PRODUCT INFORMATION

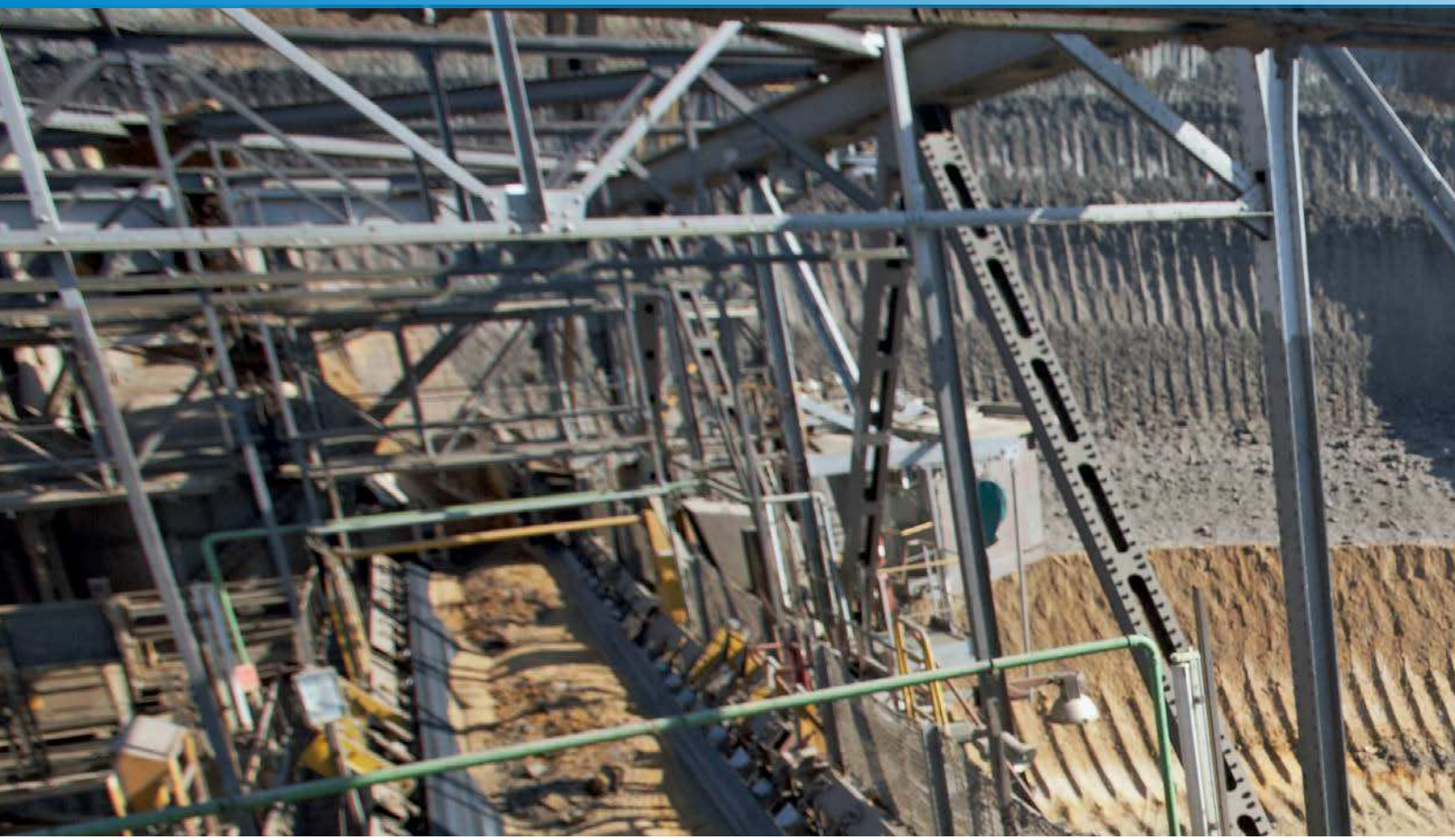
Bulkscan® LMS511

NON-CONTACT AND MAINTENANCE-FREE SENSOR FOR MEASURING VOLUME FLOW

Flow sensors

SICK
Sensor Intelligence.

THE ABSOLUTE PACKAGE: THE Bulkscan® LMS511



→ www.mysick.com/en/Bulkscan_LMS511

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.

8015028/2015-12-07

More volume, not mass: If you need to measure bulk materials on conveyor belts or in piles, the laser volume flowmeter Bulkscan® LMS511 offers you a precise measuring procedure and an appealing alternative to a belt scale. The Bulkscan® LMS511 continuously measures the flow rate without making contact – regardless of weather conditions and the condition of the material. Intelligent additional functions, such as measurement of the loading position and level, and belt monitoring, prevent damage to the machines and conveyor belts. A definite benefit when optimizing the flow of goods and efficiently controlling conveyor belts.

The Bulkscan® LMS511 is exemplary in both maintenance and cost-effectiveness: Thanks to a special alloy housing and integrated heating, it is robust and suitable for outdoor use – it is even reliable in Siberian ice and cold.

ABSOLUTELY PRECISE: MEASUREMENT OF VOLUME FLOW RATE

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THE ADVANTAGES OF DIRECT VOLUME MEASUREMENT WITH THE Bulkscan® LMS511

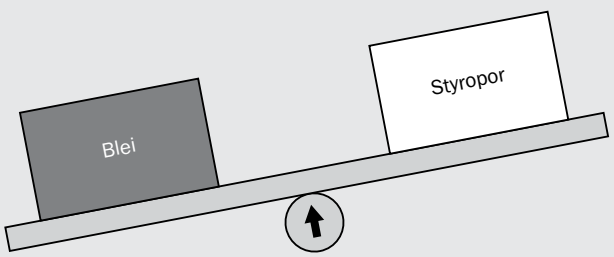
Only measuring the weight of the bulk materials involves certain risks: With belt scales, for example, the volume is calculated indirectly based on a fixed value for the density factor. In many applications, the density is not homogeneous or constant.

Even environmental influences such as humidity affect the density factor. Using only a belt scale as the measurement instrument in these cases, will lead to significant deviations between the calculated conveyor volume and the actual conveyor volume. This can also greatly impact the process control system: Due to the incorrectly calculated volume, overfilling, material jam and thus a system standstill can result.

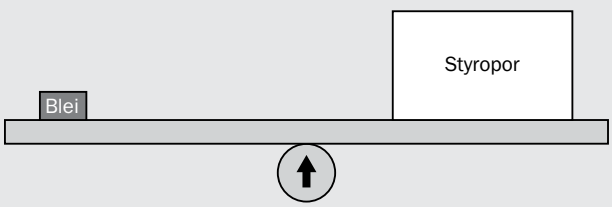
The measurement principle of determining volume via a laser beam produces a series of practical advantages:

- The measurement is non-contact
- The process can be optimized according to volume. Overloading or underloading the downstream station is prevented.
- The sensor measures the actual volume on the conveyor belt. In doing so, influencing factors such as humidity and the condition of the bulk materials are taken into account during measurement.

Possible sources of errors when only determining the measured values of mass and density



Lead has a greater mass than polystyrene foam.
➜ The volume for both, however, is the same.

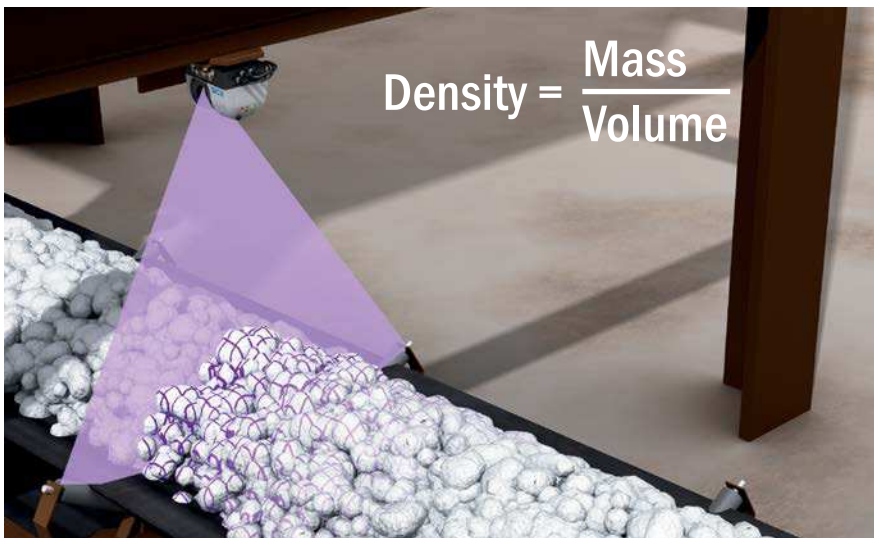


Lead and polystyrene foam have the same mass.
➜ The volume of polystyrene foam, however, is higher than that of lead.

ABSOLUTELY VERSATILE: INTELLIGENT ADDITIONAL FUNCTIONS

Volume and flow rate, level, center of gravity, loading position as well as belt monitoring: When it comes to the optimal control of each individual process stage, it is not just the measurement of the flow rate that is crucial. The Bulkscan® LMS511 provides other useful measurands thanks to its intelligent additional functions.

Calculating the bulk density



Calculating the material density makes it possible to assess the condition and quality of the material. The bulk density can be calculated in real time in combination with a belt scale.

Loading position and belt monitoring

Shifting of the conveyor belts can sooner or later lead to belt wear. Bulkscan® LMS511 detects the loading position and limit at an early stage using the belt monitoring function. This ensures optimal system utilization.

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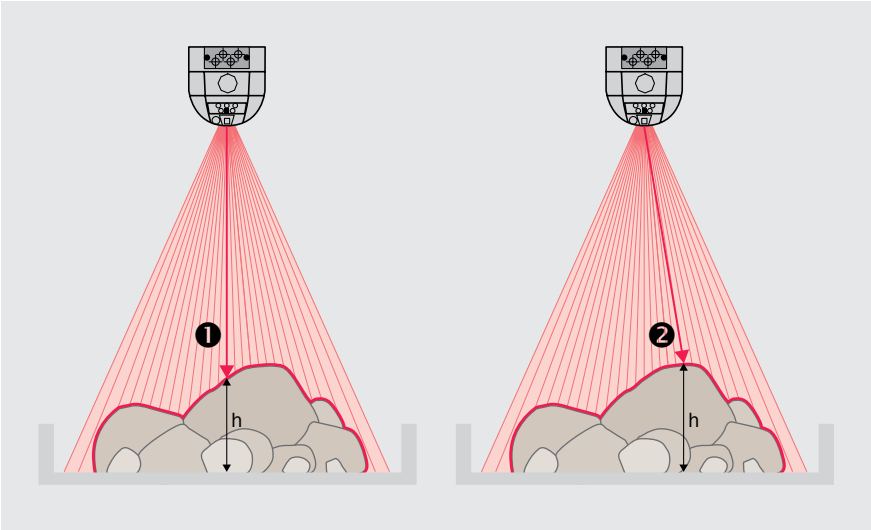
Irrtümer und Änderungen vorbehalten

Measuring the level

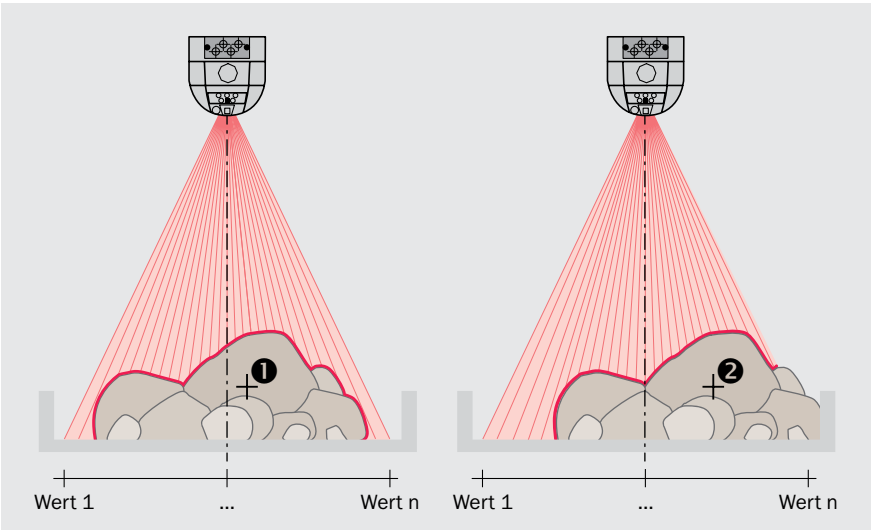


In addition to volume and throughput, the Bulkscan® LMS511 also calculates the height profile of the bulk materials. This way large rocks can be detected in a timely manner before blocking or damaging equipment in downline machining processes.

Two strategies can be used to calculate the bulk height:

- Measurement of the belt center ❶
- Mesurement of the highest point ❷

Calculating the center of gravity



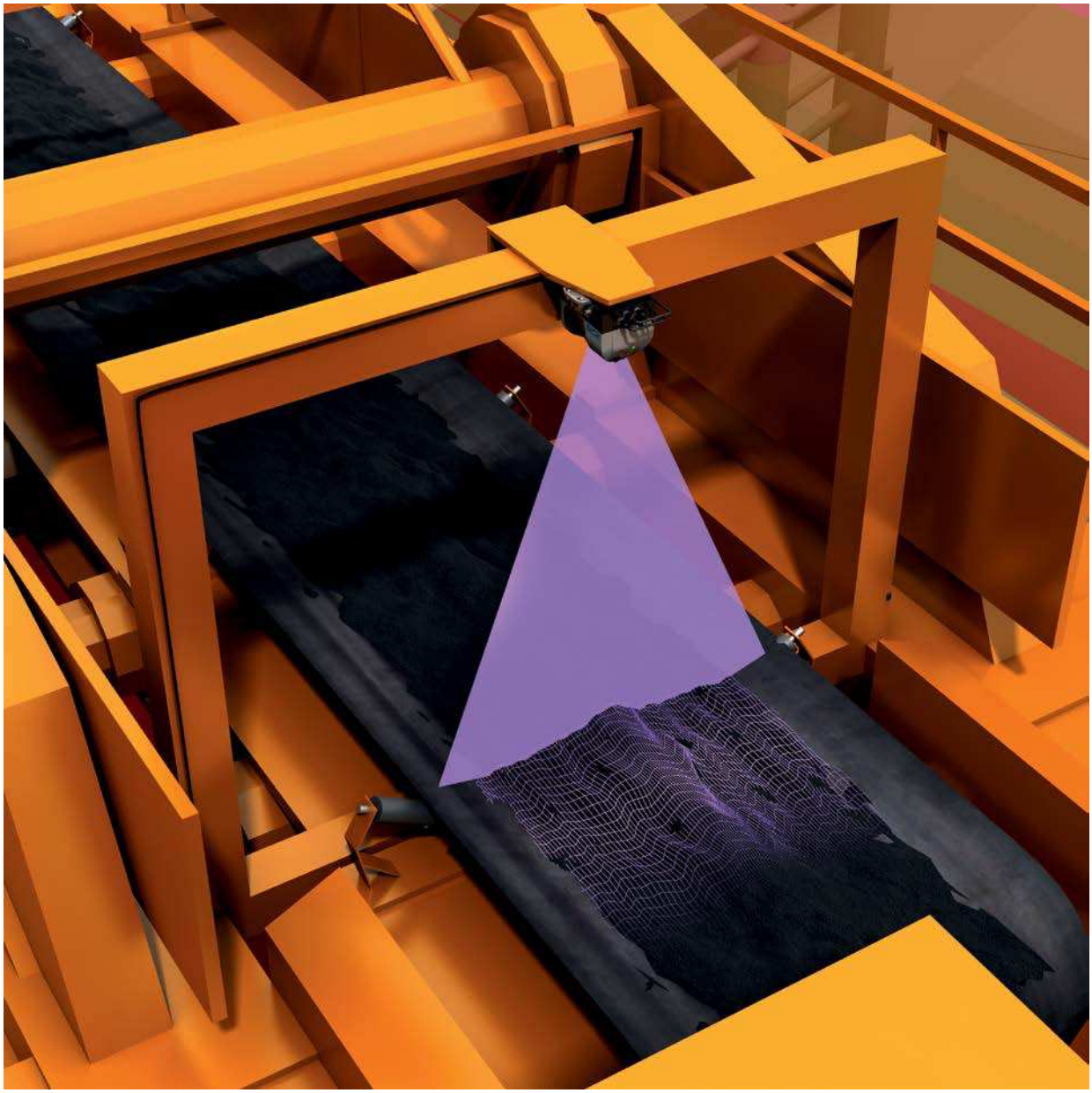
Particularly determining the center of gravity increases system availability: Bulkscan® LMS511 monitors the belt load on the entire conveying line and detects one-sided loads or one-sided belt loads.

It calculates the load's center of gravity from the bulk height measurement:

- The center of gravity is aligned on the center of the belt ❶
- Center of gravity is too far to the right ❷

ABSOLUTELY ROBUST: THE Bulkscan® LMS511 IN USE

THROUGHPUT MEASUREMENT ON A COAL OR ORE CONVEYOR BELT



A laser scanner emits a pulsed-laser beam. When it hits the bulk material, it is reflected and registered in the scanner receiver. The time it takes for the pulse to be emitted and received is directly proportional to the distance between scanner and bulk materials.

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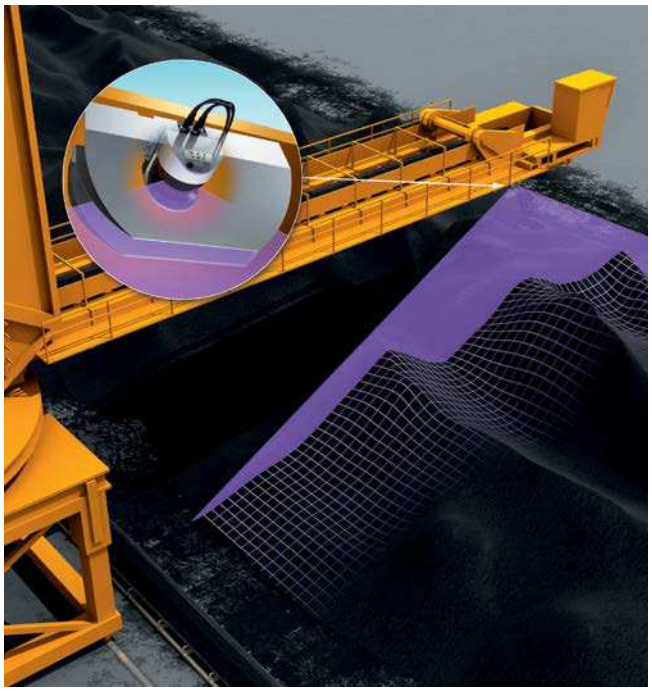
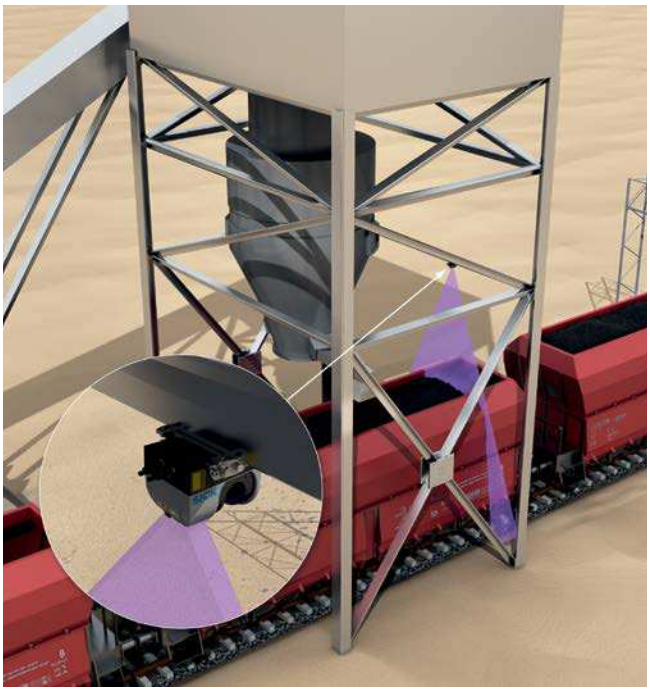
Irrtümer und Änderungen vorbehalten

PILE MEASUREMENT



VOLUME MEASUREMENT FOR WAGONS



The non-contact measuring Bulkscan® LMS511 detects the profile of the bulk material on the conveyor belt. The flow rate is calculated using the belt speed and the bulk material profile. This makes it possible to create a feedback control system that provides optimal belt speed and ensures economic belt utilization.

The benefits at a glance:

- Low-maintenance throughput measurement
- Flexible use
- Optimum belt utilization
- Belt monitoring to reduce belt wear

5-echo technology

The new, ultra-fast sampling technology from SICK enables high precision laser measurement in virtually all weather conditions.

The 5-echo technology is perfectly suited for applications that require the reliable detection of dynamic objects in changing or unfavorable weather conditions. Even for applications with poor visibility, such as in tunnels or in mines. In addition to maintaining excellent visibility in unfavorable weather conditions, 5-echo technology also ensures maximum accuracy.

NON-CONTACT AND MAINTENANCE-FREE SENSOR FOR MEASURING VOLUME FLOW

Product description

The Bulkscan® LMS511 uses time-of-flight technology for non-contact measurement of volume flow on conveyor belts. Using the multi-echo technology, the Bulkscan® LMS511 can combine time-of-flight data with the belt speed to generate a reliable volume flow signal, regardless of the bulk material's properties or weather conditions. Aside from calculating total quantities and mass flow, the Bulkscan® LMS511 can monitor the operation of the conveyor belt without coming into physical contact with it and promptly gives warning of any belt slippage. The integrated center-of-gravity calculator can be used to detect uneven loading of the bulk material and avoid excessive belt wear. Its tough industrial housing is well suited to rugged operating conditions. An integrated heater also ensures safe operation at low ambient temperatures. Discrete signals as well as Ethernet TCP/IP can be used to connect the measuring system to a host communication system.

At a glance

- Non-contact measurement of volume and mass flow of bulk material
- Laser pulses with high angular resolution ensure outstanding image resolution
- 5-echo pulse evaluation produces highly reliable measurements
- Offers non-contact belt monitoring
- Integrated center-of-gravity calculator
- Robust structure for harsh ambient conditions
- Can also measure at low temperatures thanks to integrated heater
- Compact housing with IP67 enclosure rating

Your benefits

- Maximizes conveyor throughput
- Reduces maintenance costs by preventing belt slippage
- Increases the conveyor belt's service life
- Reduces loading time
- Increases efficiency by optimizing belt capacity
- Simple installation
- Low maintenance costs
- Offers savings through minimized energy consumption

Additional information

→ www.mysick.com/en/Bulkscan_LMS511

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Detailed technical data

Features

Light source	Infrared (905 nm)
Laser class	1, eye-safe (IEC 60825-1 (2007-6))
Aperture angle	190°
Bandwith	Unlimited
Scanning frequency	35 Hz 50 Hz 75 Hz
Heating	Yes
Operating range	0.5 m ... 20 m
Amount of evaluated echoes	5

Performance

Response time	13 ms, 20 ms, 28 ms
Average filter	0 s ... 3,600 s
Accuracy	± 3 %, under perfect conditions ≤ ± 5 %, depending on the profile
Max. conveyor speed	≤ 30 m/s

Interfaces

Auxiliary interface	✔
Protocol	USB 2.0
Data transmission rate	≤ 500 kBaud
Serial host interfaces	✔
Protocol	RS-232/RS-422
Data transmission rate	≤ 500 kBaud
Ethernet	✔
Protocol	TCP/IP
Data transmission rate	100 Mbit/s
Switching inputs	2 (Conveyor belt status and Reset counters); Encoder inputs 1
Switching outputs	6
Analog signals	Available with separate accessory BAM100
Optical indicators	5 LEDs (additional 7-segment display)

Mechanics/electronics

Electrical connection	M12 5-pin plug-in connector
Supply voltage scanner/heater	19.2 V ... 28.8 V
Prohibited residual ripple	± 5 %
Switch-on peak current	2 A
Operating current scanner	≤ 1.3 A
Power consumption	22 W, + 55 W heating (typical)
Housing color	Gray (RAL 7032)
Enclosure rating	IP 67 (EN 60529, Section 14.2.7)
Protection class	III
Weight	3.7 kg
Dimensions	160 mm x 155 mm x 185 mm

Distance of the sensor to the bulk solid	≥ 0.5 m
Switch-on time	≤ 60 s

Ambient data

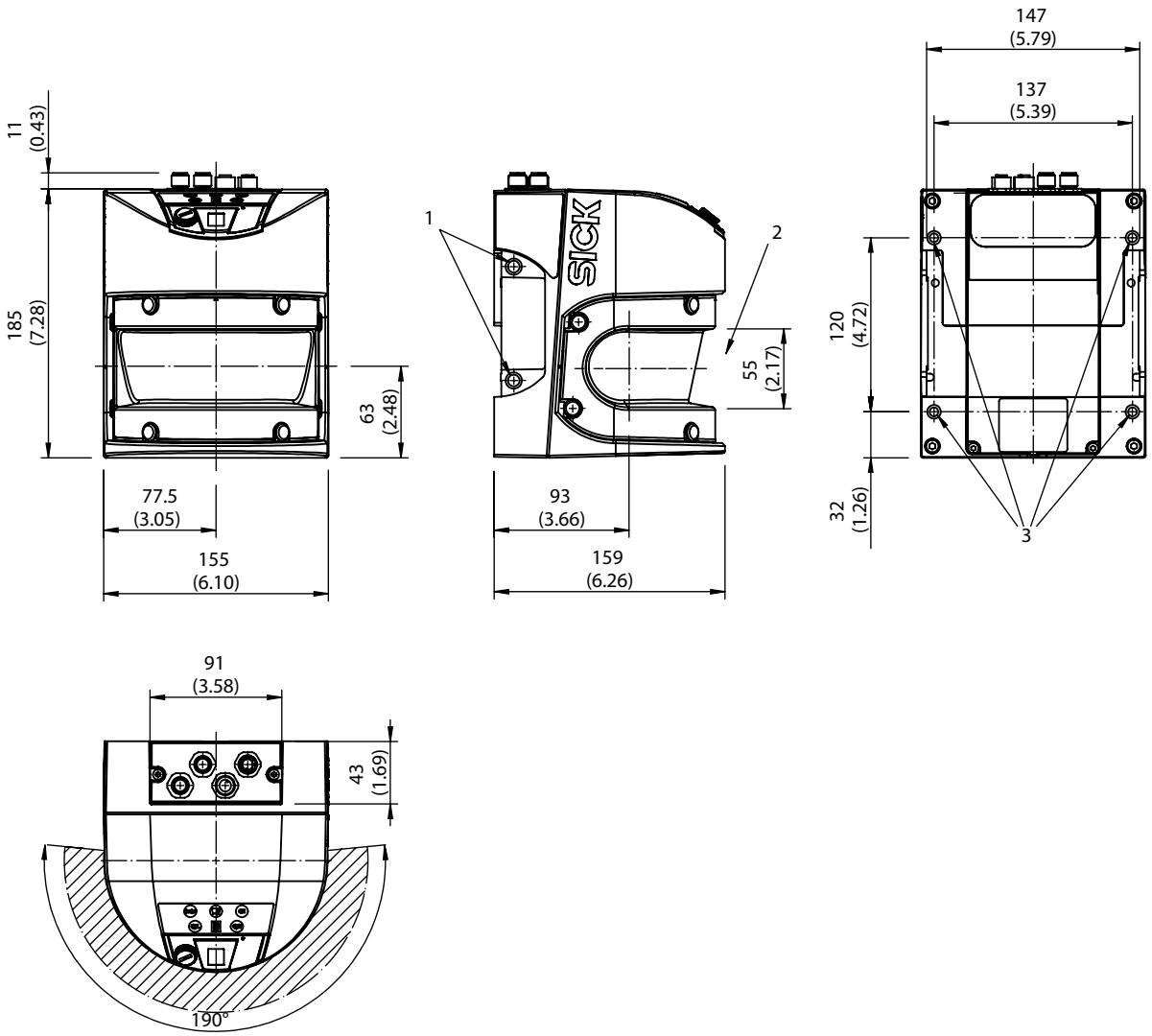
Electromagnetic compatibility (EMC)	EN 61000-6-2:2005 / EN 61000-6-3 / A1 2011
Ambient operating temperature	–40 °C ... +60 °C
Storage temperature	–40 °C ... +70 °C
Ambient light immunity	70,000 lx

Ordering information

Type	Part no.
LMS511-20190	1059529

Dimensional drawings (Dimensions in mm (inch))

Bulkscan® LMS511



① 4 screw holes M8 x 9
② Do not obstruct front window
③ 4 screw holes M6 x 8

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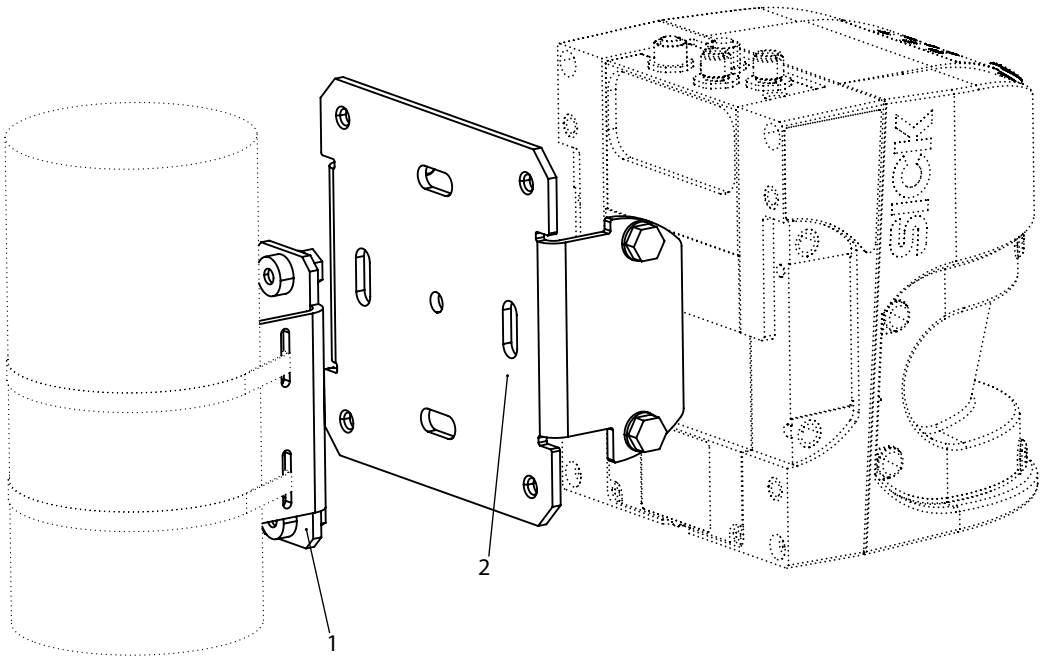
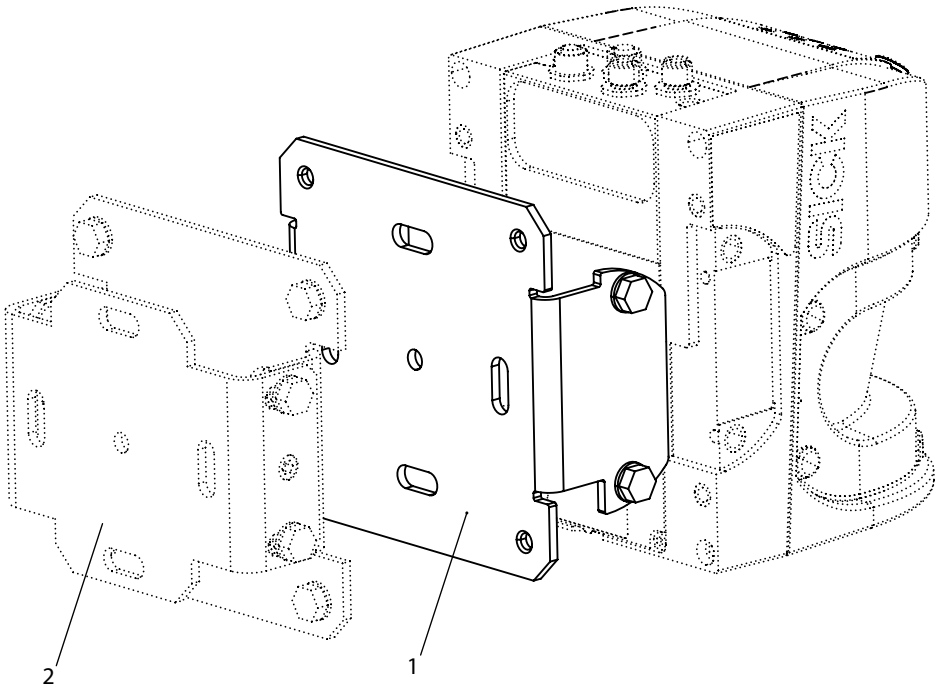
Pole mounting bracket



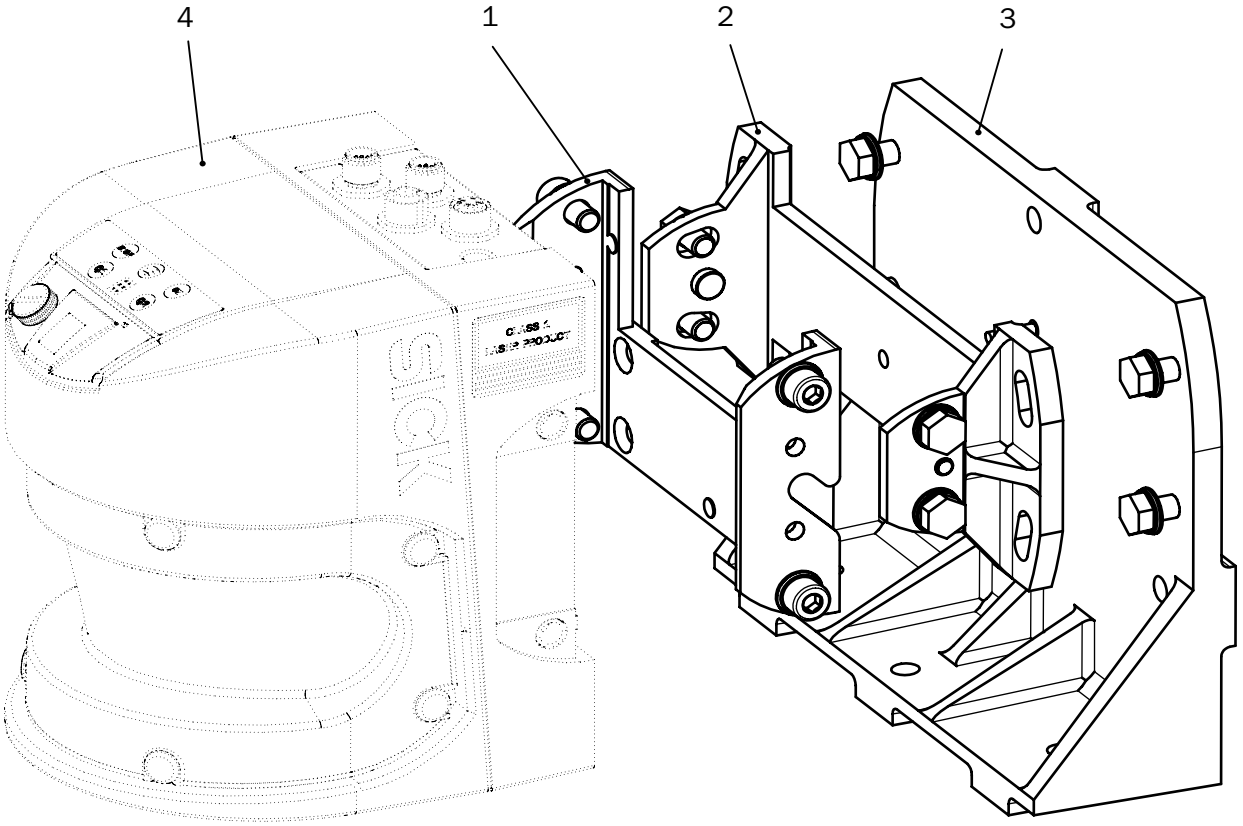
① Mounting bracket
② Mounting set for LMS2xx Part no. 2018303

Mounting bracket



① Pole mounting bracket
② Adapter bracket

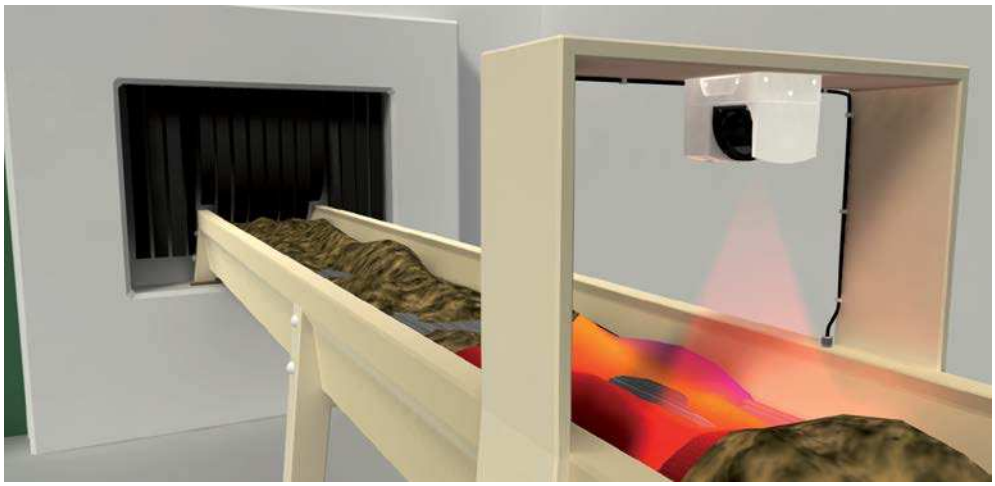
Mounting set 3



① Mounting set 1
② Mounting set 2
③ Mounting set 3
④ Product

Functional principle

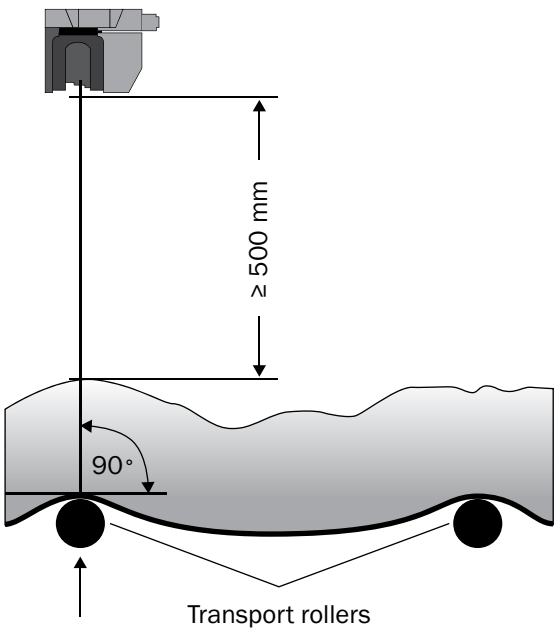
Bulkscan® LMS511



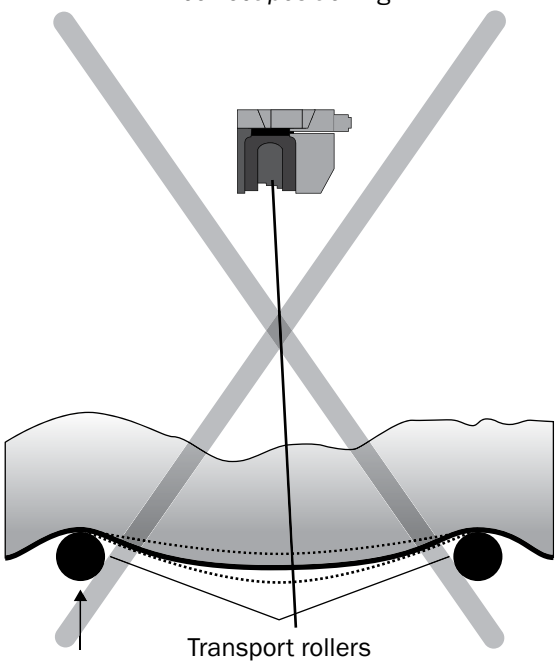
Installation instructions

Bulkscan® LMS511

Correct positioning



Incorrect positioning



Recommended accessories

Mounting brackets and mounting plates

	Brief description	Type	Part no.
	Mounting bracket for direct mounting, from the rear, on wall or machine, not adjustable	Mounting kit 1	2015623
	Mounting bracket for rear mounting on wall or machine, adjustable longitudinal and lateral axes, only in conjunction with mounting kit 1 (2015623)	Mounting kit 2	2015624
	Mounting bracket for rear mounting on wall, floor, or machine, adjustable longitudinal and lateral axes, only in conjunction with mounting kit 1 (2015623) and 2 (2015624)	Mounting kit 3	2015625
	Mounting bracket for LMS5xx (for retrofitting, if 2018303 is already in use)	Mounting bracket	2059271
	Pole bracket requires additionally adapter bracket (2059271) or mounting set (2018303)	Alignment bracket	2018304
	Spring arm/mounting arm	DFV60 spring arm	2056155

Other mounting accessories

	Brief description	Type	Part no.
	Strap for mast bracket (sold by meter)	Clamping strap	5306222
	Strap lock	Clamping strap lock	5306221

Power supply units and power cord connectors

	Brief description	Type	Part no.
	Power supply DC 24 V / 10 A	Power supply	6020875
	Power supply DC 24 V / 4 A	Power supply	6010362

Modules and gateways

	Brief description	Type	Part no.
	BAM100 analogue module for Bulkscan LMS511, Power supply: 24 V DC (–15 % / +20 %), Din rail module, 35 mm C-rail, acc. EN50022, Ethernet TCP/IP interface (RJ45), CoLA Communication, Analog signals: 3 x IN: 4 mA ... 20 mA, 4 x OUT: 4 mA ... 20 mA	BAM100-HE44K	2073296

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Programming and configuration tools

- **Enclosure rating:** IP 65

	Brief description	Type	Part no.
 Illustration may differ	Incremental measuring wheel encoder, electrical interface: 10 ... 30 V HTL / push-pull, universal mounting bracket, measuring wheel circumference = 300 mm, surface O-ring, connection: M12, 8-pin, number of lines 1,024, operating temperature –20 °C ... +100 °C	DFV60E-22EC01024	1060308
	Incremental measuring wheel encoder, electrical interface: 10 ... 30 V HTL / push-pull, universal mounting bracket, measuring wheel circumference = 300 mm, surface O-ring, connection: cable, 8-pin 1.5 m, number of lines 1024, operating temperature –20 °C ... +100 °C	DFV60E-22EK01024	1060309

Plug connectors and cables

	Enclosure rating	Cable length	Type	Part no.
	–	5 m	Connecting cable (female connector-open)	6042735
		10 m	Connecting cable (female connector-open)	6042736
		20 m	Connecting cable (female connector-open)	6042737
		5 m	Connecting cable (female connector-open)	6036159
		20 m	Connecting cable (female connector-open)	6042564
		10 m	Connecting cable (female connector-open)	6042565
		5 m	Connecting cable (male connector-open)	6042732
		10 m	Connecting cable (male connector-open)	6042733
		20 m	Connecting cable (male connector-open)	6042734
		3 m	Connection cable (male connector-male connector)	6042517
		5 m	SSL-2J04-G05ME	6034415
	IP 67, IP 20	10 m	SSL-2J04-G10ME	6030928
		20 m	SSL-2J04-G20ME	6036158

Test and monitoring tools

	Brief description	Type	Part no.
 Illustration may differ	Scan finder, receiver to localize infrared scans	LS-80L	6020756

Optics cloths

	Brief description	Type	Part no.
	Cloth for cleaning the front screen	Lens cloth	4003353

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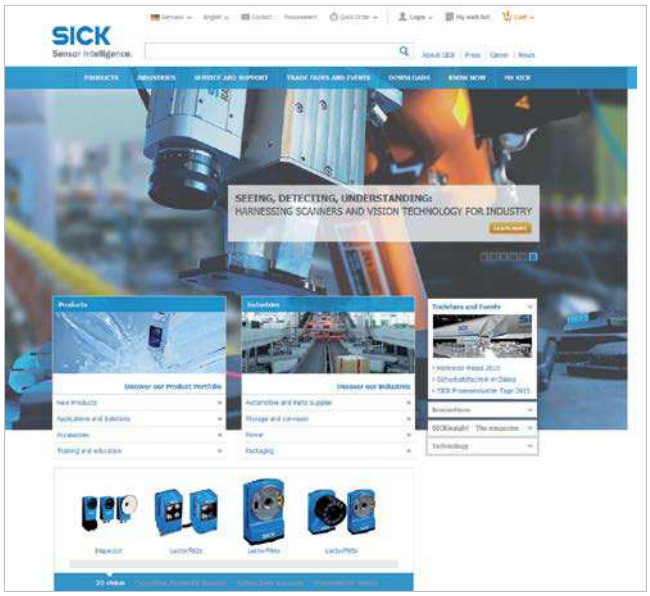

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Our comprehensive and versatile LifeTime Services are the perfect addition to the comprehensive range of products from SICK. The services range from product-independent consulting to traditional product services.

Consulting and design
Safe and professional

Product and system support
Reliable, fast and on-site

Verification and optimization
Safe and regularly inspected

Upgrade and retrofits
Easy, safe and economical

Training and education
Practical, focused and professional

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SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for industrial applications. With almost 7,000 employees and over 50 subsidiaries and equity investments as well as numerous representative offices worldwide, we are always close to our customers. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in various industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services round out our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is "Sensor Intelligence."

Worldwide presence:

Australia, Austria, Belgium, Brazil, Canada, Chile, China, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, India, Israel, Italy, Japan, Malaysia, Mexico, Netherlands, New Zealand, Norway, Poland, Romania, Russia, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, United Arab Emirates, USA, Vietnam.

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