Force sensor for rope suspension and threaded rods



Load measurement and rope tension monitoring
Inner diameter for M10 / M12 / M16 / M20

Features

- Time saving due to simple and universal installation directly in the rope suspension system
- Monitoring of rope tensions during operation for accurate maintenance
- Setting of uniform rope load during installation or pre-commissioning
- Unit-sensitive, i.e. can be used without calibration weights

Application

The sensors of the XCL-171 series are mounted on the suspension of a rope or belt and connected directly to a load measuring device with single sensor evaluation

The sensors are unit-sensitive, i.e. they are always supplied with a calibrated output signal. Due to this unit sensitivity, a meaningful load value is already available after installation without the need for additional calibration with load weights in advance.

By means of the load sensors, each rope load can be measured and monitored individually. In addition, the individual rope tensions can be monitored and adjusted.

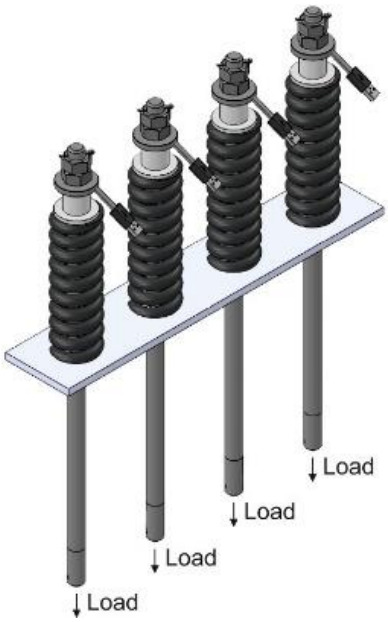
Ordering code

Description	Measuring range	Output signal	Characteristic	Specification
XCL-171-C-6000N-D10.4-USB/1.0m	0...6.0 kN	+ 1.5 mV/V	Für M10 Threaded rods	Page 3
XCL-171-C-9500N-D12.4-USB/1.0m	0...9.5 kN	+ 1.5 mV/V	Für M12 Threaded rods	Page 4
XCL-171-C-13000N-D16.5-USB/1.0m	0...13.0 kN	+ 1.5 mV/V	Für M16 Threaded rods	Page 5
XCL-171-C-20000N-D20.5-USB/1.0m	0...20.0 kN	+ 1.5 mV/V	Für M20 Threaded rods	Page 6

Load measuring ranges related to the individual sensor

Description	Thread	Minimum payload	Recommended payload	Total load per sensor
XCL-171-C-6000N-D10.4-USB/1.0m	M10	90 kg	120...360 kg	300 kg (typ) 800 kg (max)
XCL-171-C-9500N-D12.4-USB/1.0m	M12	120 kg	150...400 kg	500 kg (typ) 950 kg (max)
XCL-171-C-13000N-D16.5-USB/1.0m	M16	150 kg	200...600 kg	800 kg (typ) 1300 kg (max)
XCL-171-C-20000N-D20.5-USB/1.0m	M20	200 kg	280...850 kg	1000 kg (typ) 2000 kg (max)

Typical installation situation



Single Rope Load Sensor XCL-171-M10

For M10 Threaded rods



Specification

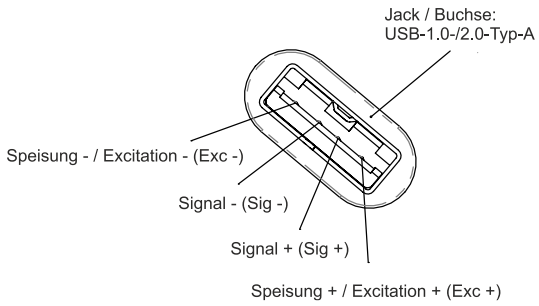
Performance	
Nominal measuring range	0…6.0 kN
Sensitivity / output signal related to the nominal measuring range	Δ + 1.5 mV/V
Zero Point	- 0.5 mV/V
Tolerance -10…+5 °C	< ± 5.5 % of final value
Tolerance +5…+40 °C	< ± 4.5 % of final value
Tolerance +40…+65 °C	< ± 5.5 % of final value
MTBF	Typ. >2'000 years

Electrical Data	
Supply voltage	5…15 VDC
Output signal referred to final value	Δ + 1.5 mV/V
Bridge resistance / sensor element strain gauge full bridge	700 Ohm

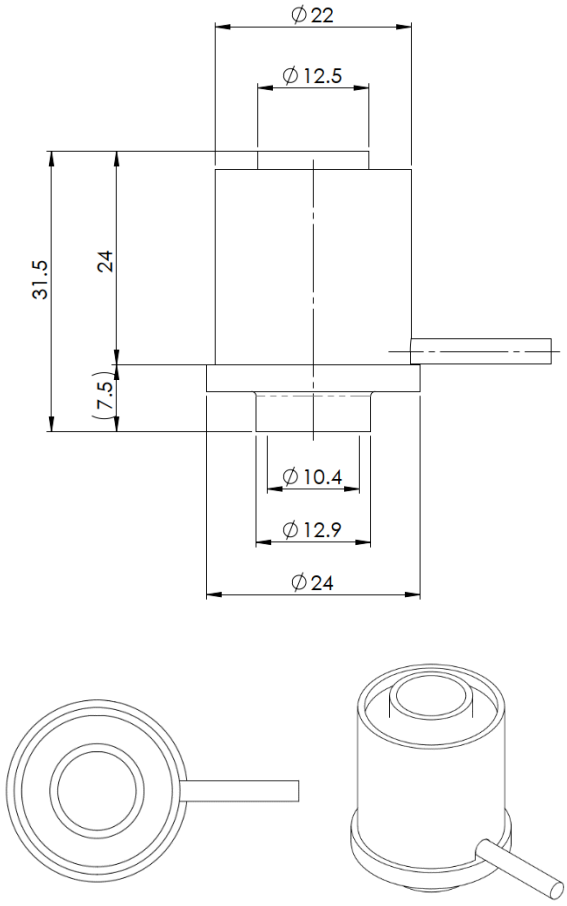
Mechanical Data	
Overload	19 kN
Electrical Connection	Connection cable with USB plug (USB-1.0-/2.0-Type-A)
Cable length	1 m

Environmental Data	
Storage temperature	-40…+70 °C
Ambient temperature	-10…+65 °C
Protection class	IP 54

Pin Assignment



Dimensions



Ordering code

For detailed ordering information, see page 2.

Single Rope Load Sensor XCL-171-M12

For M12 Threaded rods



Specification

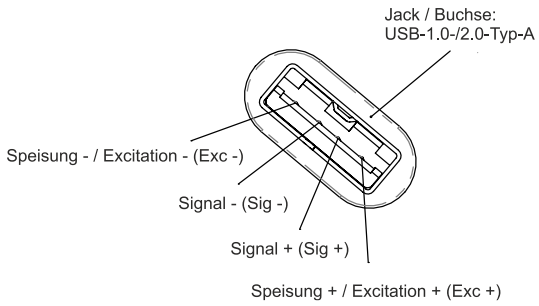
Performance	
Nominal measuring range	0…9.5 kN
Sensitivity / output signal related to the nominal measuring range	Δ + 1.5 mV/V
Zero Point	- 0.5 mV/V
Tolerance -10…+5 °C	< ± 5.5 % of final value
Tolerance +5…+40 °C	< ± 4.5 % of final value
Tolerance +40…+65 °C	< ± 5.5 % of final value
MTBF	Typ. >2'000 years

Electrical Data	
Supply voltage	5…15 VDC
Output signal referred to final value	Δ + 1.5 mV/V
Bridge resistance / sensor element strain gauge full bridge	700 Ohm

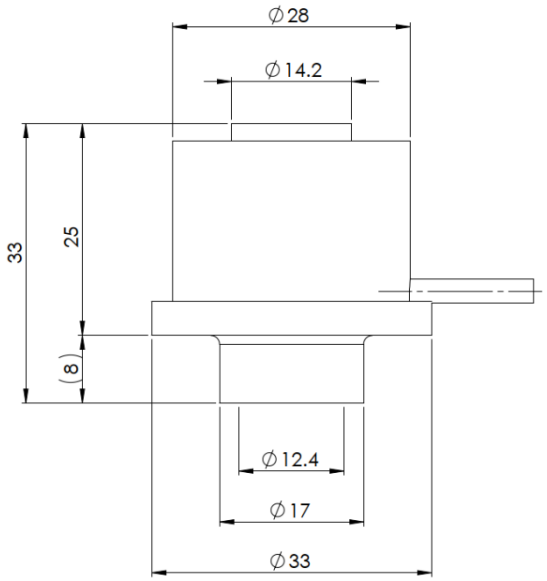
Mechanical Data	
Overload	19 kN
Electrical Connection	Connection cable with USB plug (USB-1.0-/2.0-Type-A)
Cable length	1 m

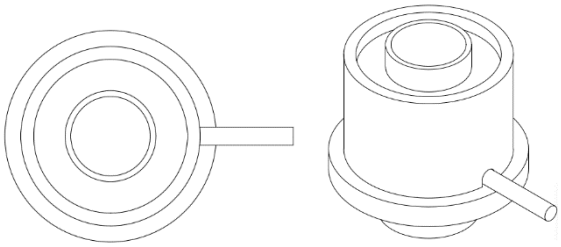
Environmental Data	
Storage temperature	-40…+70 °C
Ambient temperature	-10…+65 °C
Protection class	IP 54

Pin Assignment



Dimensions





Ordering code

For detailed ordering information, see page 2

Single Rope Load Sensor XCL-171-M16

For M16 Threaded rods



Spezifikationen

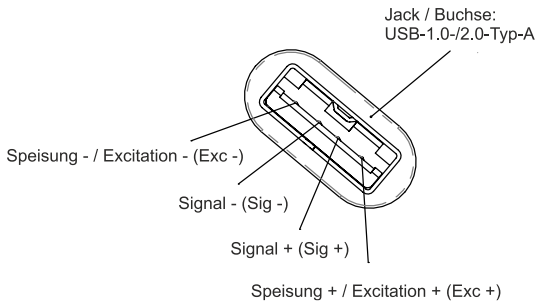
Performance	
Nominal measuring range	0…13.0 kN
Sensitivity / output signal related to the nominal measuring range	Δ + 1.5 mV/V
Zero Point	- 0,5 mV/V
Tolerance -10…+5 °C	< ± 5.5 % of final value
Tolerance +5…+40 °C	< ± 4.5 % of final value
Tolerance +40…+65 °C	< ± 5.5 % of final value
MTBF	Typ. >2'000 years

Electrical Data	
Supply voltage	5…15 VDC
Output signal referred to final value	Δ + 1.5 mV/V
Bridge resistance / sensor element strain gauge full bridge	700 Ohm

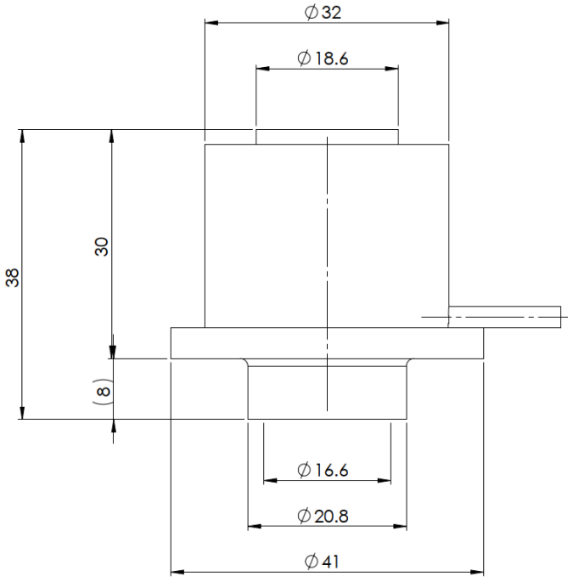
Mechanical Data	
Overload	26 kN
Electrical Connection	Connection cable with USB plug (USB-1.0-/2.0-Type-A)
Cable length	1 m

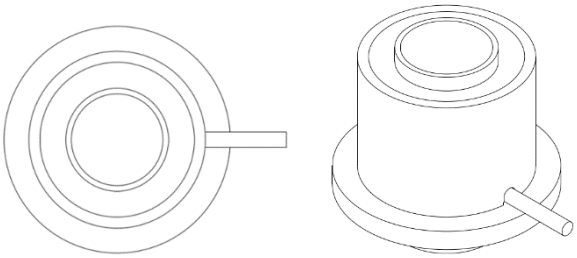
Environmental Data	
Storage temperature	-40…+70 °C
Ambient temperature	-10…+65 °C
Protection class	IP 54

Pin Assignment



Dimensions





Ordering code

For detailed ordering information, see page 2

Single Rope Load Sensor XCL-171-M20

For M20 Threaded rods



Spezifikationen

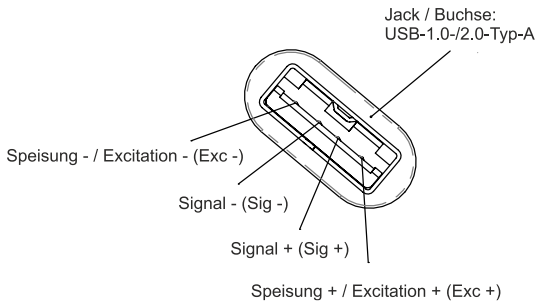
Performance	
Nominal measuring range	0...20 kN
Sensitivity / output signal related to the nominal measuring range	Δ + 1.5 mV/V
Zero Point	- 0.5 mV/V
Tolerance -10...+5 °C	< ± 5.5 % of final value
Tolerance +5...+40 °C	< ± 4.5 % of final value
Tolerance +40...+65 °C	< ± 5.5 % of final value
MTBF	Typ. >2'000 years

Electrical Data	
Supply voltage	5...15 VDC
Output signal referred to final value	Δ + 1.5 mV/V
Bridge resistance / sensor element strain gauge full bridge	700 Ohm

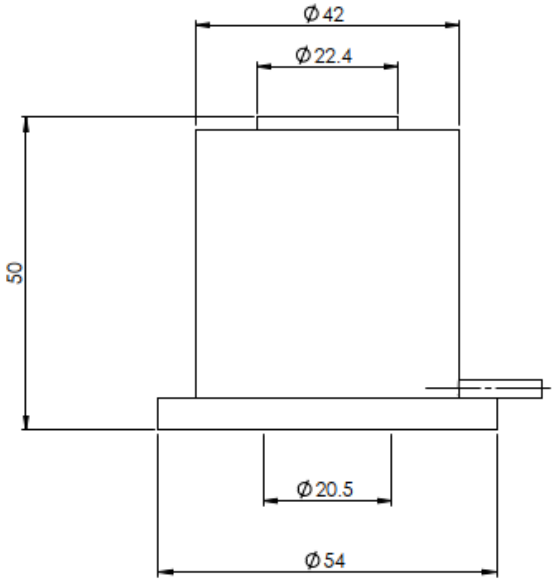
Mechanical Data	
Overload	40 kN
Electrical Connection	Connection cable with USB plug (USB-1.0-/2.0-Type-A)
Cable length	1 m

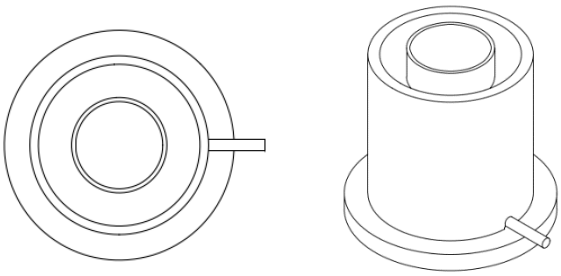
Environmental Data	
Storage temperature	-40...+70 °C
Ambient temperature	-10...+65 °C
Protection class	IP 54

Pin Assignment



Dimensions





Ordering code

For detailed ordering information, see page 2

Assembly information

The sensors of the XCL-171 series are mounted directly in the fixed point or at the rope suspension of an elevator. After mounting, the load and rope tension of each rope can be monitored individually.

The sensors are connected to a CANopen Lift Interface module, which is able to provide the actual load from each individual sensor to the controller.

Simpler solutions result from measuring the total load with the programmable evaluation unit X-232 with three relay outputs.

For OEM suppliers we also offer the possibility to provide the individual load measurement values via a specific protocol (e.g. LON bus).

