for continuous condition monitoring of positive displacement pumps	**1**
for material flow monitoring in pipes, raceways and conveyors	**2**
Acoustic sensors for diagnostics unit SITRANS DA400	**7MJ2000-1** ■ **00**
Explosion protection	
• without	**A**
• with EEx ia to ATEX	**B**
Cable (incl. pin and allen screw M6)	
• 20 m	**B**
• 40 m	**C**
• 100 m	**F**
Safety barriers for sensors	**7MJ2010-1AA**
for rail mounting NS 32 and NS35/7.5 in non hazardous areas Explosion-protected output circuit EEx ib	

[1] Not in combination with trigger sensor.

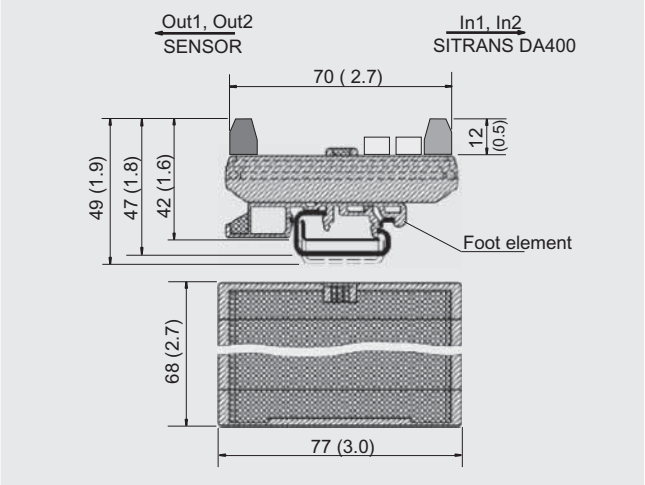
Dimensional drawings



Sensor for SITRANS DA400, dimensions in mm (inch)

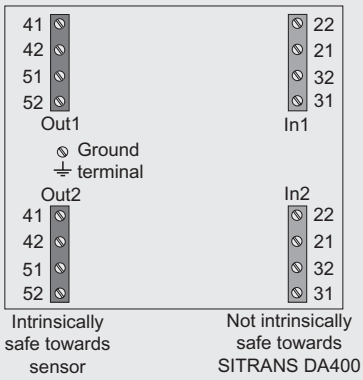


SITRANS DA400, dimensions in mm (inch)

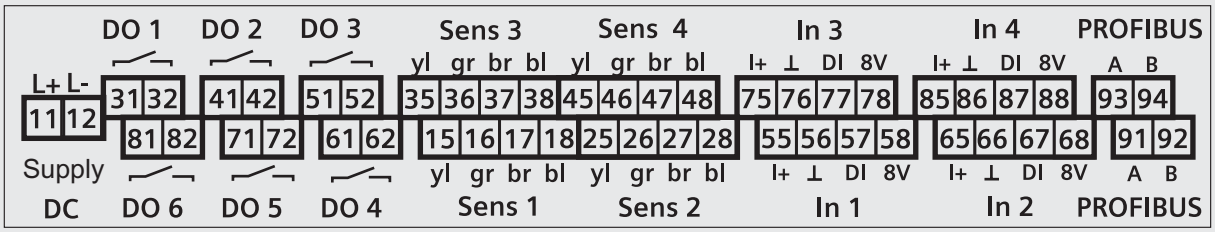


Safety barrier for SITRANS DA400, dimensions in mm (inch)

Schematics



Safety barrier for SITRANS DA400, terminal assignment



L+/L-	Power supply (Any polarity with PROFIBUS PA)	In	Input	⊥	Ground
DO	Digital output	yl	yellow	DI	Digital input
Sens	Sensor	gr	green	A	Signal A (green) with PROFIBUS DP, any with PROFIBUS PA
		br	brown		
		bl	black	B	Signal B (red) with PROFIBUS DP, any with PROFIBUS PA
		I+	Analog current input +		

SITRANS DA400, terminal assignment

8

Acoustic sensors for material flow monitoring

SITRANS AS100

Overview

SITRANS AS100 is an acoustic sensor used for solids flow detection.

Benefits

- Non-invasive
- Screw in, bolt on, weld, or bond in place
- Analog output
- High and low sensitivity range of operation

Application

SITRANS AS100 detects changes in high frequency sound waves from equipment and materials in motion. It detects and reacts instantly to changes in solids flow to warn of blockages, product absence, or equipment failure such as burst filter bags. This allows an operator to take early preventative action and avoid costly damage.

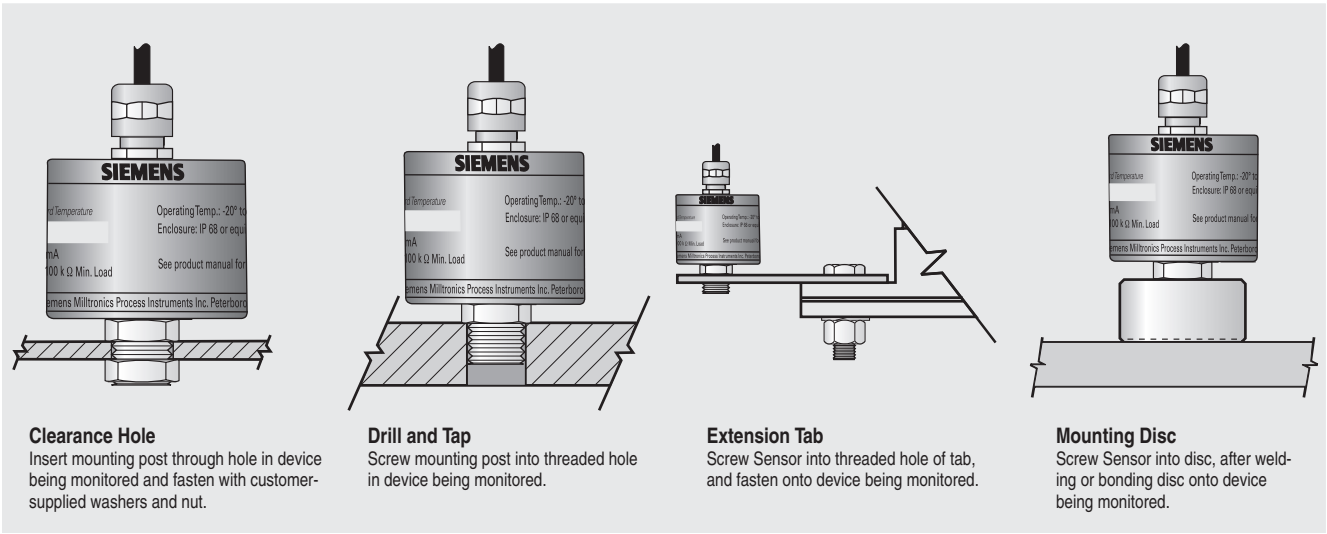
Common applications include pellets, powders and most bulk solids in pipes, chutes, vibratory feeders, pneumatic conveyors or aerated gravity flow systems.

Operating with a SITRANS CU02 control unit, the system detects conditions of high flow, low flow or no flow. It can be added to a control loop via a 4 to 20 mA output. Two relays are fully programmable and independent of each other and can be used to operate an alarm or control device.

With no moving parts and a type 304 or 303 stainless steel enclosure sealed against dust and moisture, this non-invasive unit requires little or no maintenance. With a dual operating range, the sensor offers an exceptionally wide range of application capabilities.

- Key applications: pipes, chutes, vibratory feeders, aerated gravity flow systems, burst filter bag detection

Design



Clearance Hole
Insert mounting post through hole in device being monitored and fasten with customer-supplied washers and nut.

Drill and Tap
Screw mounting post into threaded hole in device being monitored.

Extension Tab
Screw Sensor into threaded hole of tab, and fasten onto device being monitored.

Mounting Disc
Screw Sensor into disc, after welding or bonding disc onto device being monitored.

SITRANS AS100 mounting

Technical specifications

Mode of Operation	
Operating principle	Acoustic sensing of high frequency emissions caused by impact or friction
Typical application	• Detects burst filter bags in dust collection systems • Detects material being conveyed in pneumatic conveyor lines
Model	
Standard	Standard operating temperature range
Extended	Extended operating temperature range
Operation	
Relative sensitivity	0.5% / °C of reading, average over the operating range
Outputs	Analog, 0.08 to 10 V DC nominal, 100 kΩ minimum load impedance
Rated operating conditions	
Amb. temperature for enclosure	
• Standard	-20 to +80 °C (-4 to +176 °F)
• Extended	• -40 to +125 °C (-40 to +257 °F) (CE only) • -30 to +120 °C (-22 to +248 °F) option
Design	
Weight	0.4 kg (1 lb)
Enclosure	Enclosure: 304 (1.4301) stainless steel [303 stainless steel (1.4305) on Class II version]
Ingress protection	IP68 (waterproof)
Cable	
• Standard	4 m (13 ft) cable, PVC jacketed, 3 twisted pairs, 24 AWG (0.25 mm^2), shielded
• Extended	4 m (13 ft) cable, thermoplastic elastomer jacketed, 6 conductor, 24 AWG (0.25 mm^2) conductor, shielded
Power supply	20 to 30 V DC, 18 mA (typical)
Certificates and approvals	CE CSA/FM Class II, Div. 1, Group E, F and G (optional) ATEX II 3D (optional)

Selection and Ordering data

	Order No.
SITRANS AS100 Acoustic Sensor	**7MH7560-**
An acoustic sensor used for solids flow detection.	**0**
Sensor	
Standard temperature range (-20 to +80 °C)[1]	**1**
Extended temperature range (-40 to +125 °C)[2]	**3**
Extended temperature range (-30 to +120 °C)[3]	**4**
Cable Length	
4 meters (13.12 ft)	**A**
Sensor Mounting	
None	**A**
Mounting disk	**B**
Mounting tab	**C**
Approvals	
CE	**1**
CE, CSA/FM Class II Div.1, Group E, F and G (includes ½" NPT female adapter)	**3**
CE, CSA Class II, Div. 1, Group E, F and G (includes ½" NPT female adapter)	**4**
CE, FM/CSA Class II, Div. 1, Group E, F and G, ATEX II 3D (includes M20 female adapter)	**5**
Instruction manual	
English	**7ML1998-5DM02**
German	**7ML1998-5DM32**
French	**7ML1998-5DM12**
Spanish	**7ML1998-5DM21**
Note: The instruction manual should be ordered as a separate item on the order.	
This device is shipped with the Siemens Milltronics manual CD containing ATEX Quick Starts and instruction manuals.	
Spare Parts	
Mounting tab	**7MH7723-1AA**
Mounting disk	**7MH7723-1AB**
½" NPT adapter kit for standard temperature range sensor, not Class II approved	**7MH7723-1BW**
M20 adapter kit for standard temperature range sensor, not Class II or ATEX approved	**7MH7723-1BV**
½" NPT adapter kit for extended temperature range sensor, not Class II approved Note: Adapter kits are not CSA Class II approved	**7MH7723-1BX**

[1] Available with approval options 1, 3 and 5 only

[2] Available with approval option 1 only

[3] Available with approval option 4 only

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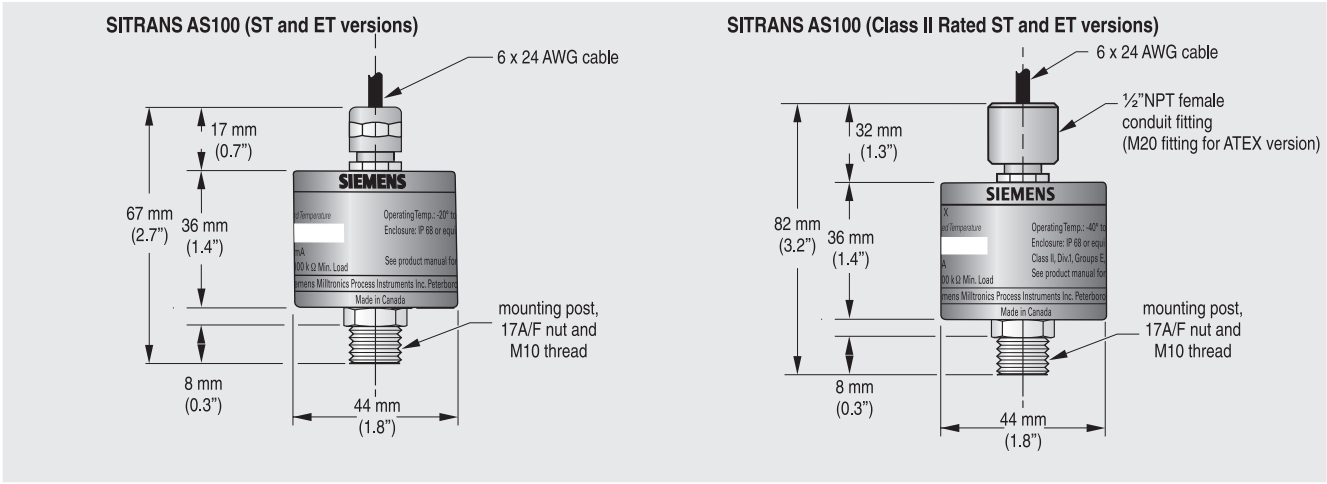
SITRANS AS100

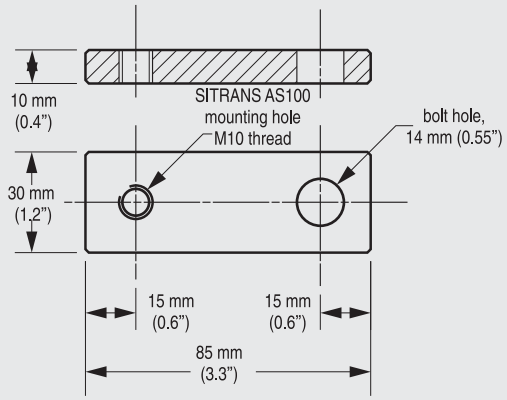
Dimensional drawings



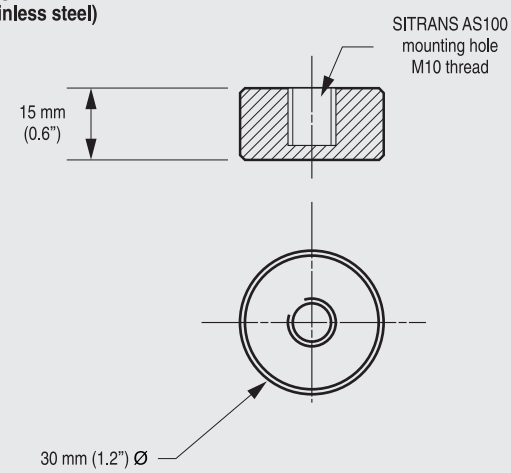
SITRANS AS100 dimensions

Accessories

Extension Tab - Bolt on (304 stainless steel)



Mounting Disc - Bonded or Welded (304 stainless steel)



SITRANS AS100 accessories

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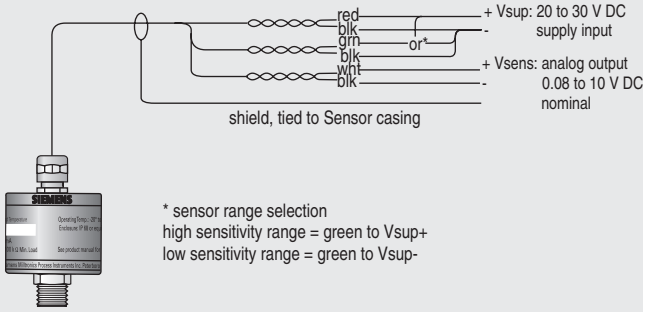
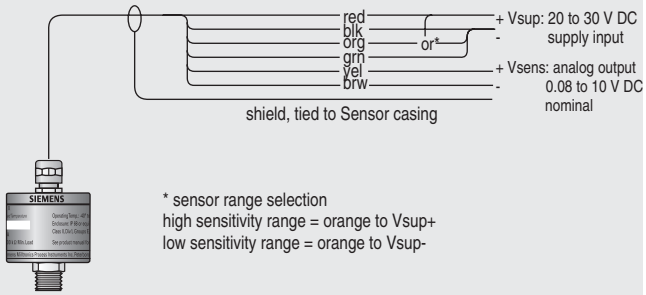
Schematics

Standard Temperature Range



* sensor range selection
high sensitivity range = green to Vsup+
low sensitivity range = green to Vsup-

Extended Temperature Range



* sensor range selection
high sensitivity range = orange to Vsup+
low sensitivity range = orange to Vsup-

Interconnection

The longer the cable, the more susceptible it is to noise and earth loops. It is therefore recommended to use cable with heavy gauge conductors and good RF/electrical shielding (copper braid rather than drain and foil). A proper junction box close to the sensor is an ideal location not only to extend the cable but also to configure the wiring for high or low sensitivity range operation.

The following table provides a guideline for suitable wire gauges where distances are considerable.

Max. distance between sensor and supply (24V or Control Unit).

AWG	wire size mm	wire size mm²	distance meters	distance feet
24	7 x 0.20	0.25	500	1600
22	7 x 0.25	0.35	800	2600
20	10 x 0.25	0.5	1200	3900

SITRANS AS100 connections

Acoustic sensors for material flow monitoring

SITRANS CU02

Overview

SITRANS CU02 is an alarm control unit, for use with SITRANS AS100 acoustic sensor, that provides reliable continuous protection for bulk solids flow.

Benefits

- 4 to 20 mA output
- Two programmable relays
- Adjustable independent time delay for each relay
- Adjustable start-up time delay
- DIN rail mounting provides easy installation
- Built-in password protection to parameters

Application

The SITRANS CU02 receives a 0 to 10 V DC input signal from the SITRANS AS100 sensor, providing relay and analog outputs for interface into a process.

- Key applications: with SITRANS AS100 for bulk solids flow

Function

The system can be readily configured for set points indicating such conditions as high flow, low flow or no flow. Alternatively, it can be added to a control loop via a 4 to 20 mA isolated output for trend monitoring proportional to the signal from the sensor.

Two relays are fully programmable and independent of each other and can be used to operate an alarm or control device. Alarming may be provided above or below a setpoint or within a band. Readings are also displayed locally by the SITRANS CU02 on its LCD.

The SITRANS CU02 may be mounted up to 500 m (1500 ft) from the sensor.

Technical specifications

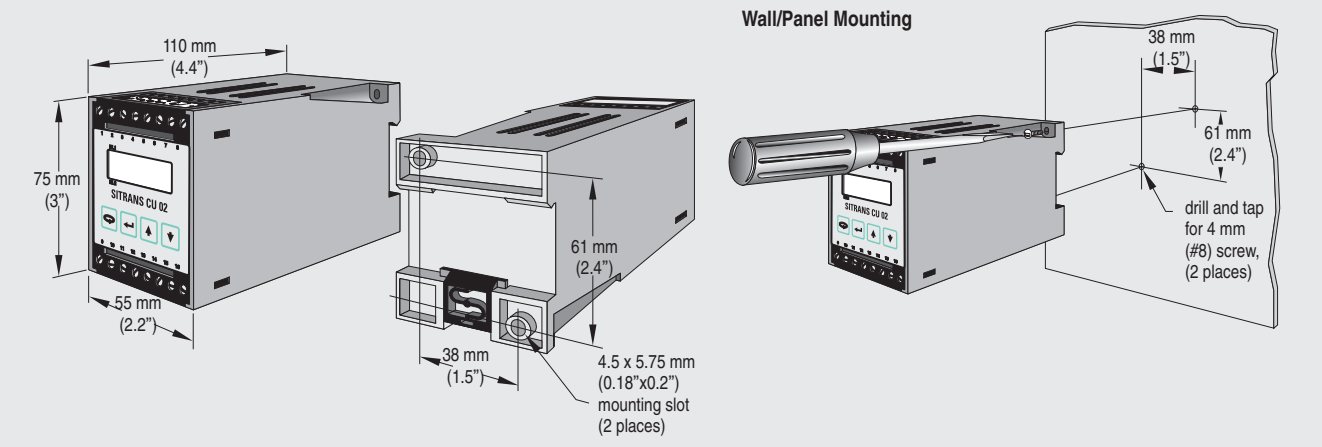
Mode of operation	
Measuring principle	Controller for acoustic sensing (SITRANS AS100)
Typical application	Connects to SITRANS AS100 to detect burst filter bag
Input	0 to 10 V DC, from sensor
Output	
Output signal	4 to 20 mA isolated output, 2 Form C relays - latching or non-latching – 5 amp at 250 V AC non-inductive
Sensor excitation	26 V DC
Max. load	750 Ω
Rated operating conditions	
Installation conditions	
• Location	Indoor
Ambient conditions	
• Ambient temperature for enclosure	-20 to +50 °C (-4 to +122 °F)
• Relative humidity	80% for temperatures up to +50 °C (+122 °F)
• Degree of protection	IP20
• Installation category	II
• Pollution degree	2
Design	
• Weight	550 g (18 oz)
• Dimensions (W x H x D)	55 mm x 75 mm x 110 mm (2.2" x 3" x 4.4")
• Material enclosure	Polycarbonate
• Mounting	DIN Rail (DIN 46277 or DIN EN50022), or wall mount, up to 500 m (1500 ft) from sensor
• Cable	2 twisted pair, 24 AWG (22 mm^2), shielded. Mount up to 500 m (1500 ft) from sensor
Display	Liquid crystal, three digits, 9 mm (0.35"), high and multisegment graphic symbols for operation status
Power supply	
• Supply voltage	100, 115, 200, 230 V AC ± 15%, 50/60 Hz, factory set
• Power consumption	Max. 10 VA
Approvals	$CSA_{NRTL/C}$, CE

Selection and Ordering data

		Order No.
SITRANS CU02 Control Unit	C)	**7MH7562-**
Alarm control unit for use with SITRANS AS100 acoustic sensor to provide reliable continuous protection for bulk solid flow		
Power Supply		
100 V AC		**1**
115 V AC		**2**
200 V AC		**3**
230 V AC		**4**
Enclosure		
Standard DIN Rail		**A**
Approvals		
CSA$_{NRTL/C}$, CE		**A**
Instruction manual		
English	C)	**7ML1998-5DN01**
French	C)	**7ML1998-5DN11**
German	C)	**7ML1998-5DN31**
Note: The instruction manual should be ordered as a separate item on the order.		
This device is shipped with the Siemens Milltronics manual CD containing ATEX Quick Starts and instruction manuals.		

C) Subject to export regulations AL: N, ECCN: EAR99

Dimensional drawings



SITRANS CU02 dimensions

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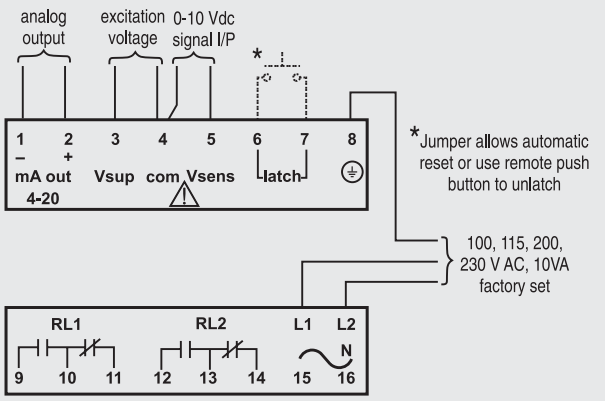
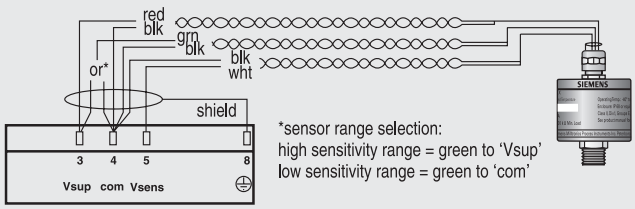
SITRANS CU02

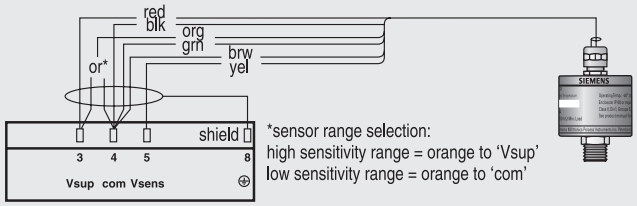
Schematics



Standard Temperature Version



Extended Temperature Version



Mounting

Installation shall only be performed by qualified personnel and in accordance with local governing regulations.
This product is susceptible to electrostatic shock. Follow proper grounding procedures.

Interconnection

All field wiring must have insulation suitable for at least 250 V.
Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
The maximum allowable working voltage between adjacent relay contacts shall be 250 V.
If sensor case is grounded, do not connect shield of cable to SITRANS CU02 ground terminal.

SITRANS CU02 connections

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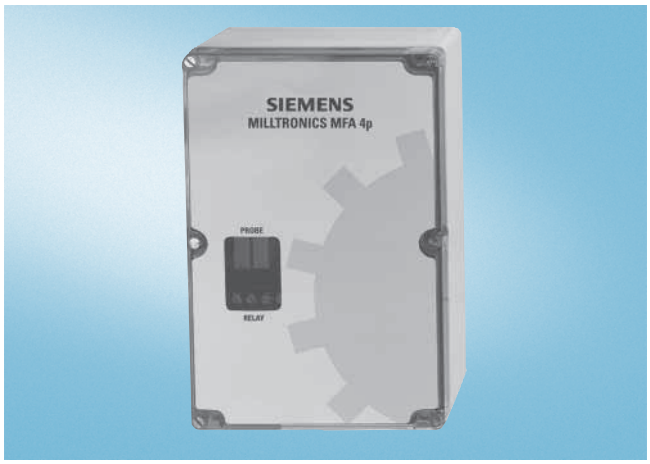
Overview



MFA 4p motion failure alarm controller is a highly sensitive single setpoint motion sensor system, used with Milltronics MSP and XPP probes.

Benefits

- Up to 100 mm (4") gap between target and probe
- Switch selectable overspeed or underspeed detection
- Setpoint adjustment 2 to 3000 PPM (pulses/minute)
- Adjustable start-up time delay
- Visual indication of probe operation and relay status
- General purpose, suitable for majority of industrial applications; rugged probe designs provide unmatched reliability

Application

The MFA 4p detects changes in the motion and speed of rotating, reciprocating or conveying equipment. It warns of equipment malfunction and signals through contacts to shut down machinery in case of a slowdown or failure. Its reliability makes it a cost-effective way to protect valuable process equipment.

The single setpoint system suits most industrial applications. This versatile unit can be used on tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps.

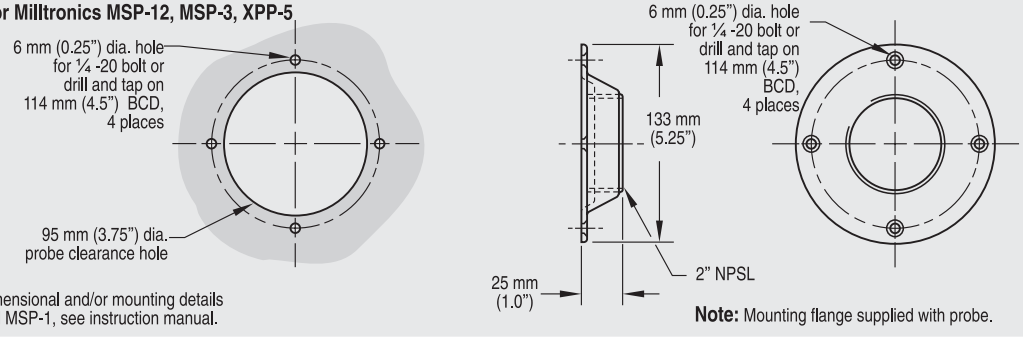
A special feature is the adjustable 0 to 60 second time delay, allowing the monitored device to accelerate to normal running speed before monitoring begins. A wide range of probes are available to suit specific needs, including high temperatures, corrosive, and Class I, II and III installations. The CE approval allows the MFA 4p to consistently meet the needs of the mining aggregate, cement and other primary and secondary industries.

- Key Applications: tail pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

Design

Mounting

Mounting for Milltronics MSP-12, MSP-3, XPP-5



Note: For dimensional and/or mounting details for MSP-9 and MSP-1, see instruction manual.

Note: Mounting flange supplied with probe.

MSP-12, MSP-3; XPP-5 mounting

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Milltronics MFA 4p

Probes

Standard Milltronics MSP-12
- Heavy-duty general purpose motion probe
- Long lasting phenolic body with internal pre-amp
- Convenient mounting flange and locknut for fast installation and setup
- Temperature rating: -40 to 60 °C (-40 to 140 °F)

High temperature Milltronics MSP-3
- Heavy-duty, high temperature aluminum probe designed to withstand operating temperatures to 260 °C (500 °F)
- Cast aluminum probe with convenient mounting flange and locknut
- 1.5 m (5 ft) of high temperature PTFE cable provided. Up to 30 m (100 ft) may be used.
- Pre-amp remote mounted in painted cast aluminum NEMA 4 enclosure 140 mm x 140 mm x 100 mm (5.5" x 5.5" x 4"), ½" NPT conduit entry
- Pre-amp temperature rating -40 to 60 °C (-40 to 140 °F)

Stainless high temperature Milltronics MSP-9
- Heavy-duty, high temperature 304 stainless steel probe
- Special construction allows operation of probe in environment up to 260°C (500°F)
- 1.5 m (5 ft) special high temperature PTFE cable provided. Up to 30 m (100 ft) may be used.
- Pre-amp remote mounted in enamel painted steel (optional stainless steel) enclosure 150 mm x 150 mm x 100 mm (6" x 6" x 4")

Miniature Milltronics MSP-1
- Miniature probe for installations with limited mounting space
- CPVC probe body complete with locknuts
- 1.8 m (6 ft) cable provided. Up to 30 m (100 ft) may be used.
- Pre-amp remote mounted in painted cast aluminum NEMA 4 enclosure 140 mm x 140 mm x 100 mm (5.5" x 5.5" x 4"), ½" NPT conduit entry
- Due to smaller size, probe sensitivity is reduced, gap max. 13 mm (0.5")
- Temperature rating: -40 to 80 °C (-40 to 180 °F)

Milltronics XPP-5
- CSA hazardous approval (Class I, Div. 1, Groups A, B, C & D; Class II, Div. 1, Groups E, F & G; Class III)
- Phenolic / aluminum body that is fully potted
- Convenient mounting flange and locknut
- 3/4" NPT male hub connection
- Operating temperature from -40 to 60 °C (-40 to 140 °F)

MFA 4p motion probes

Technical specifications

Mode of operation	
Measuring principle	Motion monitor and alarm
Typical application	Monitoring loss of motion in tail pulley, screw flights, bucket elevators
Features	• Switch selectable overspeed or underspeed detection • Setpoint adjustment: 2 to 3000 PPM • Adjustable start-up time delay: 0 to 60 seconds • Visual indication of probe operation and relay status
Output	2 relays working in unison, each providing 1 SPDT Form C relay contact, rated 8 A @ 250 V AC resistive
Performance	
Repeatability	± 1%
Dead band	± 0.25%
Dynamic Range	0 to 7200 PPM
Ambient Temperature Range	-20 to +50 °C (-5 to +122 °F)
Design	
Enclosure rating	Type 4X/NEMA 4X/IP65 (standard and optional stainless steel) Type 4/NEMA 4/IP65 (optional mild steel)
Enclosure dimensions	160 mm x 240 mm x 82 mm (6.3" x 9.5" x 3.2")
Enclosure material	Polycarbonate [optional: mild steel or stainless steel, 203 mm x 254 mm x102 mm (8" x 10" x 4")]
Power Supply	100/115/200/230 V AC switch selectable, 50/60 Hz, 15 VA ± 10% of rated voltage
Certificates and approvals	CE, $CSA_{US/C}$, FM

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Selection and Ordering data — Order No.

MFA 4P Motion Failure Alarm Controller — C) **7MH7144-**

A highly sensitive single setpoint motion sensor system, used with MSP and XPP probes.

Enclosure

NEMA 4X, polycarbonate enclosure	1
NEMA 4, painted mild steel enclosure	2
NEMA 4X, stainless steel enclosure	3

Input Voltage

100/115/200/230 V AC, 50/60 Hz, switch selectable	A

Speed detection version

Standard, underspeed (U/S) or overspeed (O/S), switch selectable	A
Slow speed (S/S), U/S or O/S detection, switch selectable	B

Approvals

CE, CSA$_{US/C}$, FM	2

Instruction manual

English	C)	**7ML1998-5FM01**
French	C)	**7ML1998-5FM11**
Spanish	C)	**7ML1998-5FM21**
German	C)	**7ML1998-5FM31**

Note: The instruction manual should be ordered as a separate item on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.

Spare parts

Relay		**7MH7723-1DW**
Transformer		**7MH7723-1DX**
Circuit Card, standard	C)	**7MH7723-1DU**
Circuit Card, Slow speed	C)	**7MH7723-1DV**

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data — Order No.

Milltronics RMA Remote Mounted Amplifier — C) **7MH7145-**

Remote mounted amplifier for Milltronics MSP-1, MSP-3 and MSP-9 motion sensing probes. — 0

Enclosure

Aluminum enclosure, 1/2" NPT entry	A
Painted steel, NEMA 4 rating	C
Stainless steel enclosure, NEMA 4X rating	D

Instruction manual

English	C)	**7ML1998-5FM01**
French	C)	**7ML1998-5FM11**
Spanish	C)	**7ML1998-5FM21**
German	C)	**7ML1998-5FM31**

Note: The instruction manual should be ordered as a separate item on the order.

Spare parts

Card, RMA	C)	**7MH7723-1DT**

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data — Order No.

Milltronics Motion Sensing Probes — C) **7MH7146-**

A series of motion sensing probes used with the MFA 4p. — 0

Milltronics MSP-1: miniature motion sensing probe
Milltronics MSP-3: heavy-duty, high temperature aluminum
Milltronics MSP-9: heavy-duty, high temperature stainless steel
Milltronics MSP-12: heavy-duty, general purpose
Milltronics XPP-5: hazardous rate

Note: Milltronics MSP-1, MSP-3 and MSP-9 probes require the use of Milltronics RMA (amplifier)

Model

MSP-1 with 1.8 m (6 ft) of cable	A
MSP-3, 1/2" NPT cable inlet with 1.5 m (5 ft) high temperature cable	B
MSP-9 with 1.5 m (5 ft) high temperature cable	D
MSP-12, 1/2" NPT cable inlet	E
XPP-5, with 1.5 m (5 ft) cable, (CSA Class I, Group A, B, C and D; Class II Group E, F and G)	G
XPP-5, with 10 m (32.8 ft) cable, (CSA Class I, Group A, B, C and D; Class II Group E, F and G)	H
XPP-5, with 15 m (49.2 ft) cable, (CSA Class I, Group A, B, C and D; Class II Group E, F and G)	J

Approvals

CE	A

Instruction manual

English	C)	**7ML1998-5FM01**
French	C)	**7ML1998-5FM11**
Spanish	C)	**7ML1998-5FM21**
German	C)	**7ML1998-5FM31**

Note: The instruction manual should be ordered as a separate item on the order.

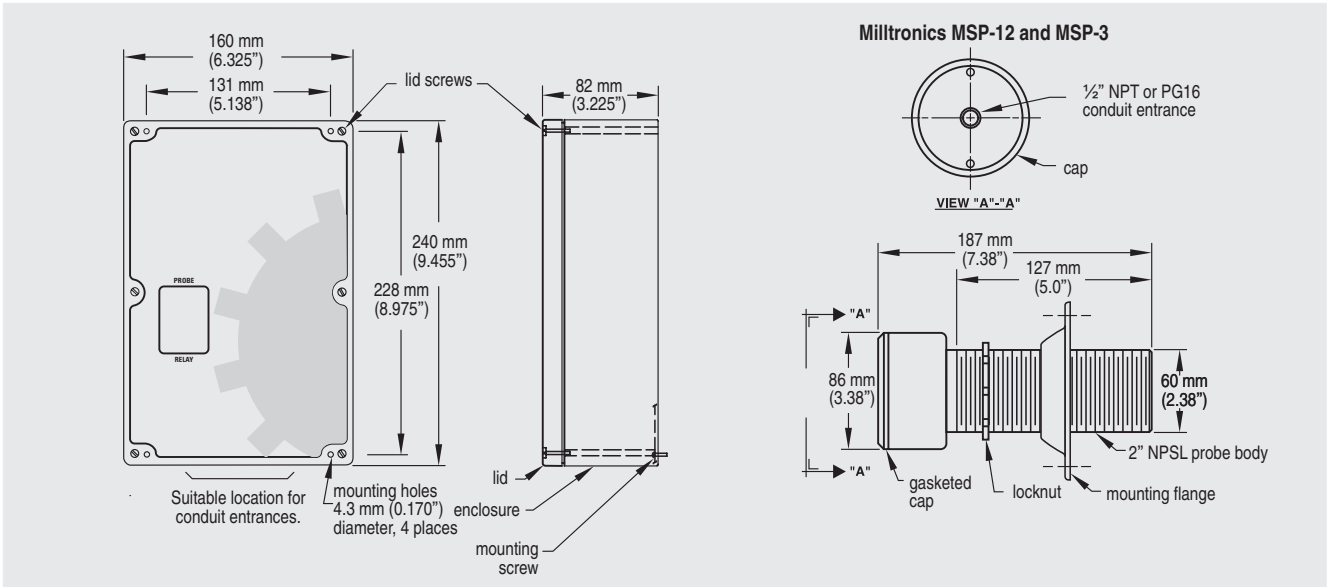
Spare parts

Locknut, for MSP-1		**7MH7723-1CQ**
Locknut, for MSP-3, MSP-4, MSP-12, XPP-5	C)	**7MH7723-1CR**
Mounting flange, for MSP-3, MSP-4, MSP-12, XPP-5		**7MH7723-1CS**
Mounting bracket for MSP-9		**7MH7723-1CT**
Lid, 1/2" NPT cable inlet, for MSP-3, MSP-12		**7MH7723-1CU**
Lid for MSP-9		**7MH7723-1CV**
Lid gasket, for MSP-3, MSP-9		**7MH7723-1CW**
Lid gasket, for MSP-12		**7MH7723-1CX**

C) Subject to export regulations AL: N, ECCN: EAR99

Milltronics MFA 4p

Dimensional drawings



MFA 4p dimensions

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Overview

Milltronics Millpulse 600 is a heavy-duty 2-wire motion sensor that provides solid state switch output to PLCs between 18 to 135 V AC or DC.

Benefits

- Up to 100 mm (4") gap between Millpulse and targets
- Two-wire unit
- PLC compatible
- Rugged, low maintenance suitable for tough environments

Application

Millpulse supplies cost effective equipment protection even in the harshest conditions.

This rugged unit is impervious to dust, dirt, build-up and moisture, and is ideal for such primary industries as mining, aggregate and cement plants. Operating where other systems are prone to failure, the non-contacting design eliminates the need for lubricating, cleaning and part replacement. It will reduce downtime and clean-up expenses associated with conveying equipment failure. Its pulse output can be used to minimize spillage, prevent damage, detect fire caused by belt slippage at the head pulley and warn of other conveyor malfunction.

The Millpulse 600 offers underspeed, overspeed, differential speed and speed indication functions by a PLC. With an all aluminum body, it operates from -40 to +60 °C (-40 to +140 °F).

- Key Applications: tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

Design

Mounting

The Millpulse 600 should be mounted in an area classified as non-hazardous, that is suitable to the enclosure rating and materials and is within the temperature range specified. The cap should be accessible to allow for wiring and viewing of the status display LED.
When mounting the Millpulse onto a vibration-free structure, use the supplied mounting flange to ensure that there is no danger of the target damaging the unit.

Where possible, mount the probe so the cable inlet is pointing downward to avoid accumulation of condensation in the casing. Where wiring must be run in conduit, use a flexible conduit for easier removal or adjustment of the probe. Keep the Millpulse away from high voltage or current runs, contractors and the SCR drives.

Do not connect the Millpulse 600 directly to supply.

Milltronics Millpulse 600

Technical specifications

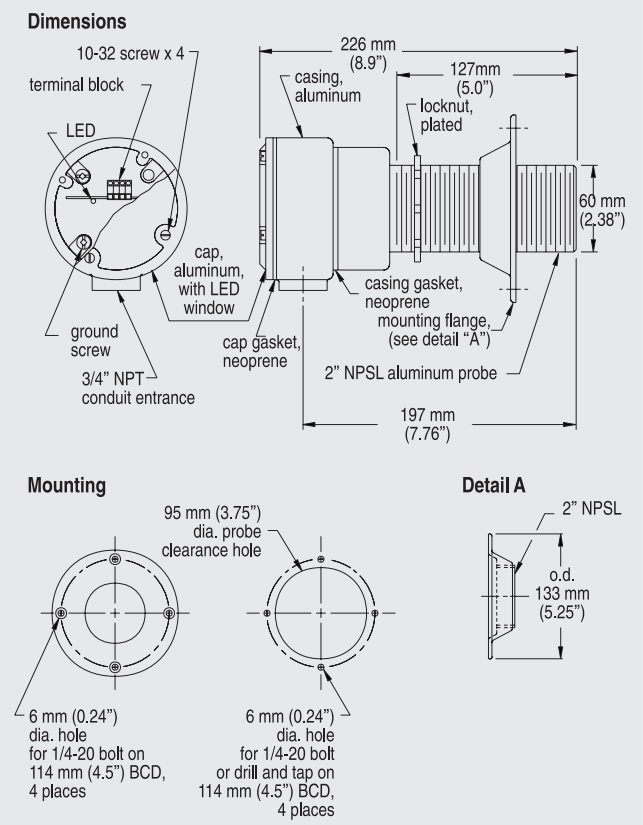
Mode of operation	
Measuring principle	Disruption of magnetic field by ferrous target
Typical application	Provides pulse output to PLC when monitoring screw conveyor flight
Rated operating conditions	
Operating temperature	-40 to +60 °C (-40 to +140 °F)
Design	
Probe body	Aluminum
Process mounting	2" NPSL
Connection box	Aluminum, ¾" NPT conduit entrance, 4 screw terminals for max. 12 AWG (3.30 mm^2) wire size
Gasketing	Neoprene
Display	Red LED for switch status
Enclosure rating	Type NEMA 4X, 6, IP67
Shipping weight	2 kg (4.4 lbs)
Power supply	
Switching capability	Voltage • 18 to 48 V AC/DC • 60 to 135 V AC/DC Current • 5 to 400 mA continuous, 2 A surge for 20 ms at 1 operation per second
Voltage drop	8 V
Residual current	1.5 mA
Switch duration	On: 50 ms minimum Off: 50 ms minimum
Operating limit	600 pulses per minute maximum
Certificates and approvals	$CSA_{US/C}$, CE

Selection and Ordering data

		Order No.
Milltronics Millpulse 600		
Heavy-duty 2-wire motion sensor that provides solid state switch output to PLCs between 18 to 135 V AC or DC.		
Model		
Millpulse 600, aluminum enclosure, ¾ NPT, CE, $CSA_{US/C}$ approved (switches 18 to 135 V AC/DC)	C)	**7MH7142-0AA10**
Instruction manual		
Millpulse 600, English	C)	**7ML1998-5DG02**
Millpulse 600, Spanish	C)	**7ML1998-5DG22**
Note: The instruction manual should be ordered as a separate item on the order.		
This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.		
Spare Parts		
Locknut	C)	**7MH7723-1CR**
Mounting flange		**7MH7723-1CS**

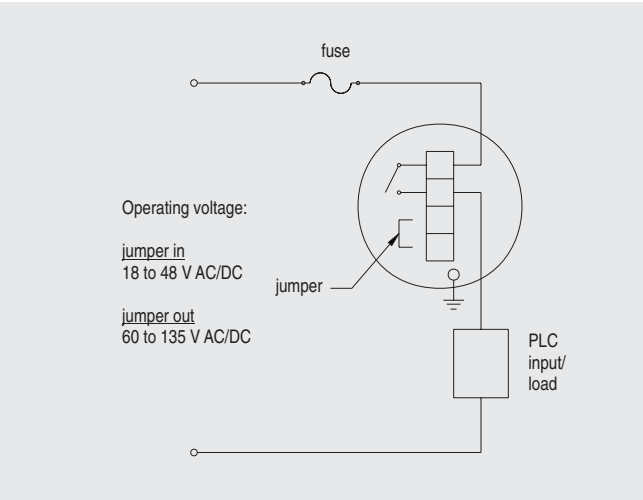
C) Subject to export regulations AL: N, ECCN: EAR99

Dimensional drawings



Millpulse 600 dimensions and mounting

Schematics



Millpulse 600 connections

Interconnection

If the manufacturer of your PLC does not state that it is compatible with CENELEC 50040/36/37/38 electrical standards, then ensure that the switching current of the PLC input is above the residual current of the MillPulse. If your PLC does not meet the requirements, a resistor across the PLC inputs can be used to increase the switching current.

Milltronics ZSS

Overview

Milltronics ZSS is a heavy-duty zero-speed alarm switch. This non-contacting unit provides cost-effective equipment protection even in the harshest conditions.

Benefits

- Up to 38 mm (1.5”) gap between ZSS and targets
- Rugged, low maintenance suitable for tough environments
- 1 SPDT Form C relay contact
- Provides cost-effective protection

Application

This rugged unit is impervious to dust, dirt, build-up and moisture and is ideal for such primary industries as mining, aggregate, and cement plants. Operating where other systems are prone to failure, the non-contacting design eliminates the need for lubricating, cleaning and part replacement. Downtime and clean-up expenses associated with conveying equipment failure are reduced by the ZSS. It alarms to minimize spillage, prevent extensive damage or even fire caused by belt slippage at the head pulley and warn against conveyor malfunction.

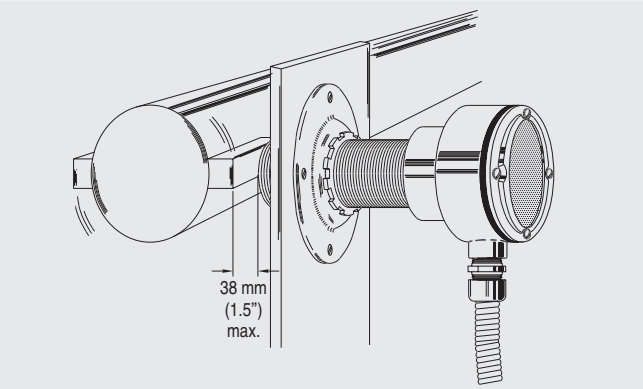
The ZSS has built-in selectable start delays and 1 Form C relay contact. With a phenolic body, it operates from -40 to +60 °C (-40 to +140 °F).

- Key Applications: tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights

Design

Mounting

The ZSS probe should be mounted, using the supplied mounting flange, onto a vibration-free structure. The gap between the probe and the target should be sufficient such that there is no danger of the target damaging the probe. The maximum allowable gap is 38 mm (1.5”) from the face of the target to the face of the probe for target dimensions of 25 x 25 x 50 mm (1“ x 1“ x 1”). The Zero Speed Switch is sensitive to lateral disturbances to its magnetic field. If the Zero Speed Switch is responding to motion from an interfering target, move the Zero Speed Switch or install a ferrous plate (steel) as a shield between the Zero Speed Switch and the interfering target. Where possible, the probe should be mounted such that the cable inlet is pointing downward to avoid accumulation of condensation in the casing. Connection of the probe should be made via flexible conduit for easier removal or adjustment of the probe.



Zero Speed Switch mounting

Technical specifications

Mode of operation	
Measuring principle	Disruption of magnetic field by ferrous target
Typical application	Monitors absence or presence of motion in harsh conditions
Output	
Contact	1 SPDT Form C dry relay contact, rated 5 A at 250 V AC, fail-safe operation
Time delay	Start up : 3 seconds ± 1 fixed
Zero Speed (selected via a common jumper)	• 5 seconds ± 1 (minimum speed 10 to 15 ppm) or • 10 seconds ± 2 (minimum speed 5 to 7.5 ppm)
Rated operating conditions	
Operating temperature	-40 to +60 °C (-40 to +140 °F)
Design	
Probe body	Phenolic and aluminum
Process mounting	2” NPSL
Connection box	Aluminum, ¾” NPT conduit entrance, 4 screw terminals for max. 12 AWG (3.30 mm^2) wire size
Gasketing	Neoprene
Enclosure rating	Type NEMA 4 style/IP65
Dynamic range	Minimum 6 or 12 pulses per minute Maximum 2400 pulses per minute
Shipping weight	2 kg (4.4 lbs)
Power supply	• 115 V AC/50 to 60 Hz, 10 VA • 230 V AC/50 to 60 Hz, 10 VA • ± 10% of rated voltage
Certificates and approvals	CSA General Purpose Not CE compliant

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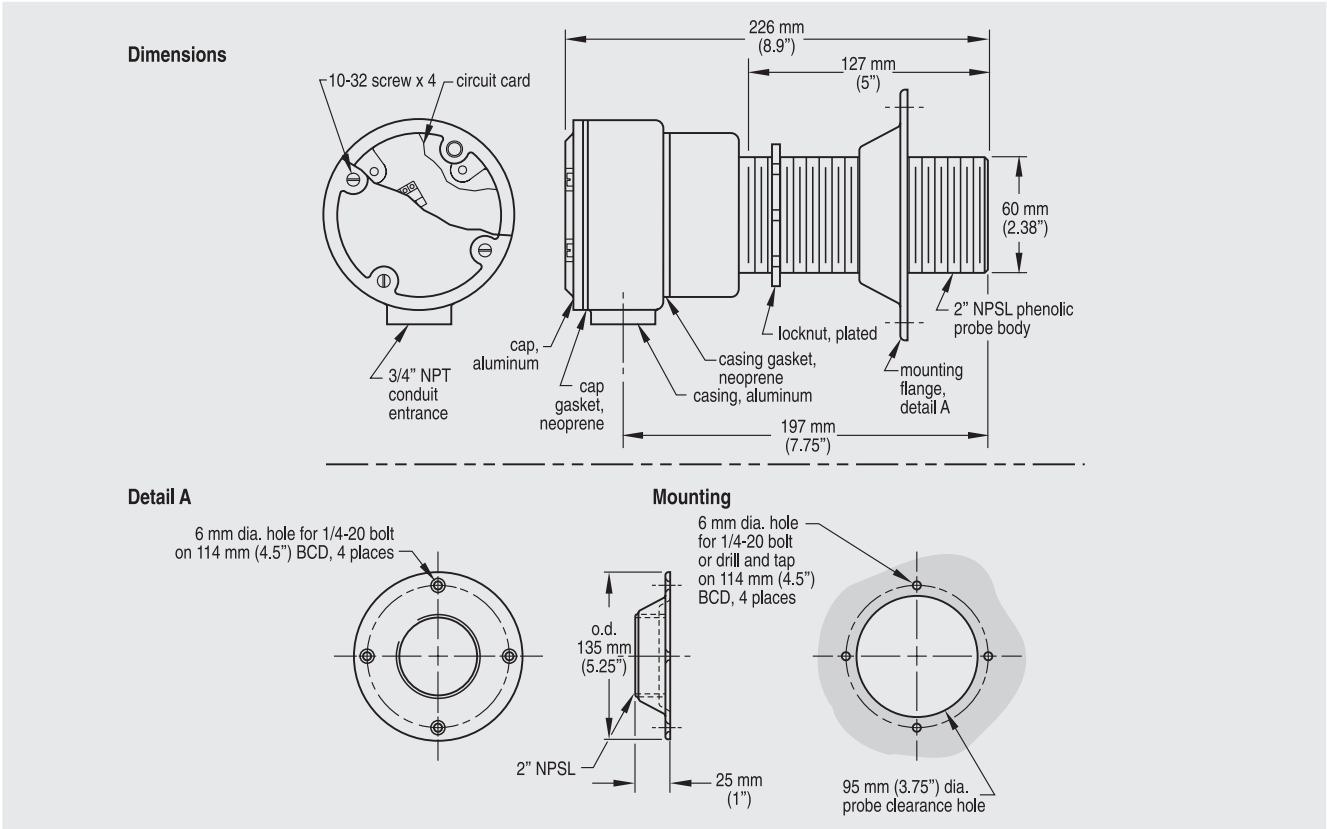
Milltronics ZSS

Selection and Ordering data		Order No.
Milltronics ZSS motion sensing switch		
A heavy-duty zero-speed alarm switch that does not require a controller. Note: This device is not CE approved		
Model		
Zero Speed Switch (ZSS), 115 V AC	C)	**PBD-92712000**
Zero Speed Switch (ZSS), 230 V AC	C)	**PBD-92722000**
Instruction manual		
Zero Speed Switch (ZSS), English	C)	**7ML1998-5DF01**
Zero Speed Switch (ZSS), German Note: The instruction manual should be ordered as a separate item on the order.	C)	**7ML1998-5DF31**
This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.		
Spare Parts		
Locknut	C)	**7MH7723-1CR**
Mounting flange		**7MH7723-1CS**

C) Subject to export regulations AL: N, ECCN: EAR99

Dimensional drawings



Zero Speed Switch dimensions and mounting

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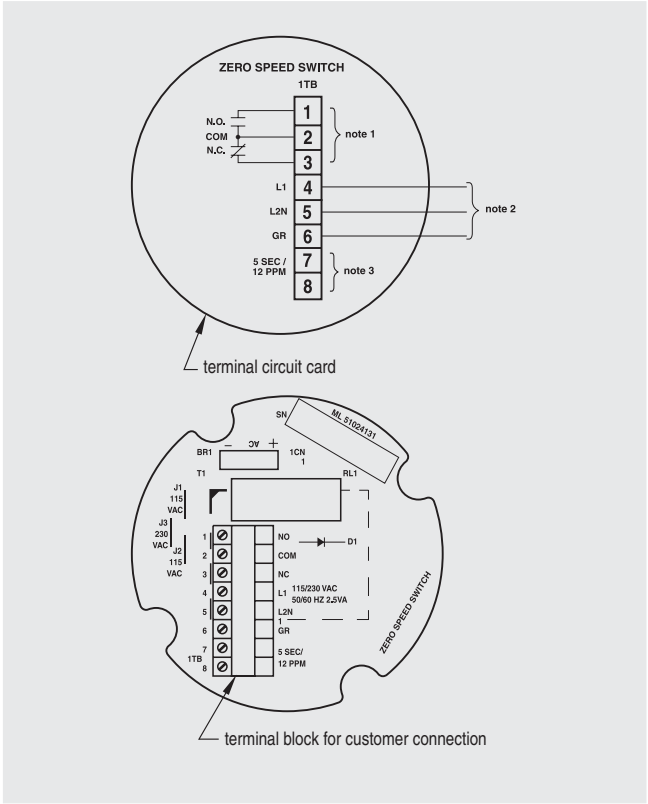
Schematics



Zero Speed Switch wiring

1. Dry contacts shown in de-energized (alarm or shelf) state.
2. ZSS is manufactured for 115 or 230 V AC operation. Correct voltage must be supplied. Voltage lower than the specified will result in an inoperative condition. Voltages higher than the specified will severely change the unit.
3. For 5 second contact closure delay on zero speed and 12 PPM range, connect jumper across 1 TB-7/8. No jumper connection will provide 3 second delay and 6 PPM range.
4. For 115 V AC operation: jumpers J1 and J2 only are installed. For 230 V AC operation: jumper J3 only is installed.