

Belt Weighing

Speed sensors

SITRANS WS300

Overview



SITRANS WS300 is a low- to high-resolution shaft-driven speed sensor.

Benefits

- Compact and economical
- Easy, low-cost installation
- Accurate belt speed detection
- Optional resolutions for measurement over a range of belt speeds
- Corrosion resistant

Application

SITRANS WS300 speed sensor operates in conjunction with a conveyor belt scale, providing a signal to an integrator which computes the rate of material being conveyed. At only 1.22 kg (2.68 lb), it is one of the lightest and most durable units ever developed for monitoring conveyor belt speed. With its rugged cast aluminum housing, it is suitable for outdoor installation, and its low weight prolongs bearing life.

It is directly coupled to a rotating tail or bend pulley shaft to ensure accurate belt-travel readout, eliminating problems caused by belt slippage or material build-up. The WS300 converts shaft rotation into a pulse train of 32, 256, 1 000, or 2 000 pulses per revolution using a high precision rotary optical encoder. The digital signal is transmitted as speed input to any Siemens integrator for calculation of belt speed, flow rate and totalized weight.

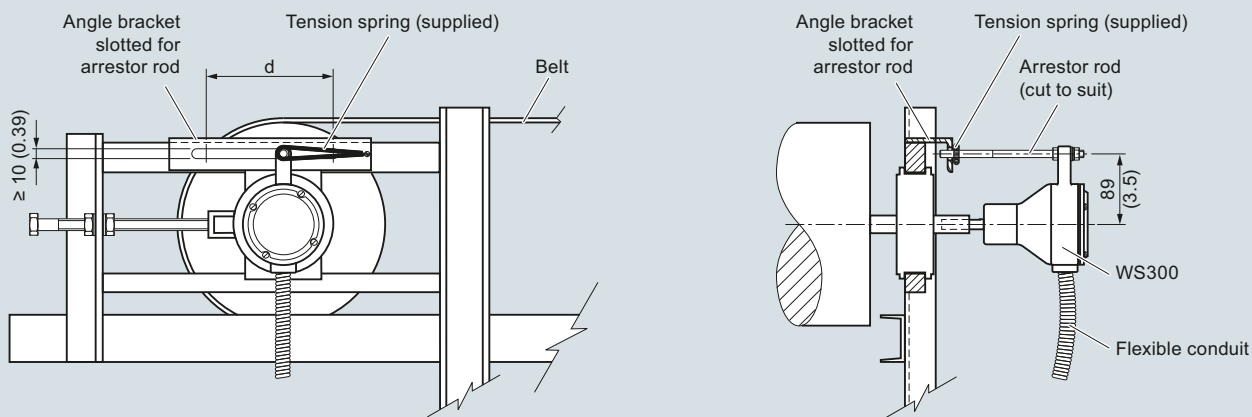
This low- to high-resolution speed sensor provides a frequency signal proportional to the shaft speed, enabling a range of speeds to be read accurately. The quadrature type shaft encoder prevents erroneous speed signals due to vibration or shaft oscillation. The WS300 is easily mounted and is bi-directional for either clockwise or counter-clockwise belt travel.

The IS version uses an inductive proximity switch detecting rotating targets.

Design

Mounting

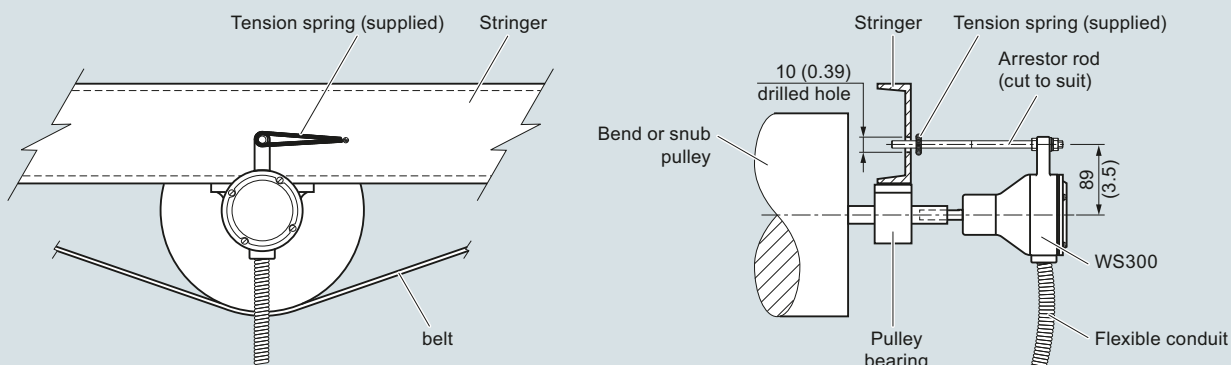
Mounting to a Tail Pulley



Notes:

Distance 'd' is the take-up travel on the tail pulley.
When adjusting the belt take-up, ensure that there is play on the arrestor rod. If the arrestor rod is pushed against the end of its travel slot, premature bearing wear may result.

Mounting to a Bend or Snub Pulley

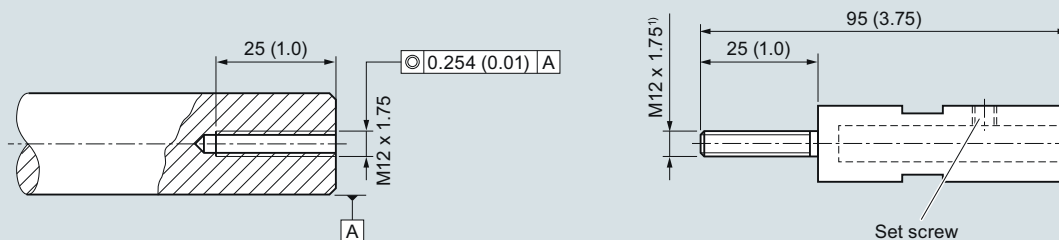


Notes:

When mounting to a bend or a snub pulley only, a 10 mm (0.39 inch) drilled hole is required for the arrestor rod.

SITRANS WS300, dimensions in mm (inch)

Mounting using optional threaded shaft coupling



¹⁾ Use adhesive when installing threaded shaft coupling (e.g. Loctite).

WS300 mounting using threaded shaft coupling, dimensions in mm (inch)

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Technical specifications

SITRANS WS300	
Mode of operation	
Measuring principle	Standard: pulse from shaft rotation using high precision rotary optical encoder IS: pulse from inductive proximity switch
Typical application	When a low- to high-resolution speed sensor is required
Input	
	Shaft rotation 0.3 ... 2 000 rpm, bi-directional, resolution dependent
Output	
	<ul style="list-style-type: none"> Unidirectional open collector, NPN, sinking output Standard: 10 ... 30 V DC, 25 mA max. IS: NAMUR NC, load current, 0 ... 15 mA 32, 256, 1 000, or 2 000 pulses per revolution (ppr) 32 ppr: 2 000 max. rpm, 1 066 Hz 256 ppr: 2 000 max. rpm, 8 530 Hz 1 000 ppr: 900 max. rpm, 15 000 Hz 2 000 ppr: 450 max. rpm, 15 000 Hz
Rated operating conditions	
Ambient temperature	Standard: -40 ... +70 °C (-40 ... +158 °F) IS: -25 ... +100 °C (-13 ... +212 °F)
Degree of protection	NEMA 4X, Type 4X, IP65
Design	
Enclosure	<ul style="list-style-type: none"> Rated NEMA 4X, Type 4X, IP65 Painted aluminum Stainless steel (optional)
Power supply	
	<ul style="list-style-type: none"> Standard: 10 ... 30 V DC, 60 mA max. IS: 5 ... 16 V DC, 25 mA max. (from IS switch isolator)
Cable	
Recommended	<ul style="list-style-type: none"> Standard: 3-wire shielded, 0.82 mm² (18 AWG) IS: 2-wire shielded 0.324 mm² (22 AWG) Max. run 305 m (1 000 ft)

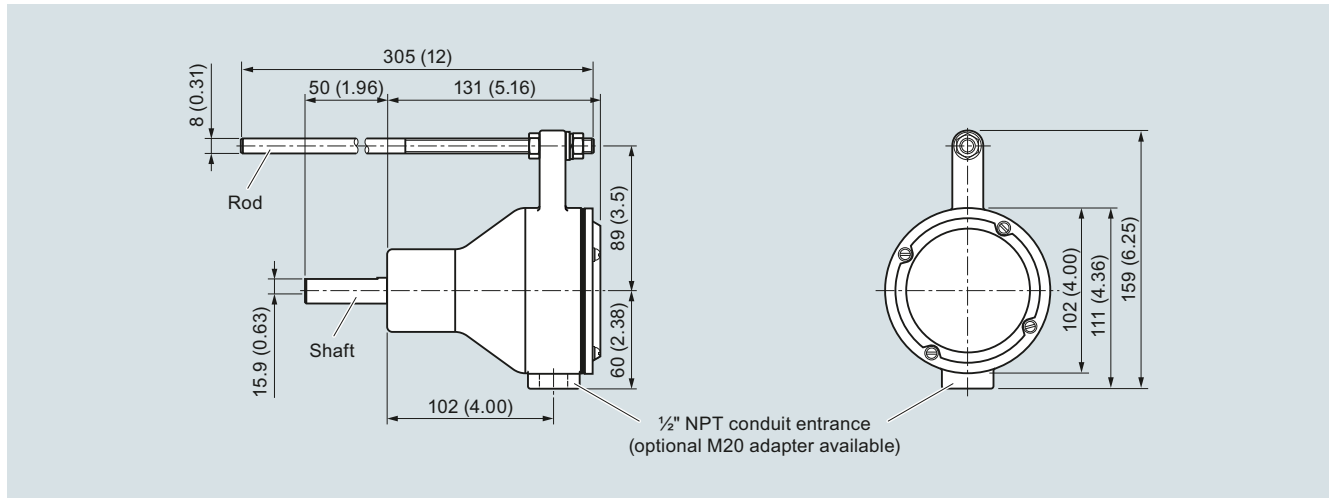
SITRANS WS300	
Approvals	
WS300 Standard	<ul style="list-style-type: none"> General
Hazardous	<ul style="list-style-type: none"> CE, UKCA, RCM, EAC, KC CSA/FM Class II, Div. 1, Groups E, F, G; Class III ATEX I M1, ATEX II 2D, Ex tb IIIC T70°C Db UKEX I M1, UKEX II 2D, Ex tb IIIC T70°C Db MSHA EAC Ex, RTN IECEx Ex tb IIIC T70°C Db
Optional switch isolator (required for WS300 IS)	<ul style="list-style-type: none"> Pepperl+Fuchs #KFA5-SOT2-Ex2, #KFA6-SOT2-Ex2 or #KFD2-SOT2-Ex2
	<ul style="list-style-type: none"> ATEX II 1G [Ex ia] IIC ATEX II 1D [Ex ia] IIIC CSA/UL: Class 1, Div. 1, Groups A, B, C, and D. Class II, Div. 1, Groups E, F, and G, Class III CE, UKCA

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Dimensional drawings



WS300, dimensions in mm (inch)

Circuit diagrams

Connections (Standard)

Description	Terminal
10 ... 30 V DC	1
Speed out-CW	2
Speed out-CCW	3
Common	4
Ground	GND

- Determine the pulley shaft rotation on the end of the pulley shaft to which the WS300 is attached.
- If the pulley shaft is rotating clockwise, connect the appropriate wire to terminal 2. If the pulley shaft is rotating counter-clockwise, connect the appropriate wire to terminal 3.
- Do not connect terminals 2 and 3 at the same time.
- Connection between the WS300 standard unit and the integrator should be made with three-wire shielded, 0.82 mm² (18 AWG) cable.
- Ground shield of cable at integrator only.
- Connect shield to appropriate terminal at the integrator.

Terminal Connections to integrator

WS300	1 +V	2 CW	3 CCW	4 Cmn	GND
Milltronics BW500	19	16	16	17	N/C
SIWAREX FTC	CI+, 1L+	CI-	CI-	1M	N/C
SIWAREX WP241	1L+	DI.0	DI.0	2M, 1M	N/C

Connections (IS)

Description	Terminal
5 ... 16 V DC, 25 mA max. (from IS Switch Isolator)	1
Speed out	2
Ground	GND

- Only terminals 1 and 2 are required; rotation in a clockwise or counter-clockwise direction is not required.
- To connect the switch isolator, use two-wire shielded 0.324 mm² (22 AWG) cable. Use the same cable to connect the switch isolator to the integrator.
- Ground shield of cable at integrator only.
- Connect shield to appropriate terminal at the integrator.

Terminal Connections to integrator

W300 IS	IS Switch Isolator Terminal	Milltronics BW500	SIWAREX FTC	SIWAREX WP241
1	3			
2	1			
	7	16	1L+	1L+
	8	17	CI+	CI+

Connect CI- to Common