

Process Protection



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Process Protection

Product overview

Overview

	Application	Device description	Page
Acoustic sensor for pump monitoring	 <p>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.</p>	SITRANS DA400 <ul style="list-style-type: none"> • 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 	6/5
Acoustic sensors for material flow monitoring	 <p>Acoustic sensor for solids flow detection.</p>	SITRANS AS100 <ul style="list-style-type: none"> • Non-invasive • Screw in, bolt on, weld, or bond in place • Analog output • High and low sensitivity range of operation 	6/10
	 <p>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.</p>	SITRANS CU02 <ul style="list-style-type: none"> • 3 digit LCD display • 4 ... 20 mA output • Two programmable relays • Adjustable independent time delay for each relay • DIN rail mounting provides easy installation 	6/14
Motion sensors	 <p>Highly sensitive single set point motion sensor alarm unit, used with MSP probes.</p>	Milltronics MFA 4p <ul style="list-style-type: none"> • Probe/target separation up to 100 mm (4 inch) • Minimum velocity of moving ferrous target: 1 cm/sec. (2 fpm) 	6/17
	 <p>Heavy duty 3-wire motion sensor that provides an NPN open collector output to PLCs.</p>	Milltronics MSP-7 <ul style="list-style-type: none"> • Up to 100 mm (4 inch) gap between target and probe • Corrosion resistant construction 	6/23
	 <p>Heavy-duty zero speed alarm switch.</p>	SITRANS WM100 <ul style="list-style-type: none"> • Detects the absence or presence of motion of rotating or reciprocating or conveying equipment 	6/25

Supplied product documentation on DVD and safety instructions



The scope of delivery of the Siemens products for process instrumentation includes a multilingual instruction sheet with **safety instructions** as well as a uniform **mini DVD – Process Instrumentation and Weighing Systems**.

This DVD contains the most important manuals and certificates for the Siemens process instrumentation and weighing technology portfolio. The delivery may also contain product-specific or order-specific printed materials.

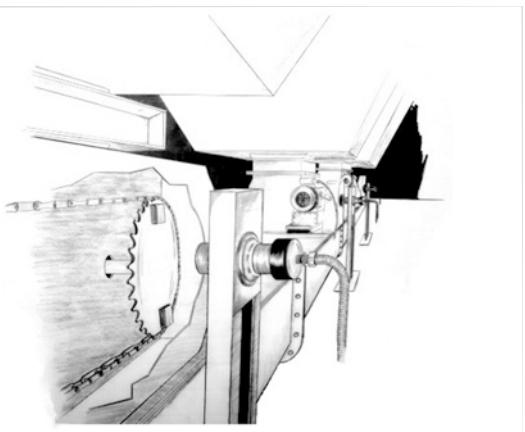
For additional information, refer to the Annex on page 10/3.

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. Most of the MFA 4p motion sensing probes, as well as the SITRANS WM100, can be mounted up to 100 mm (4 inch) 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 SITRANS AS100 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.

Process Protection

Acoustic and Motion sensing

Acoustic and Motion Sensing

Technical specifications

Process Protection Selection Guide

Criteria	SITRANS DA400	SITRANS AS100	Milltronics MFA 4p	Milltronics MSP-7	SITRANS WM100
Typical industries	Mining, water/wastewater, chemicals/petrochemicals and oil & gas industry	Aggregates, grain, cement, food processing, power generation, steel processing	Aggregates, cement, mining, wastewater, grain	General industrial applications	Aggregates, cement, mining
Typical Applications	Oscillating displacement pumps such as diaphragm piston pumps, piston pumps and hose-type diaphragm piston pumps. Monitoring of flowing materials in pipes, conveyors or channels.	Pipes, pneumatic conveyors, aerated gravity flow systems, burst filter bag detection	Tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators	Tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps	Tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators
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	Type 4X/NEMA 4X/IP67 aluminum
Sensor mounting	Screw to outside of pump housing. For material flow monitoring 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 probe secured with supplied flange	Non-contacting, secured with supplied flange
Operating temperature	Electronics: -20 ... +60 °C (-4 ... +140 °F) Sensor: -20 ... +110 °C (-4 ... +230 °F)	-20 ... +80 °C (-4 ... +176 °F) ¹⁾	-20 ... +50 °C (-4 ... +122 °F) ²⁾	-40 ... +60 °C (-40 ... +140 °F)	-40 ... +60 °C (-40 ... +140 °F)
Power requirements	19 V ... 36 V DC, < 100 mA	20 ... 30 V DC, 18 mA	100/115/200/230 V AC ± 10 % 50/60Hz, 15 VA	21 ... 28 V DC, 40 mA max.	115 or 230 V AC ± 10 % 50/60 Hz, 7 VA
Approvals	CE, PROFIBUS DP, and PROFIBUS PA conform, Ex protection to ATEX 1G or 1D	CE, RCM, CSA/FM Class II, Div. 1, Group E, F, G optional, ATEX II, 2GD, 3D optional, EAC	CSA _{US/C} , CE, RCM	CE, RCM	CSA _{US/C} , CE, RCM

¹⁾ Extended temperature model -40 ... +125 °C (-40 ... +257 °F) available (CE version)

²⁾ Probes available for -40 ... +260 °C (-40 ... +500 °F)

Overview

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

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

It comprises 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 locating 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 an 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. against 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 safety 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 control systems:

- Via digital outputs
- Digitally, via PROFIBUS DP or PROFIBUS PA

Simple to operate and parameterize:

- 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.

Process Protection

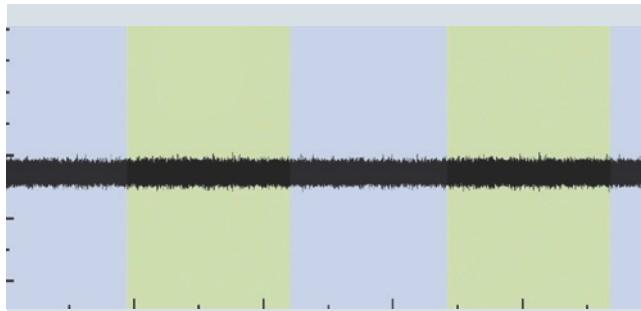
Acoustic sensors for pump monitoring

SITRANS DA400 acoustic diagnostic unit

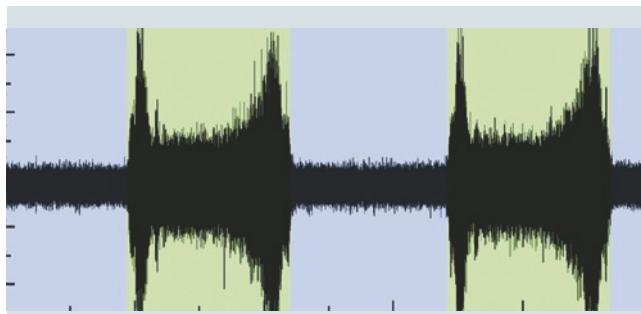
These oscillations are created by:

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

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 ($> 20 \text{ kHz}$). The sensor is non-directional, i.e. the angle at which the sound wave impacts 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 SITRANS DA400 diagnostic unit.

Technical specifications

SITRANS DA400	Without Ex protection	With Ex protection
Input		
Acoustic channels	4	
• Cycle time	10 ms	
Only for connection to intrinsically safe sensors with:		
• Max. voltage U_o	-	$\leq 5.5 \text{ V}$
• Max. current I_o	-	$\leq 70 \text{ mA}$
• Max. power P_o	-	$\leq 100 \text{ mW}$
• Internal capacitance C_i	-	$\leq 1.2 \mu\text{F}$
• 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	$< 12 \Omega$
• Resolution		0.1 %
• Accuracy		0.5 %
• Fault signal		$> 21 \text{ mA}$ or $< 3.6 \text{ mA}$ (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	-	$\leq 30 \text{ V}$
• Max. short-circuit current I_i	-	$\leq 100 \text{ mA}$
• Max. power P_{oi}	-	$\leq 1 \text{ W}$
• Internal capacitance C_i	-	$\leq 11 \text{ nF}$
• Internal inductance L_i	-	$\leq 70 \mu\text{H}$
Universal input 24 V digital signal		
• Input resistance		$> 19 \text{ k}\Omega$
• Signal level Low		$< 4.5 \text{ V}$ or open
• Signal level High		$> 7 \text{ V}$
• Hysteresis		$> 1 \text{ V}$
• Static destruction limit	$\pm 40 \text{ V}$	-
For connection with approved intrinsically safe circuits with:		
• Max. supply voltage U_i	-	$\leq 30 \text{ V}$
• Max. short-circuit current I_i	-	$\leq 100 \text{ mA}$
• Max. power P_{oi}	-	$\leq 1 \text{ W}$
• Internal capacitance C_i	-	$\leq 11 \text{ nF}$
• Internal inductance L_i	-	$\leq 70 \mu\text{H}$
Universal input closing contact		
• For connection to closing contact with the maximum values:		
- Max. voltage U_o	-	$\leq 10 \text{ V}$
- Max. current I_o	-	$\leq 1 \text{ mA}$
- Max. power P_o	-	$\leq 5 \text{ mW}$
- Internal capacitance C_i	-	$\leq 11 \text{ nF}$
- Internal inductance L_i	-	$\leq 70 \mu\text{H}$
8.2 V source for NAMUR signal (DIN EN 60947-5-6)		
• Open circuit voltage	8.2 V $\pm 0.3 \text{ V}$, short-circuit proof	-
• Input resistance	$< 950 \Omega$	-
• Static destruction limit for incorrect wiring	+20 V/-10 V	-

Process Protection

Acoustic sensors for pump monitoring

SITRANS DA400 acoustic diagnostic unit

SITRANS DA400	Without Ex protection	With Ex protection	SITRANS DA400	Without Ex protection	With Ex protection
Output					
Digital outputs	6	6 (applicable for NAMUR switch hardener)	Power supply		
• Semiconductor relay	Individually isolated, short circuit-proof	-	Rated voltage	24 V DC	16 V DC
• Switching voltage	24 V AC/36 V DC, any polarity	-	Operating range	19 ... 36 V DC	15 ... 17 V DC
• Destruction limit	35 V AC, 50 V DC	-	Current consumption	< 100 mA	< 40 mA
• Max. switching current	100 mA	-	For connection with approved intrinsically safe circuits with:		
• Signal status Low (no response)	-	≤ 1.2 mA (source to DIN 19234)	• Max. supply voltage U_i	-	≤ 17.4 V
• Signal status High (response)	-	≥ 2.1 mA (source to DIN 19234)	• Max. short-circuit current I_i	-	≤ 191 mA
For connection with an intrinsically safe switching amplifier to DIN 19234 with:			• Max. power P_{oi}	-	≤ 1.35 W
• Max. supply voltage U_i	-	≤ 15.5 V	• Internal capacitance C_i	-	≤ 33 nF
• Max. short-circuit current I_i	-	≤ 25 mA	• Internal inductance L_i	-	≤ 28 μ H
• Max. power P_{oi}	-	≤ 64 mW			
• Internal capacitance C_i	-	≤ 5.2 nF			
• Internal inductance L_i	-	Negligible			
Conditions of use					
Installation conditions	Vertical wall mounting, cables fed in from below		Certificates and approvals		
Climatic class	Class 4K4 according to EN 60721-3-4		Explosion protection to EN 50014, EN 50020 and EN 50021		
Mounting location	-	Zone 1 or zone 2	Intrinsic safety "i"	-	TÜV (German Technical Inspectorate) 06 ATEX 2952
Permissible ambient temperature	-20 ... +60 °C (-4 ... +140 °F)	-	Marking	-	II 2(1) G EEx is [ia] IIC T6
• 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				
Degree of protection to EN 60529	IP65				
Electromagnetic Compatibility					
• Emitted interference and interference 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		Communication		
Dimensions (W x H x D) in mm (inch)	172 x 320 x 80 (6.8 x 12.6 x 3.2)		PROFIBUS DP	RS 485, switchable terminating resistor	
Enclosure material	Macrolon (polycarbonate + 20 % glass fiber)	Makrolon (Polycarbonate + 20 % glass fibers), surface attenuated with CrNi layer and painted	Protocol	Cyclic with Master C1 and acyclic with Master C2	
Electrical connection via screw terminals	<ul style="list-style-type: none"> • Rigid 2.5 mm (0.984 inch) • Flexible 1.5 mm (0.59 inch) • Flexible with connector sleeves 1.5 mm (0.59 inch) 		Power supply	-	Bus-supplied
Cable inlet via plastic cable joints	<ul style="list-style-type: none"> • 2 x Pg 13.5 • 5 x Pg 11 		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 Profil V3.0 Rev. 1, Class B
			• Device address	-	1 ... 126 (126 factory-set)
			PC parameterization software	SIMATIC PDM (not included in the scope of delivery)	

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Acoustic sensors for pump monitoring

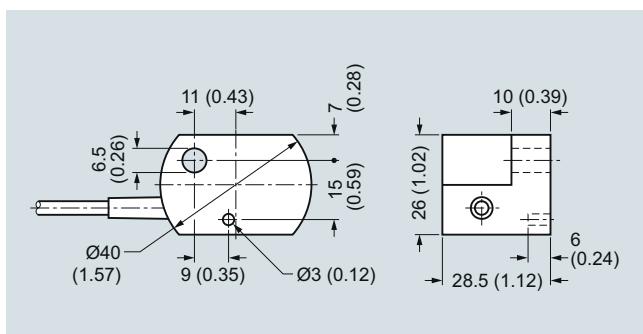
SITRANS DA400 acoustic diagnostic unit

Sensor for SITRANS DA400		Ex barriers for sensors
Setup	<ul style="list-style-type: none"> Piezoceramic sensor with pre-amplifier Encapsulated electronics 4-wire cable with anti-kink sleeve 	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.
Conditions of use		Input A maximum of two sensors can be connected.
Permissible ambient temperature	-40 ... +110 °C (-40 ... +230 °F)	Conditions of use
Degree of protection to EN 60529	P66/IP68	Degree of protection to EN 60529 IP20
Mechanical load	Class 4M7 according to EN 60721-3-4	Permissible Ambient Temperature -20 ... +60 °C (-4 ... +140 °F)
Climatic class	Class 4K4 according to EN 60721-3-4	Design
Design		Weight 115 g (0.254 lb)
Housing material	Stainless steel 1.4571 (316Ti SST)	Housing material Plastic, polyamide
Cable	Ends with wire protectors and cable shoe for connection to the SITRANS DA400	Type of installation Installation on mounting rail NS 32 or NS 35/7.5.
Weight	125 g (0.276 lb)	The acoustic diagnostic unit SITRANS DA400 and the safety barrier must be operated outside the Ex zone.
Mounting location	Zone 0/1 or zone 20/21/22	Dimensions (W x H x D) in mm (inch) 68 x 77 x 42 (2.68 x 3.03 x 1.65)
Dimensions (W x H x D) in mm (inch)	26 x 29 x 40 (1.02 x 1.14 x 1.57)	
Power Supply	Power fed from device	Certificates and Approvals
Certificates and approvals		Explosion protection TÜV 2005 ATEX 2876 X
Explosion protection		Intrinsic safety "i" TÜV 05 ATEX 2917 X
Intrinsic safety "i"	TÜV 2005 ATEX 2876 X	Marking II (2) G [EEx ib] IIC
Marking	II 1 G EEx ia IIC T6/T5/T4 or II 1 D EEx ia D 20/21/22 T160	
Permissible ambient temperature		Selection and Ordering data
Category 1G		Article No.
- Temperature class T4, T5	-20 ... +60 °C (-4 ... +140 °F)	Acoustic diagnostics unit SITRANS DA400 7MJ2400-
- Temperature class T6	-20 ... +50 °C (-4 ... +122 °F)	■ A 0 ■
• Category 2G		
- Temperature class T4	-40 ... +110 °C (-40 ... +230 °F)	1
- Temperature class T5	-40 ... +80 °C (-40 ... +176 °F)	2
- Temperature class T6	-20 ... +65 °C (-4 ... +149 °F)	A
• Category 1D or 2D		B
- Temperature class T160	-40 ... +110 °C (-40 ... +230 °F)	1
		2
		Communication
		• PROFIBUS DP
		• PROFIBUS PA
		Explosion protection
		• Without
		• With EEx ia/b to ATEX ¹⁾
		Application software
		For continuous condition monitoring of positive displacement pumps
		For material flow monitoring in pipes, raceways and conveyors
		Acoustic sensors for diagnostics unit SITRANS DA400 7MJ2000-1
		■ 0 0 ■
		A
		B
		C
		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

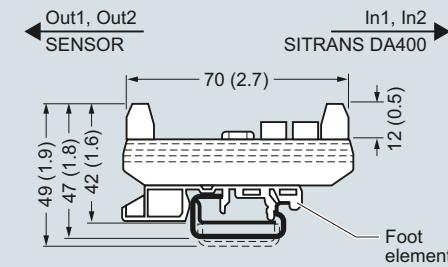
¹⁾ Not in combination with trigger sensor.

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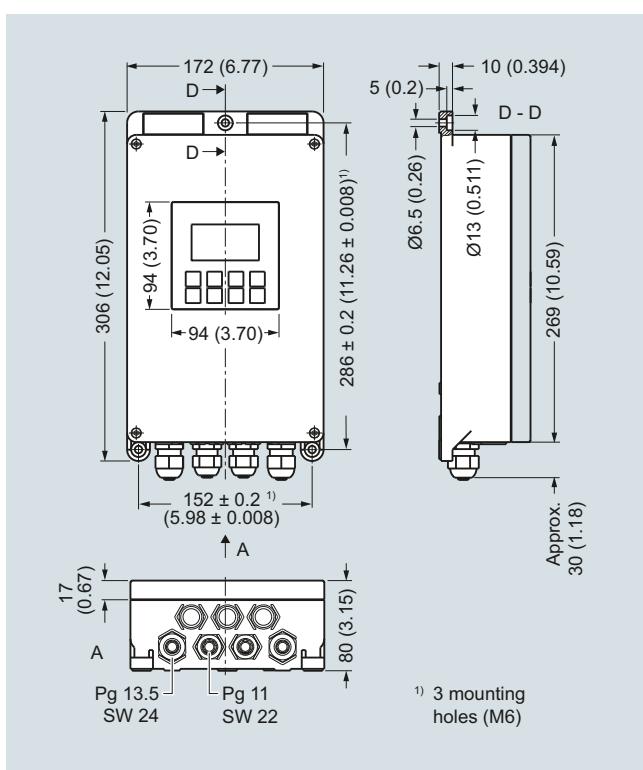
Acoustic sensors for pump monitoring

SITRANS DA400 acoustic diagnostic unit**Dimensional drawings**

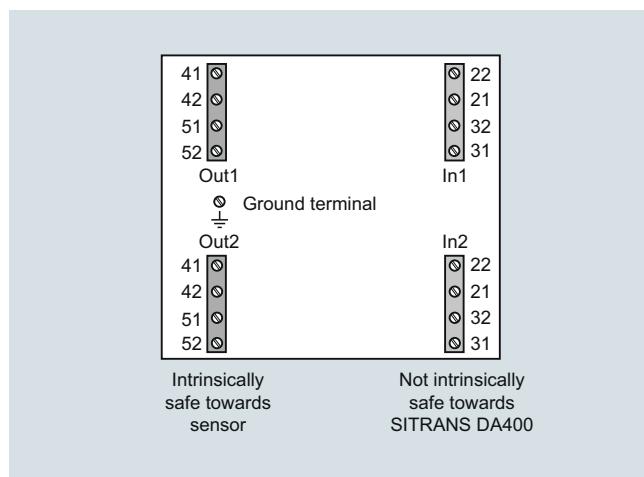
Sensor for SITRANS DA400, dimensions in mm (inch)



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



SITRANS DA400, dimensions in mm (inch)

Circuit diagrams

Safety barrier for SITRANS DA400, terminal assignment

DO 1	DO 2	DO 3	Sens 3	Sens 4	In 3	In 4	PROFIBUS
L+/-			yl gr br bl	yl gr br bl	I+ ⊥ DI 8V	I+ ⊥ DI 8V	A B
11 12	31 32	41 42	51 52	35 36 37 38 45 46 47 48	75 76 77 78	85 86 87 88	93 94
Supply 24V DC	DO 6	DO 5	DO 4	Sens 1	Sens 2	In 1	In 2
							PROFIBUS

L+/L- Power supply
(Any polarity with
PROFIBUS PA)

DO Digital output

Sens Sensor

In Input
yl Yellow
gr Green
br Brown
bl Black
I+ Analog current input +

⊥ Ground
DI Digital input
A Signal A (green) with PROFIBUS DP,
any with PROFIBUS PA
B Signal B (red) with PROFIBUS DP,
any with PROFIBUS PA

SITRANS DA400, terminal assignment

Process Protection

Acoustic sensors for material flow monitoring

SITRANS AS100 Acoustic sensor

Overview



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

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.

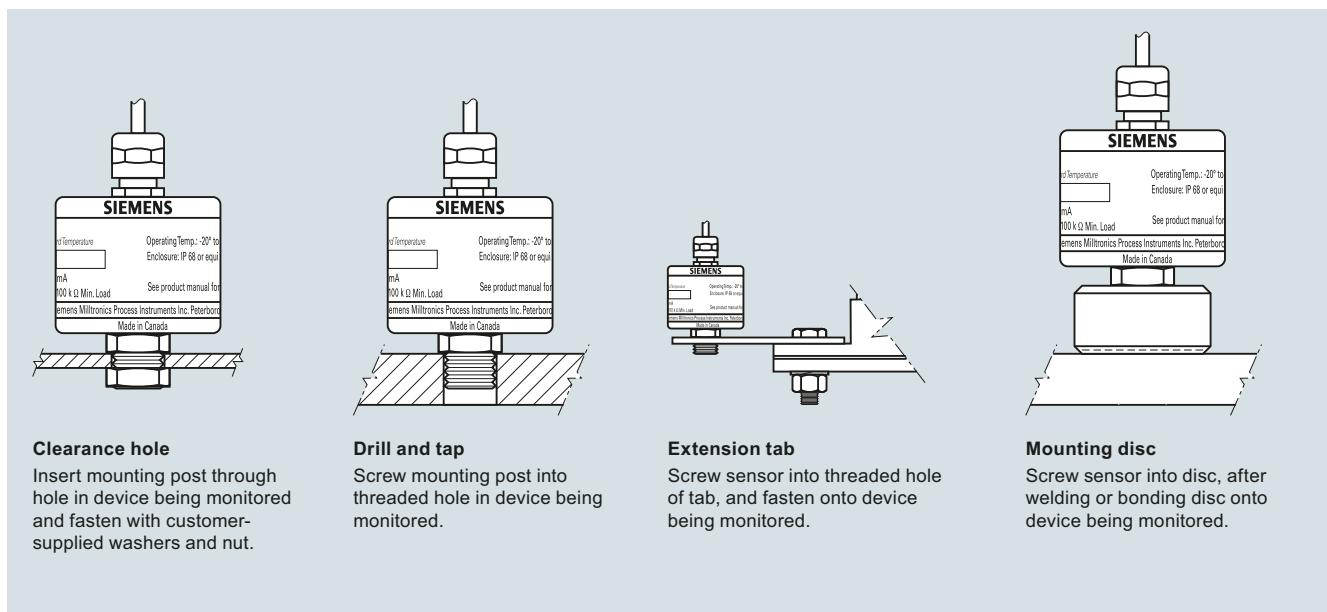
- Key applications: pipes, chutes, vibratory feeders, aerated gravity flow systems, burst filter bag detection

Benefits

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

6

Design



SITRANS AS100 mounting

Process Protection

Acoustic sensors for material flow monitoring

SITRANS AS100 Acoustic sensor

Technical specifications

Mode of Operation

Operating principle	Acoustic sensing of high frequency emissions caused by impact or friction
Typical application	<ul style="list-style-type: none"> • Detects burst filter bags in dust collection systems • Detects material being conveyed in pneumatic conveyor lines • Route confirmation in chute work

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 ... 10 V DC nominal, 100 kΩ minimum load impedance

Rated operating conditions

Amb. temperature for enclosure	-20 ... +80 °C (-4 ... +176 °F)
• Standard	• -40 ... +125 °C (-40 ... +257 °F) (CE only)
• Extended	• -30 ... +120 °C (-22 ... +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, aluminum 231 on 2GD version]
Degree of protection	IP68 (waterproof)
Cable	4 m (13 ft) cable, PVC jacketed, 3 twisted pairs, 24 AWG (0.25 mm ²), shielded
• Standard	4 m (13 ft) cable, thermoplastic elastomer jacketed, 6 conductor, 24 AWG (0.25 mm ²) conductor, shielded
• Extended	

Power supply

20 ... 30 V DC, 18 mA (typical)

Certificates and approvals

CE, RCM, EAC, KCC CSA/FM Class II, Div. 1, Group E, F, and G (optional), ATEX II 2GD (optional), ATEX II 3D (optional), EAC Ex
--

Selection and Ordering data

SITRANS AS100 Acoustic Sensor

An acoustic sensor used for solids flow detection.

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Sensor

Standard temperature range [-20 ... +80 °C (-4 ... +176 °F)]¹⁾

Extended temperature range [-40 ... +125 °C (-40 ... +257 °F)]²⁾

Extended temperature range [-30 ... +120 °C (-22 ... +248 °F)]³⁾

Cable Length

4 m (13.12 ft)

Sensor Mounting

None

Mounting disk

Mounting tab

Approvals

CE, RCM, EAC, KCC

CSA/FM Class II, Div. 1, Group E, F, and G (includes ½" NPT female fitting)

CSA Class II, Div. 1, Group E, F, and G (includes ½" NPT female fitting), EAC Ex

CE, RCM, FM/CSA Class II, Div. 1, Group E, F and G, ATEX II 3D (includes M20 female fitting), EAC Ex

ATEX II 2GD, c/w cable gland, EAC Ex⁴⁾

Article No.

7MH7560-

0

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A

B

C

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Selection and Ordering data

Order code

Further designs

Please add "-Z" to Article No. and specify Order code(s).

C11

Manufacturer's test certificate: According to

EN 10204-2.2

Y17

Acrylic coated, stainless steel tag [12 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text

Operating Instructions

All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Spare Parts

Article No.

7MH7723-1AA

7MH7723-1AB

7MH7723-1BW

7MH7723-1BV

7MH7723-1BX

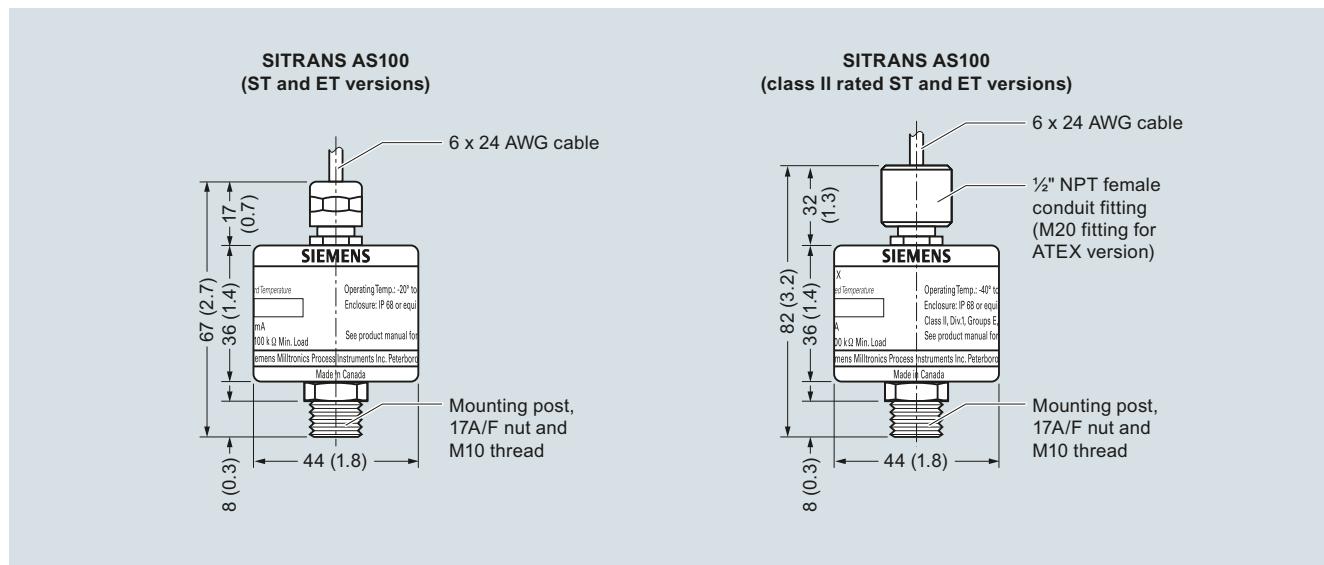
Note: Adapter kits are not CSA Class II approved

Process Protection

Acoustic sensors for material flow monitoring

SITRANS AS100 Acoustic sensor

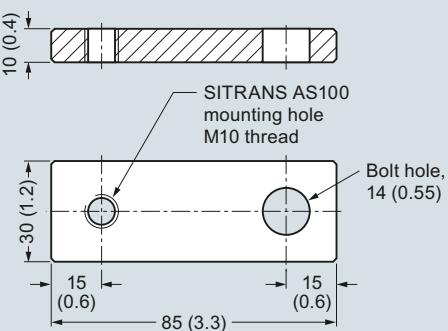
Dimensional drawings



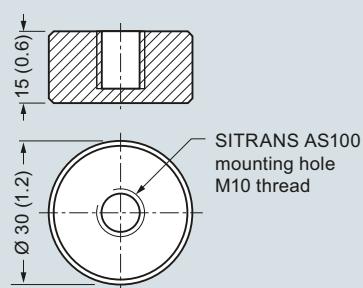
SITRANS AS100, dimensions in mm (inch)

Accessories

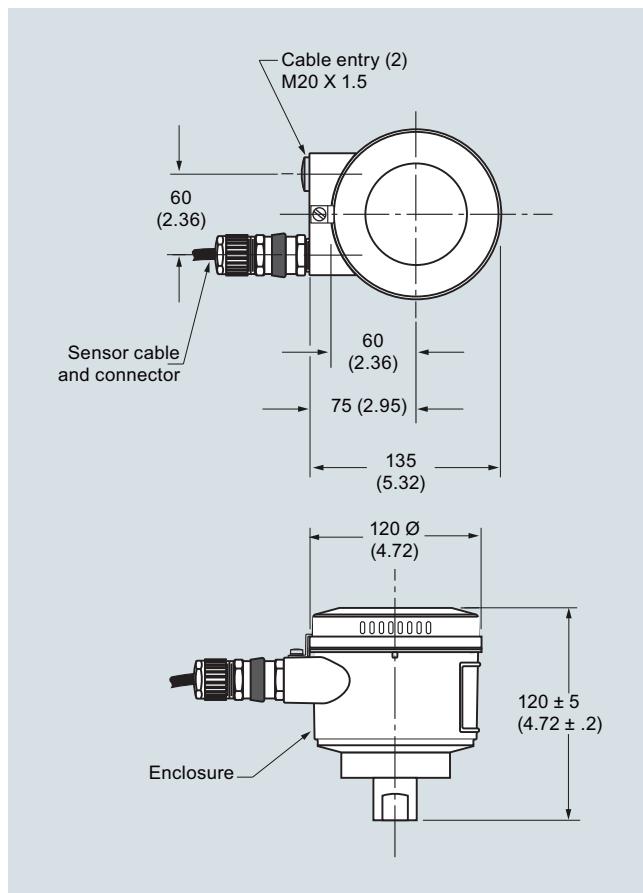
Extension tab - bolt on (304 stainless steel)



Mounting disc - bonded or welded (304 stainless steel)



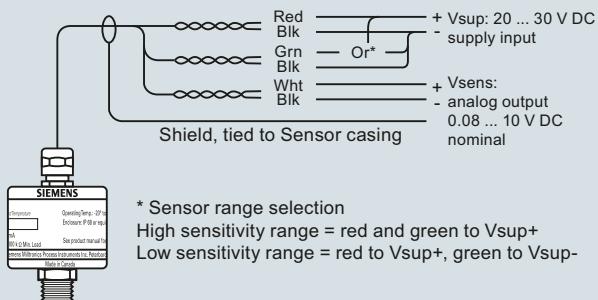
SITRANS AS100 accessories, dimensions in mm (inch)



SITRANS AS100 (2D, 2G, XP version), dimensions in mm (inch)

Circuit diagrams

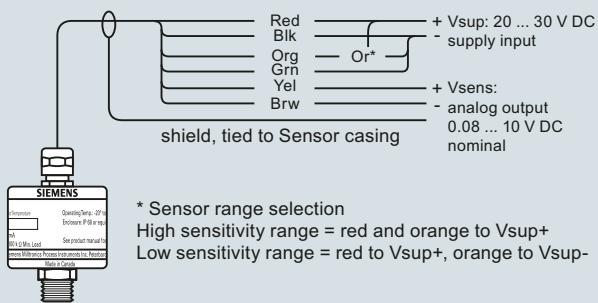
Standard temperature range



* Sensor range selection

High sensitivity range = red and green to Vsup+
Low sensitivity range = red to Vsup+, green to Vsup-

Extended temperature range



* Sensor range selection

High sensitivity range = red and orange to Vsup+
Low sensitivity range = red to Vsup+, 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
(24 V or Control Unit).

AWG	Wire size		Distance	
	mm	mm ²	meters	feet
24	7 x 0.20	0.25	500	1 600
22	7 x 0.25	0.35	800	2 600
20	10 x 0.25	0.5	1 200	3 900

SITRANS AS100 connections

Process Protection

Acoustic sensors for material flow monitoring

SITRANS CU02 Control Unit

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

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 (1 500 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 ... 10 V DC, from sensor
Output	
Output signal	4 ... 20 mA isolated output, 2 Form C relays - latching or non-latching - 5 A 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 ... +50 °C (-4 ... +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 x 75 x 110 mm (2.2 x 3 x 4.4 inch)
Material enclosure	Polycarbonate
Mounting	DIN Rail (DIN 46277 or DIN EN 50022), or wall mount, up to 500 m (1 500 ft) from sensor
Cable	2 twisted pair, 24 AWG (22 mm ²), shielded. Mount up to 500 m (1 500 ft) from sensor
Display	
	Liquid crystal, three digits, 9 mm (0.35 inch), high and multi-segment 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 _{US/C} , CE, RCM, EAC, KCC

Process Protection

Acoustic sensors for material flow monitoring

SITRANS CU02 Control Unit

Selection and Ordering data

SITRANS CU02 Control Unit

Alarm control unit for use with SITRANS AS100 acoustic sensor to provide reliable continuous protection for bulk solid flow

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Power Supply

100 V AC
115 V AC
200 V AC
230 V AC

Enclosure

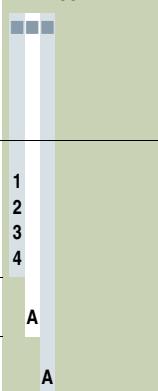
Standard DIN Rail

Approvals

CSA_{US/C}, CE, RCM, EAC, KCC

Article No.

7MH7562-



Selection and Ordering data

Further designs

Please add "-Z" to Article No. and specify Order code(s).

Manufacturer's test certificate: According to EN 10204-2.2

Acrylic coated, stainless steel tag [38 x 51 mm (1.5 x 2 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text

Operating Instructions

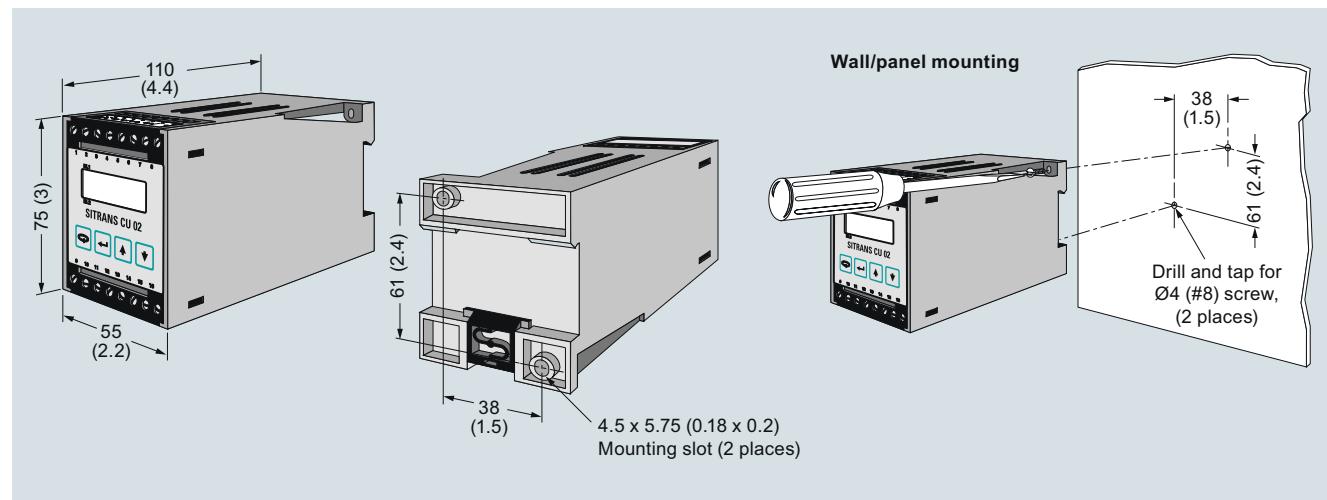
All literature is available to download for free, in a range of languages, at <http://www.siemens.com/processinstrumentation/documentation>

Order code

C11

Y18

Dimensional drawings



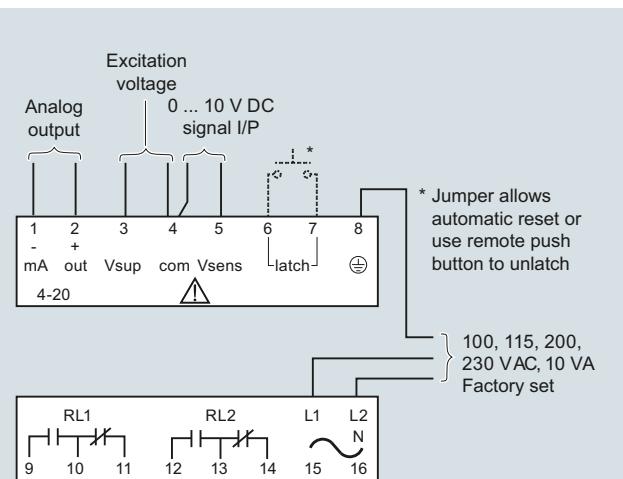
SITRANS CU02, dimensions in mm (inch)

Process Protection

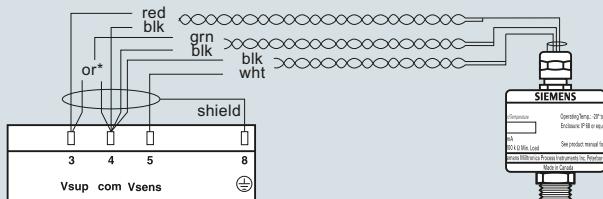
Acoustic sensors for material flow monitoring

SITRANS CU02 Control Unit

Circuit diagrams



Standard temperature version

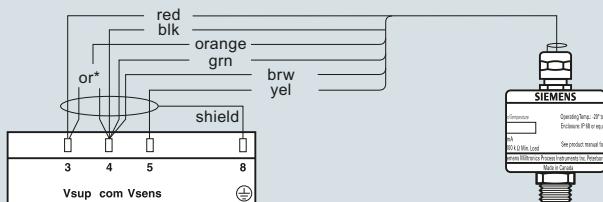


* Sensor range selection

High sensitivity range = green to 'V_{sup}'

Low sensitivity range = green to 'com'

Extended temperature version



* Sensor range selection

High sensitivity range = orange to 'V_{sup}'

Low sensitivity range = orange to 'com'

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

Milltronics MFA 4p motion failure alarm controller
Overview


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

Benefits

- Up to 100 mm (4 inch) gap between target and probe
- Switch selectable overspeed or underspeed detection
- Setpoint adjustment 0.15 to 3 000 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

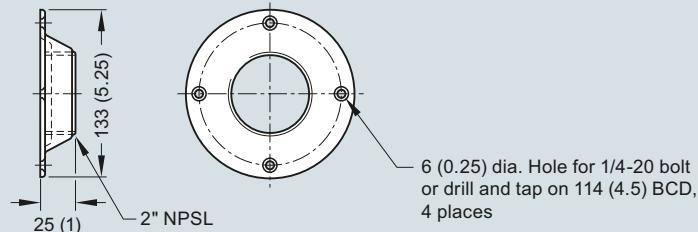
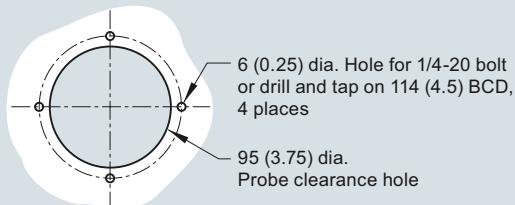
Application

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.

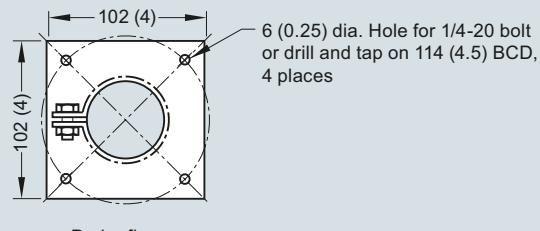
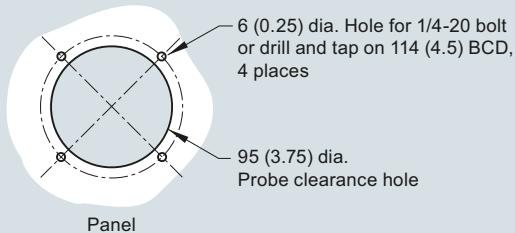
The single setpoint system suits most industrial applications. This versatile unit can be used on tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps.

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 and corrosive 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 for Milltronics MSP-12, MSP-3, XPP-5


Note: Mounting flange supplied with probe.

Mounting for Milltronics MSP-9


Milltronics MSP-12, MSP-3, MSP-9, XPP-5 mounting, dimensions in mm (inch)

Process Protection

Motion sensors

Milltronics MFA 4p motion failure alarm controller

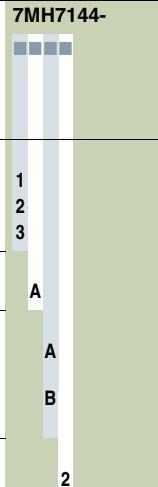
 <p>Standard Milltronics MSP-12</p> <ul style="list-style-type: none"> • Heavy-duty general purpose motion probe • Long lasting aluminum body with internal amplifier • Convenient mounting flange and locknut for fast installation and setup • Temperature rating: -40 ... +60 °C (-40 ... +140 °F) • Enclosure rating: Type/NEMA 4X, 6, IP67 <hr/>  <p>Milltronics XPP-5</p> <ul style="list-style-type: none"> • CSA hazardous approval (Class I, Div. 1, Groups A, B, C, D; Class II Div. 1, Groups E, F, G; Class III) • Aluminum body that is fully potted • Convenient mounting flange and locknut • 3/4" NPT male hub connection • Operating temperature from -40 ... 60 °C (-40 ... 140 °F) • Enclosure rating: Type/NEMA 4X, 6, IP67 	 <p>High temperature Milltronics MSP-3</p> <ul style="list-style-type: none"> • Heavy-duty, high temperature aluminum probe designed to withstand operating temperatures from -50 ... 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. • Amplifier remote mounted in enclosure 140 x 140 x 100 mm (5.5 x 5.5 x 4 inch), available in cast aluminum (1/2" NPT conduit entry), painted steel (Type/NEMA 4, IP65 rating), or stainless steel (Type/NEMA 4X, IP65 rating) • Amplifier temperature rating: -40 ... +60 °C (-40 ... +140 °F) • Enclosure rating: Type/NEMA 4X, 6, IP67 <hr/>  <p>Stainless high temperature Milltronics MSP-9</p> <ul style="list-style-type: none"> • Heavy-duty, high temperature 304 stainless steel probe • Special construction allows operation of probe in environment from -50 ... 260 °C (500 °F) • 1.5 m (5 ft) special high temperature PTFE cable provided. Up to 30 m (100 ft) may be used. • Amplifier remote mounted in enclosure 140 x 140 x 100 mm (5.5 x 5.5 x 4 inch), available in cast aluminum (1/2" NPT conduit entry), painted steel (Type/NEMA 4, IP65 rating), or stainless steel (Type/NEMA 4X, IP65 rating) • Enclosure rating: Type/NEMA 4X, 6, IP67 • Amplifier temperature rating: -40 ... +60 °C (-40 ... +140 °F) <hr/>  <p>Milltronics RMA (Remote Mounted Amplifier)</p> <ul style="list-style-type: none"> • Available for internal mounting within Probe, or in enclosure for remote mounting • Enclosures available in cast aluminum (1/2" NPT entry), painted steel (Type/NEMA 4 rating) or stainless steel (Type/NEMA 4X, IP65 rating) • Operating temp. from -40 ... +60 °C (-40 ... +140 °F) • Enclosure rating: Type/NEMA 4X, 6, IP67
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Milltronics motion probes

Technical specifications

Mode of operation	Motion monitor and alarm	Dynamic Range	0 ... 7 200 PPM
Measuring principle	Monitoring loss of motion in tail pulley, screw flights, bucket elevators	Ambient Temperature Range	-20 ... +50 °C (-5 ... +122 °F)
Features	<ul style="list-style-type: none"> • Switch selectable overspeed or underspeed detection • Setpoint adjustment: 0.15 ... 3 000 PPM • Adjustable start-up time delay: 0 ... 60 seconds • Visual indication of probe operation and relay status 	Design	<p>Enclosure rating</p> <p>Type 4X/NEMA 4X/IP65 (standard and optional stainless steel) Type 4/NEMA 4/IP65 (optional mild steel)</p>
Output	2 relays working in unison, each providing 1 SPDT Form C relay contact, rated 8 A at 250 V AC resistive	Enclosure dimensions	160 x 240 x 82 mm (6.3 x 9.5 x 3.2 inch) Optional: mild steel or 304 (1.4301) stainless steel
Performance		Enclosure material	203 x 254 x 102 mm (8 x 10 x 4 inch) Polycarbonate Optional: mild steel or stainless steel
Repeatability	± 1 %	Power Supply	100 ... 240 V AC, 50/60 Hz, 15 VA, ± 10 % of rated voltage
Dead band	± 0.25 %	Certificates and approvals	CE, RCM, EAC, KCC, CSA _{US/C} , FM

Milltronics MFA 4p motion failure alarm controller

Selection and Ordering data		Article No.	Selection and Ordering data	Article No.
MFA 4P Motion Failure Alarm Controller		7MH7144-	Milltronics RMA Remote Mounted Amplifier	7MH7145-
A highly sensitive single setpoint motion sensor system, used with MSP probes.			Remote mounted amplifier for Milltronics MSP-3 and MSP-9 motion sensing probes.	0
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Enclosure			Enclosure	
NEMA 4X, polycarbonate enclosure		1	Aluminum enclosure, IP65, Type/NEMA 4X,	A
NEMA 4, painted mild steel enclosure		2	1/2" NPT entry	C
NEMA 4X, 304 (1.4301) stainless steel enclosure		3	Painted steel, Type/NEMA 4, IP65 rating	D
Input Voltage		A	304 (1.4301) stainless steel enclosure, Type/NEMA 4X, IP65 rating	
100 ... 240 V AC, ± 10 %, 50/60 Hz, 15 VA		2		
Speed detection version			Selection and Ordering data	Order code
Standard, underspeed (U/S) or overspeed (O/S), switch selectable			<i>Further designs</i>	
Slow speed (S/S), U/S or O/S detection, switch selectable (limit of 15 ppm)			Please add "-Z" to Article No. and specify Order code(s).	
Approvals			Manufacturer's test certificate: According to EN 10204-2.20	C11
CE, RCM, EAC, KCC, CSA _{US/C} , FM			Acrylic coated, stainless steel tag [38 x 51 mm (1.5 x 2 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text	Y18
Selection and Ordering data		Order code	<i>Operating Instructions</i>	
<i>Further designs</i>			All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Please add "-Z" to Article No. and specify Order code(s).			<i>Operating Instructions</i>	
Manufacturer's test certificate: According to EN 10204-2.2	C11		Card, RMA	Article No. 7MH7723-1DT
Acrylic coated, stainless steel tag [69 x 50 mm (2.7 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters), specify in plain text	Y15			
Painted mild steel, heated enclosure with viewing window for use down to -50 °C (-58 °F) (finished unit is mounted inside enclosure) [483 x 584 x 203 mm (19 x 23 x 8 inch)]	A35			
Stainless steel, sun/weather shield (finished unit is field mounted inside enclosure) [357 x 305 x 203 mm (14 x 12 x 8 inch)]	S50			
<i>Operating Instructions</i>				
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation				
Spare Parts		Article No.		
Transformer		7MH7723-1DX		
Circuit Card, standard		7MH7723-1DU		
Circuit Card, Slow speed		7MH7723-1DV		
Lid with overlay for MFA 4p		7MH7723-1GY		

Process Protection

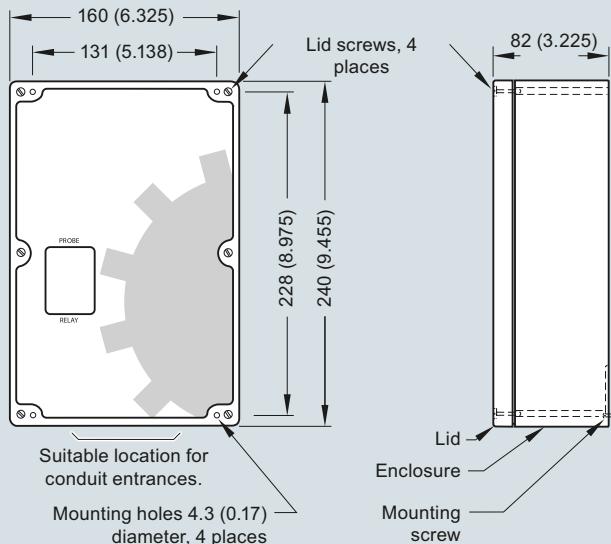
Motion sensors

Milltronics MFA 4p motion failure alarm controller

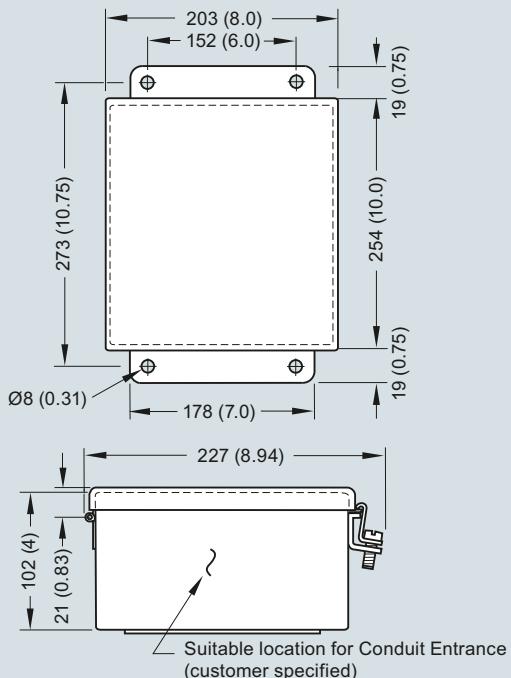
Selection and Ordering data	Article No.	Selection and Ordering data	Order code
Milltronics Motion Sensing Probes A series of motion sensing probes used with the MFA 4p. Milltronics MSP-3: heavy-duty, high temperature aluminum Milltronics MSP-9: heavy-duty, high temperature stainless steel Milltronics MSP-12: heavy-duty, general purpose Milltronics XPP-5: hazardous rated Note: Milltronics MSP-3 and MSP-9 probes require the use of Milltronics RMA (amplifier)	7MH7146- Further designs Please add "-Z" to Article No. and specify Order code(s).		
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		Total cable length: enter the total cable length in plain text description	Y01
Cable Length Standard length (as described in Model options) ¹⁾ Add Order code Y01 and plain text: "Total cable length ... m" Extended cable length 2 ... 30 m (6.6 ... 98.4 ft) ²⁾ Extended cable length 31 ... 50 m (101.7 ... 164 ft) ⁴⁾ Extended cable length 51 ... 100 m (167.3 ... 328.1 ft) ⁴⁾	0 1 2 3	Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text	Y17
Model [standard cable length/type] MSP-3, ½" NPT cable inlet ³⁾ [1.5 m (5 ft) high temperature cable] MSP-9 [1.5 m (5 ft) high temperature cable] ³⁾ MSP-12, ½" NPT cable inlet XPP-5 [1.5 m (5 ft) cable, (CSA Class I, Groups A, B, C and D; Class II Groups E, F, and G)] XPP-5 [10 m (32.8 ft) cable, (CSA Class I, Groups A, B, C, and D; Class II Groups E, F, and G)] XPP-5 [15 m (49.2 ft) cable, (CSA Class I, Groups A, B, C, and D; Class II Groups E, F, and G)]	B D E G H J A	Cable gland kit Manufacturer's test certificate: According to EN 10204-2.2	A57 C11
Approvals CE, RCM, EAC, KCC		Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
		Spare Parts Locknut, for MSP-3, MSP-7, MSP-12, XPP-5 Mounting flange, for MSP-3, MSP-7, MSP-12, XPP-5 Mounting bracket for MSP-9 Lid, 1/2" NPT cable inlet for MSP-3, MSP-7, MSP-12 Lid for MSP-9 Lid gasket, for MSP-3, MSP-9 Lid gasket, for MSP-7, MSP-12 Motion cable gland adaptor kit	Article No. 7MH723-1CR 7MH723-1CS 7MH723-1CT 7MH723-1CU 7MH723-1CV 7MH723-1CW 7MH723-1CX 7MH723-1JU

Dimensional drawings

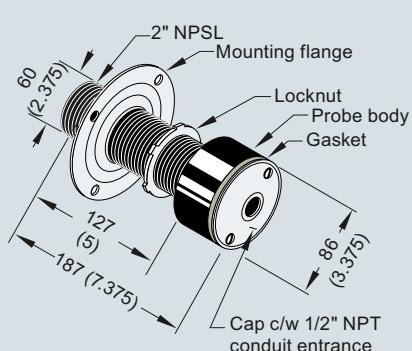
Type 4X/NEMA 4X/IP65 Polycarbonate Enclosure



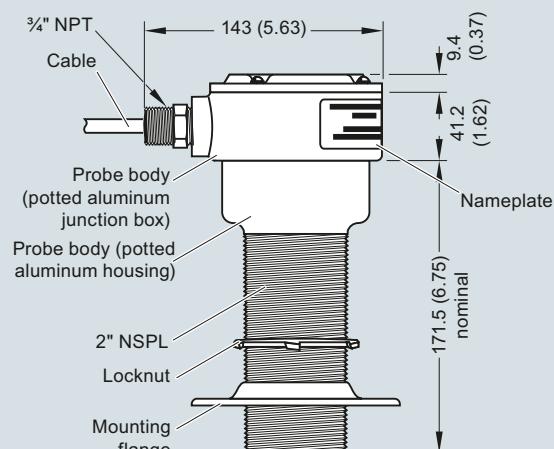
Type 4/NEMA 4/IP65 Painted Steel Enclosure & Type 4X/NEMA 4X/IP65 Stainless Steel Enclosure



Standard Probe MSP-12



Hazardous Locations XPP-5



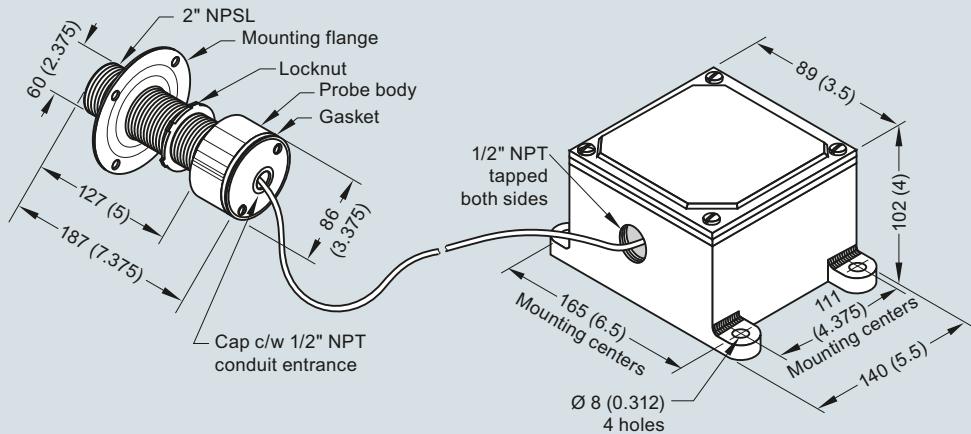
Milltronics MFA 4p and probe, dimensions in mm (inch)

Process Protection

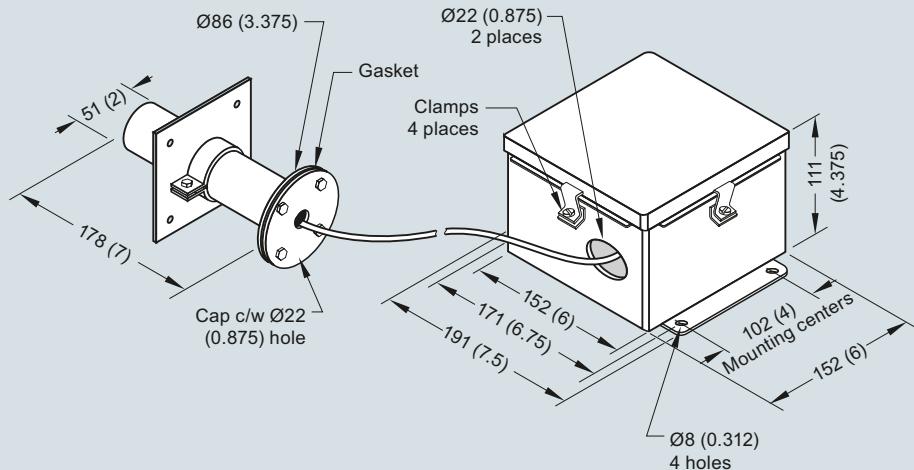
Motion sensors

Milltronics MFA 4p motion failure alarm controller

High temperature probe MSP-3



High temperature stainless steel probe MSP-9



Milltronics probes, dimensions in mm (inch)

Milltronics MSP-7 motion sensor
Overview


Milltronics MSP-7 is a heavy-duty 3-wire motion sensor that provides an NPN open collector output to PLCs.

Benefits

- Up to 100 mm (4 inch) gap between target and probe
- Corrosion resistant construction
- General purpose, suitable for majority of industrial applications; rugged probe designs provide unmatched reliability

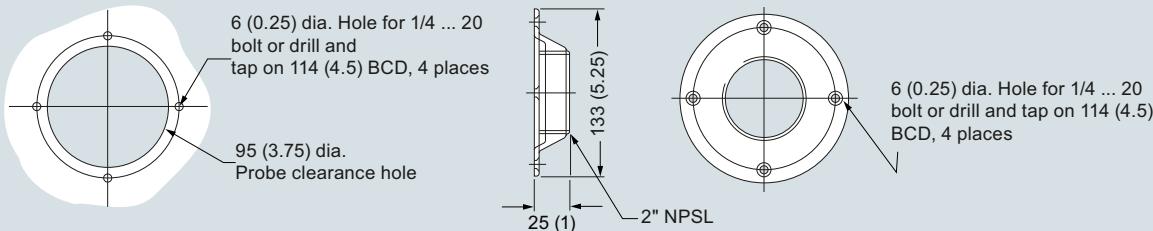
Application

The MSP-7 motion sensing probe can detect changes in the rotation and movement of ferrous equipment. When connected to a PLC it can warn of malfunction and signals to stop or slow down equipment, preventing costly failure or downtime. Its reliability makes it a very cost effective sensor.

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.

An NPN open collector 3-wire output allows for versatile connection to most PLC models and a large dynamic range ensures that the MSP-7 can detect changes in target speed for a variety of applications.

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

Design
Mounting for Milltronics MSP-7


Note: Mounting flange supplied with probe.

Mounting for Milltronics MSP-7, dimensions in mm (inch)

Technical specifications

Mode of operation	
Measuring principle	Magnetic
Typical application	Monitoring loss of motion in tail pulley, screw flights, bucket elevators
Features	<ul style="list-style-type: none"> • Rugged corrosion resistant aluminum body • Low voltage operation • Large dynamic range • Threaded body for finite adjustment
Output	NPN open collector, 2 kΩ pull up to input voltage, 330 Ω impedance, 40 mA max.
Performance	
Repeatability	± 1 %
Dead band	± 0.25 %
Dynamic Range	0 ... 7 200 PPM
Ambient Temperature Range	-40 ... +60 °C (-40 ... +140 °F)
Design	
Enclosure rating	Type 4X/NEMA 4X/IP67
Power Supply	21 ... 28 V DC, 40 mA max.
Certificates and approvals	CE, RCM, EAC, KCC

Process Protection

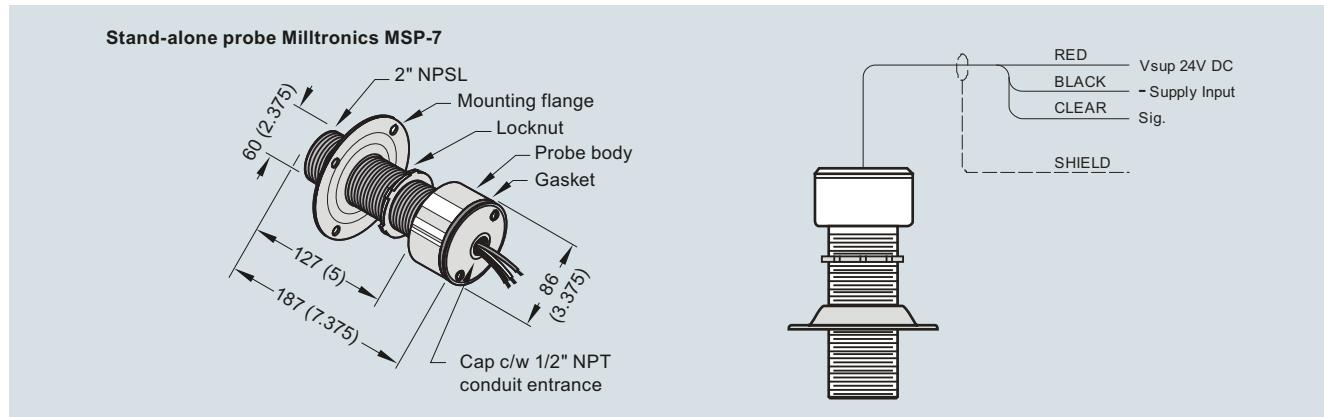
Motion sensors

Milltronics MSP-7 motion sensor

Selection and Ordering data	Article No.	Selection and Ordering data	Order code
Milltronics Motion Sensing Probes Milltronics MSP-7: heavy-duty, 3 wire stand-alone ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7MH7146-	Further designs Please add "-Z" to Article No. and specify Order code(s).	
Cable Length Standard length (as described in Model options) ¹⁾ Add Order code Y01 and plain text: "Total cable length ... m" Extended cable length 2 ... 30 m (6.6 ... 98.4 ft)	0 1	Total cable length: enter the total cable length in plain text description Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text Cable gland kit	Y01 Y17 A57
Model [standard cable length/type] MSP-7, 1/2" NPT cable inlet [1.5 m (5 ft) cable]	K	Manufacturer's test certificate: According to EN 10204-2.2	C11
Approvals CE, RCM, EAC, KCC	A	Operating Instructions All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
1) No Y01 needed in Order code for standard length		Spare Parts Locknut, for MSP-3, MSP-7, MSP-12, XPP-5 Mounting flange, for MSP-3, MSP-7, MSP-12, XPP-5 Lid, 1/2" NPT cable inlet for MSP-3, MSP-7, MSP-12 Lid gasket, for MSP-7, MSP-12 Motion cable gland adaptor kit	Article No. 7MH7723-1CR 7MH7723-1CS 7MH7723-1CU 7MH7723-1CX 7MH7723-1JU

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Dimensional drawings



Stand-alone probe Milltronics MSP-7, dimensions in mm (inch)

SITRANS WM100 motion sensor

Overview

SITRANS WM100 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 100 mm (4 inch) gap between SITRANS WM100 and targets
- Rugged, low maintenance suitable for tough environments
- 1 SPDT Form C relay contact
- Provides cost-effective protection
- Visual indication of target triggered pulse

Application

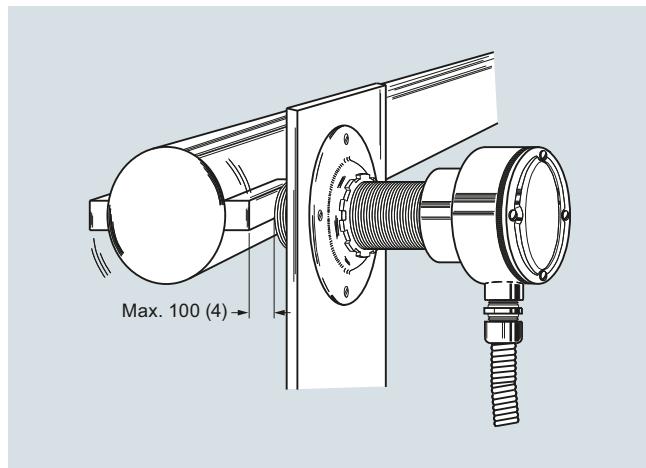
This rugged unit is impervious to dust, dirt, build-up and moisture and is ideal for such primary industries as mining, aggregate, and cement. Operating where other systems are prone to failure, the non-contacting design eliminates the need for lubricating, cleaning and part replacement. Downtime and clean-up expenses associated with conveying equipment failure are reduced by the SITRANS WM100. It alarms to minimize spillage, prevent extensive damage or even fire caused by belt slippage at the head pulley, and warns against conveyor malfunction.

The SITRANS WM100 has built-in selectable start delays and 1 Form C relay contact. With an 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 WM100 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 100 mm (4 inch) from the face of the target to the face of the probe for 4.5 x 4.5 mm (3/16 x 3/16 inch) keyway. The WM100 is sensitive to lateral disturbances to its magnetic field. If the WM100 is responding to motion from an interfering target, move the WM100 or install a ferrous plate (steel) as a shield between the WM100 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.



SITRANS WM100 mounting, dimensions in mm (inch)

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: 10 ... 14 seconds (5 ... 7 s with 12 ppm jumper installed)
Zero Speed (selected via a common jumper)	5 seconds ± 1 (minimum speed 10 ... 15 ppm) or 10 seconds ± 2 (minimum speed 5 ... 7.5 ppm)
Rated operating conditions	
Operating temperature	-40 ... +60 °C (-40 ... +140 °F)
Design	
Probe body	Aluminum
Process mounting	2" NPSL
Connection box	Aluminum, 3/4" NPT conduit entrance, 5 screw terminals plus grounding terminal for electrical connection, max. 12 AWG (3.30 mm ²) wire size
Gasketing	Neoprene
Display	Red LED for verification of pulses
Enclosure rating	Type NEMA 4x, 6, IP67
Dynamic range	Minimum 6 or 12 pulses per minute Maximum 3 000 pulses per minute
Shipping weight	2 kg (4.4 lb)
Power supply	<ul style="list-style-type: none"> • 115 V AC/50 ... 60 Hz, 7 VA • 230 V AC/50 ... 60 Hz, 7 VA • ± 10 % of rated voltage
Certificates and approvals	CSAUS/C, CE, RCM, EAC, KCC

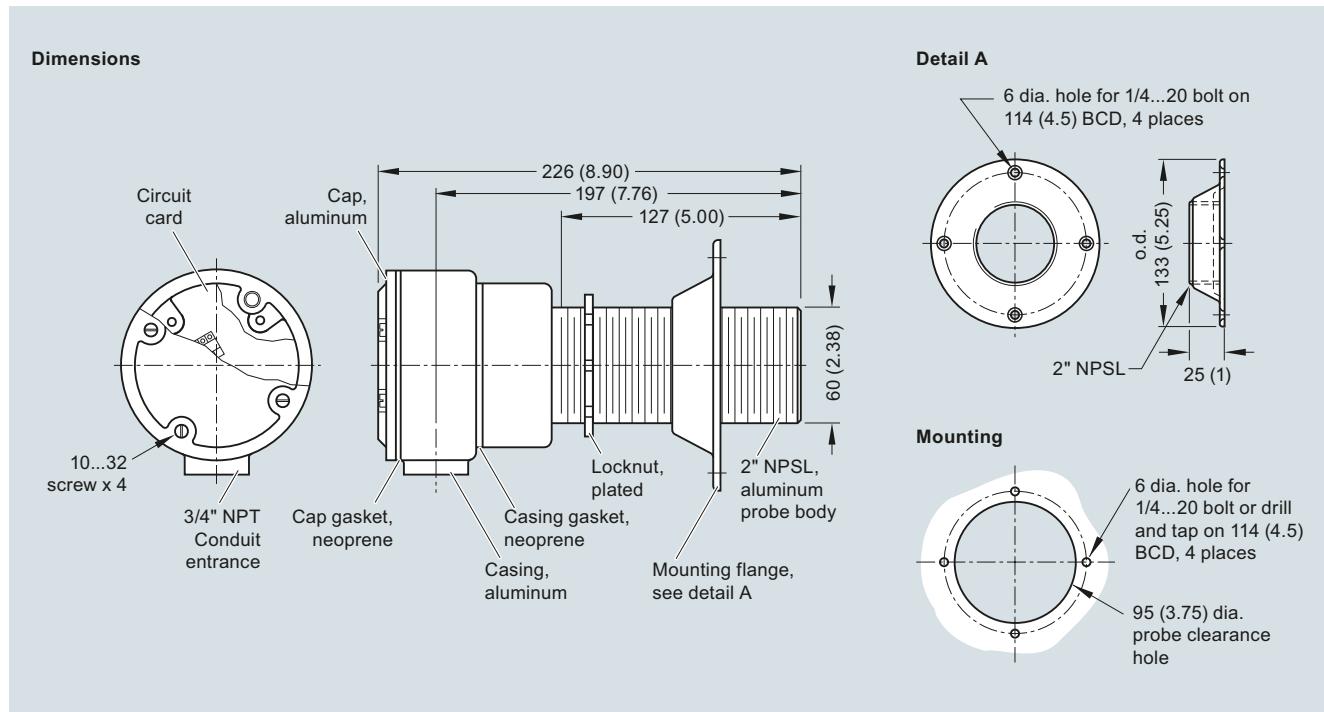
Process Protection

Motion sensors

SITRANS WM100 motion sensor

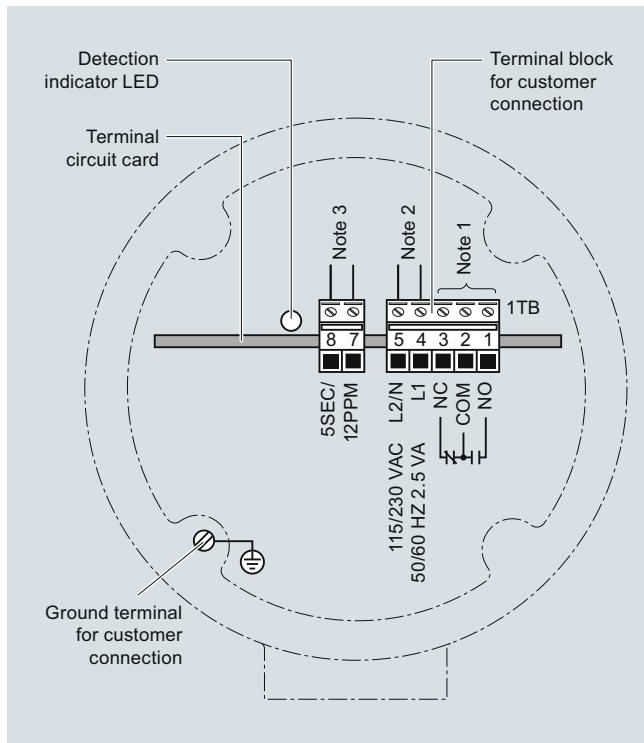
Selection and Ordering data	Article No.	Selection and Ordering data	Order code
SITRANS WM100 A heavy-duty zero-speed alarm switch that does not require a controller. ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7MH7158 - 0 A 0 0 A B	<i>Further designs</i> Please add "-Z" to Article No. and specify Order code(s). Manufacturer's Test Certificate: According to EN 10204-2.2 Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text	C11 Y17
Model 115 V AC 230 V AC		<i>Operating Instructions</i> All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
		<i>Accessories</i> Locknut Mounting flange Motion cable gland adaptor kit	Article No. 7MH7723-1CR 7MH7723-1CS 7MH7723-1JN

Dimensional drawings



SITRANS WM100 mounting, dimensions in mm (inch)

Circuit diagrams



SITRANS WM100 wiring

Notes:

1. Dry contacts shown in de-energized (alarm or shelf) state.
2. SITRANS WM100 is manufactured for either 115 or 230 V AC operation. Check WM100 nameplate for applicable voltage. Correct voltage must be supplied. Voltages lower than specified will result in an inoperative condition. Voltages higher than specified will severely damage unit.
3. For 5 second time delay and a minimum 12 ppm range, connect jumper across terminals 7 and 8. Without a jumper, the default is a 10 second time delay and a minimum 6 ppm range.

Process Protection

Notes

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