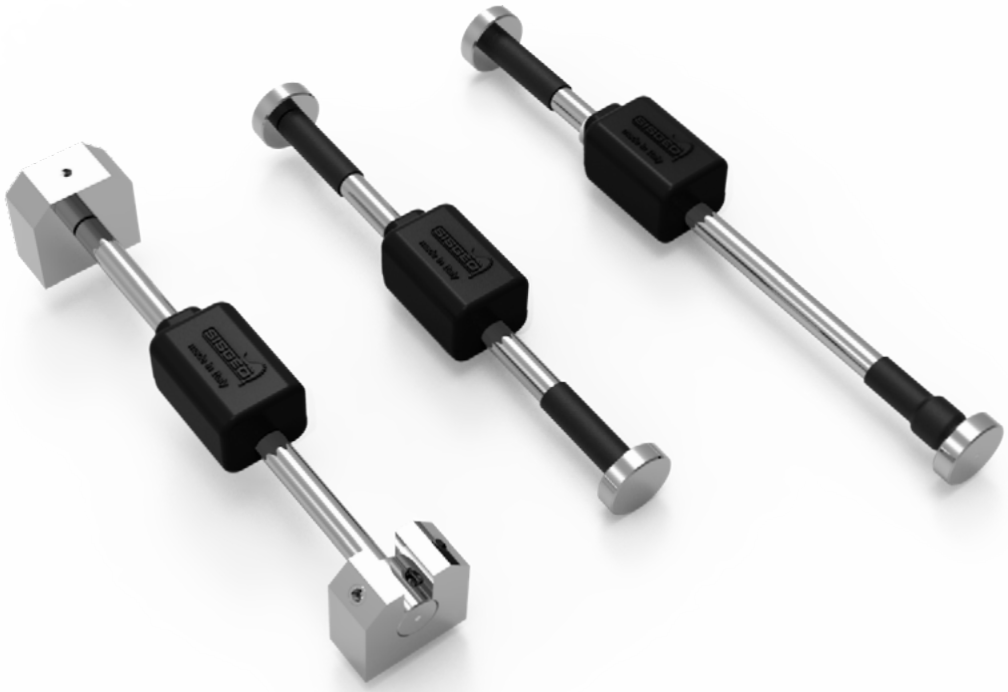
VK40

VIBRATING WIRE

STRAIN GAUGES

STRAIN GAUGES
& THERMOMETERS

SISGEO®



VIBRATING WIRE
STRAIN GAUGES

Vibrating wire strain gauges are used to measure strain in steel and concrete structures. The measured strain can be used to calculate structural loads or stresses.
Arc-weldable strain gauges are installed on steel structures by means of weldable end blocks. On concrete surfaces, they can be installed using mounting blocks with rebar bolts.
Embedment strain gauges are cast into concrete structures and are also available in a shotcrete version with an adjustable tensioning collar.
For high concrete pressure applications, such as deep foundation piles, an embedment strain gauge for deep installations is recommended.

APPLICATIONS

- Piles and mass concrete
- Concrete structures, beams and columns
- Concrete foundations and diaphragm walls
- Tunnel segments
- Steel structures, pipes and arch supports
- Gravity and arch dams
- RCC dams
- Bridges and viaducts

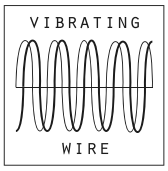
FEATURES

- Reliable long term performance
- Robust design for demanding environments
- Thermally aged to minimize long-term drift
- Built-in temperature sensor
- Waterproof
- Accurate readings even with long cable lengths

CE *Meet the essential requirements of the EMC Directive 2014/30/EU*

VK40_EN_05 - 04/2026

OPERATING PRINCIPLE



A tensioned wire, when plucked, vibrates at its resonant frequency. The square of this frequency is proportional to the strain in the wire.
To make use of this principle, the vibrating wire strain gauge is designed to hold a wire in tension between two end blocks that are fixed to the structure. An electromagnetic coil assembly is used to pluck the wire and return a frequency signal to the readout unit.
Deformation of the structure changes the distance between the two end blocks, thereby changing the tension of the wire and its resonant frequency. The measured signal is converted into microstrain values. Gauges may be read up to 1000 meters away from their location.
The strain gauge incorporates a built-in thermistor to provide temperature data for the evaluation of thermal effects, if required.

TECHNICAL SPECIFICATIONS

PRODUCT CODE	0VK4000VS00	0VK4000VSC0	0VK4200VC00	0VK4200VCHP	0VK4000SM00
Description	arc-weldable strain gauge	concrete surface strain gauge	embedment strain gauge	embedment SG for deep application	shotcrete SG with adjustable tensioning
Measuring principle	vibrating wire	vibrating wire	vibrating wire	vibrating wire	vibrating wire
Active gauge length	150 mm (5.9")	150 mm (5.9")	165 mm (6.5")	165 mm (6.5")	200 mm (7.9")
Range (nominal)	3000 με (±1500 με)	3000 με (±1500 με)	3000 με (±1500 με)	3000 με (±1500 με)	10000 με (±5000 με)
Typical frequency range [1]	500 - 1000 Hz	500 - 1000 Hz	500 - 1015 Hz	520 - 1025 Hz	1800 - 2460 Hz
Repeatability	<±1 με	<±1 με	<±1 με	<±1 με	<±3 με
Sensitivity (nominal)	See Compliance Certificate				
Resolution	<1.0 με	<1.0 με	<1.0 με	<1.0 με	<1.0 με
Accuracy	±0.5% FS	±0.5% FS	±0.5% FS	±0.5% FS	±3.0% FS [2]
Coil resistance (nominal)	150 ohm	150 ohm	150 ohm	150 ohm	150 ohm
Embedded thermistor type	NTC (Negative Temperature Coefficient) 3 kΩ				
Embedded thermistor accuracy	±1°C (±0.5°C within 0 - 50 °C)				
Power supply	Automatically selected by readout (max 40 V)				
Output	Frequency (strain), resistance (temperature)				
IP class	IP68 up to 2.0 MPa	IP68 up to 2.0 MPa	IP68 up to 2.0 MPa	IP68 up to 2.0 MPa	IP68 up to 2.0 MPa
Restriction for use in fresh concrete [3]	max 2.4 MPa concrete pressure	max 2.4 MPa concrete pressure	max 800 kPa concrete pressure	max 2.4 MPa concrete pressure	max 2.4 MPa concrete pressure
Main body materials	stainless steel body and epoxy resin sensor enclosure				
Anchors material	galvanized steel welding blocks	galvanized steel blocks and rebars	stainless steel circular plates	stainless steel circular plates	stainless steel circular plates
Coeff. of thermal expansion	12 x 10^{-6} / °C				
Temperature range	-20°C + 80°C				
Signal cable	0WE104SG0ZH or 0WE104SG0PV				
Max. cable length to logger	1000 m (for more information see FAQ#77)				

(1) The stated values may vary by ±10 %.

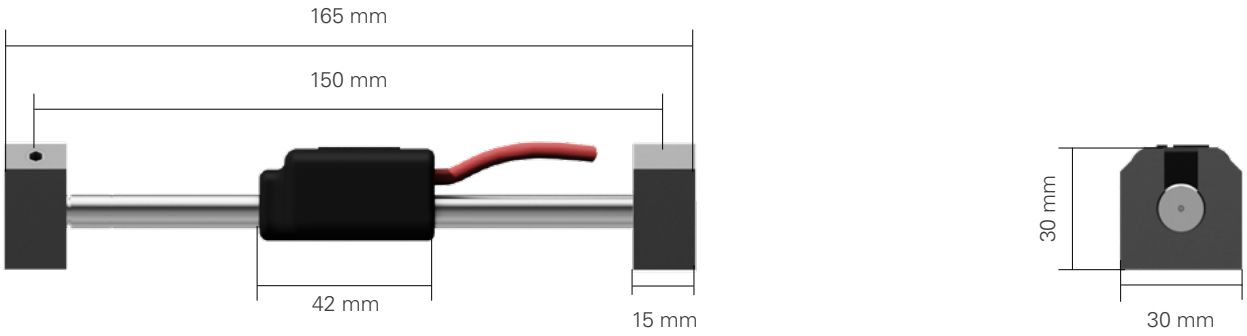
(2) ±3.0 % FS with standard batch calibration; ±0.5 % FS with individual calibration.

(3) This is the maximum installation depth under a fresh concrete column, e.g. in foundation piles.

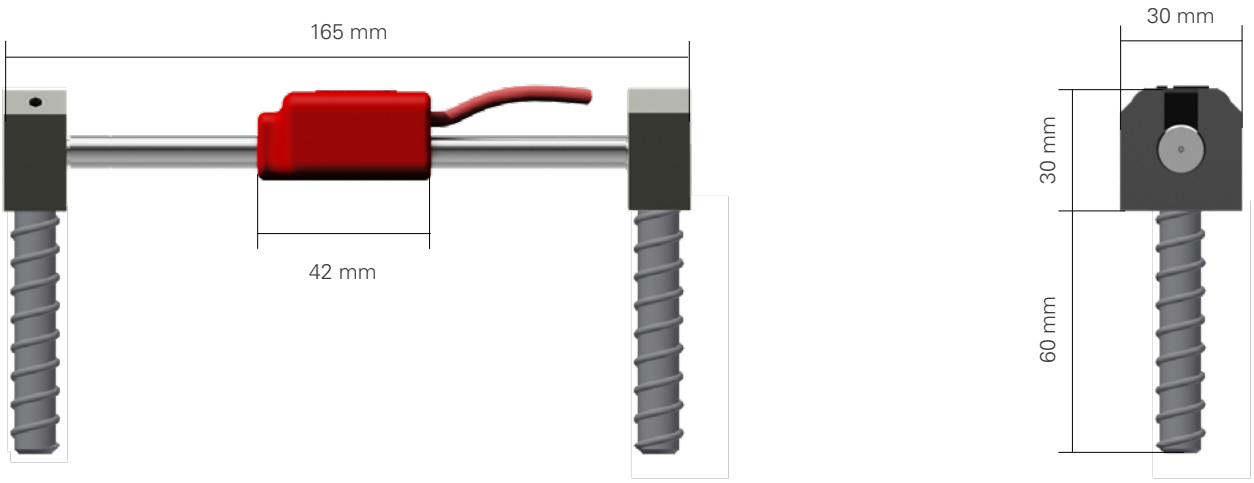
VK40_EN_05 - 04/2026

PHYSICAL FEATURES (0VK4000VS00 AND 0VK4000VSC0)

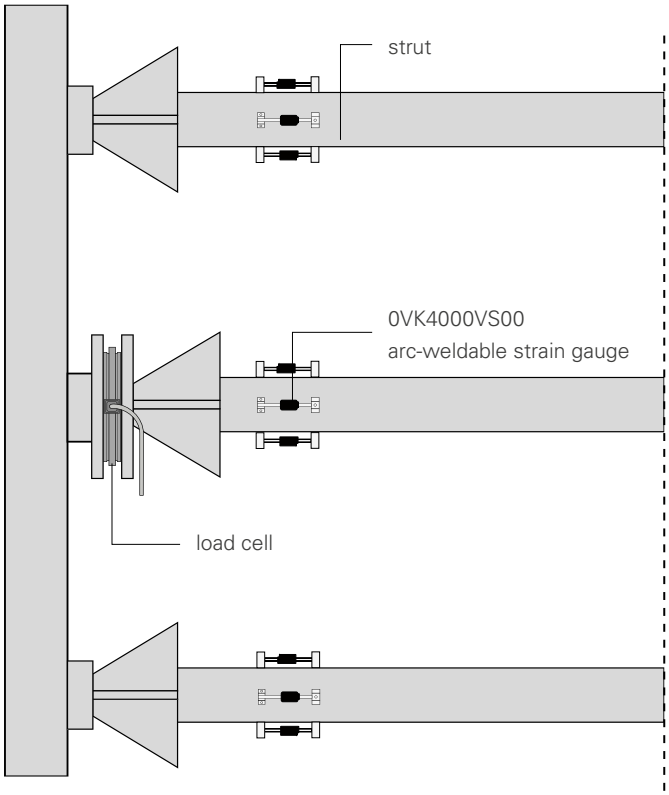
0VK4000VS00 - ARC-WELDABLE STRAIN GAUGE

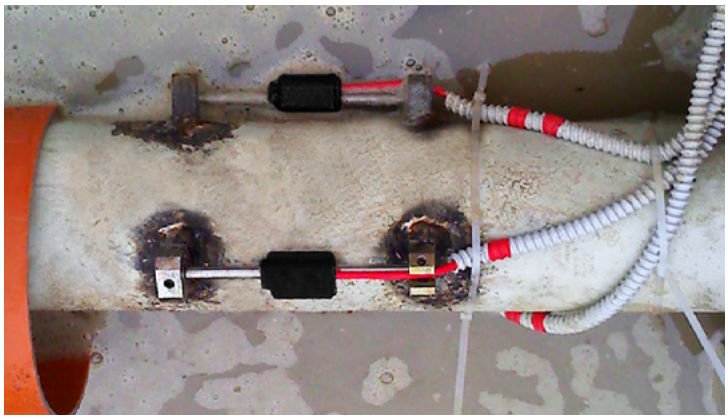


0VK4000VSC0 - CONCRETE SURFACE STRAIN GAUGE



AN EXAMPLE OF STRUT APPLICATION

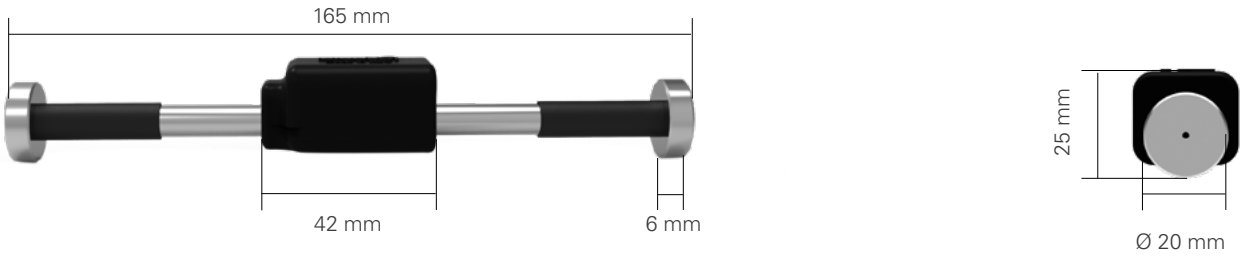




VK40_EN_05 - 04/2026

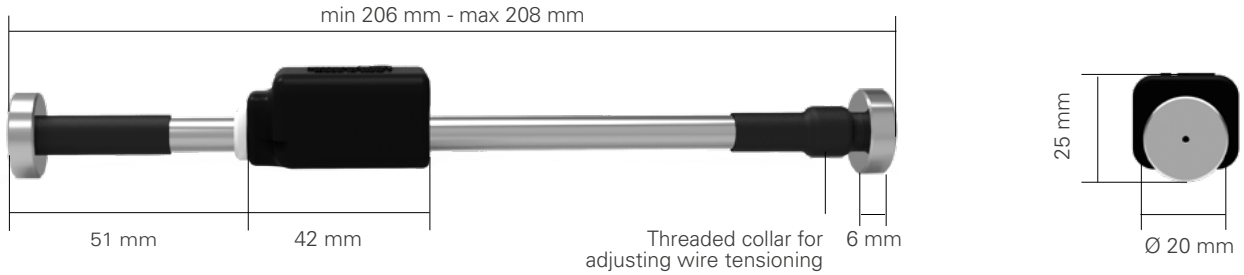
PHYSICAL FEATURES (0VK4200VC00 AND 0VK4200VCHP)

0VK4200VC00 / 0VK4200VCHP - EMBEDMENT STRAIN GAUGES

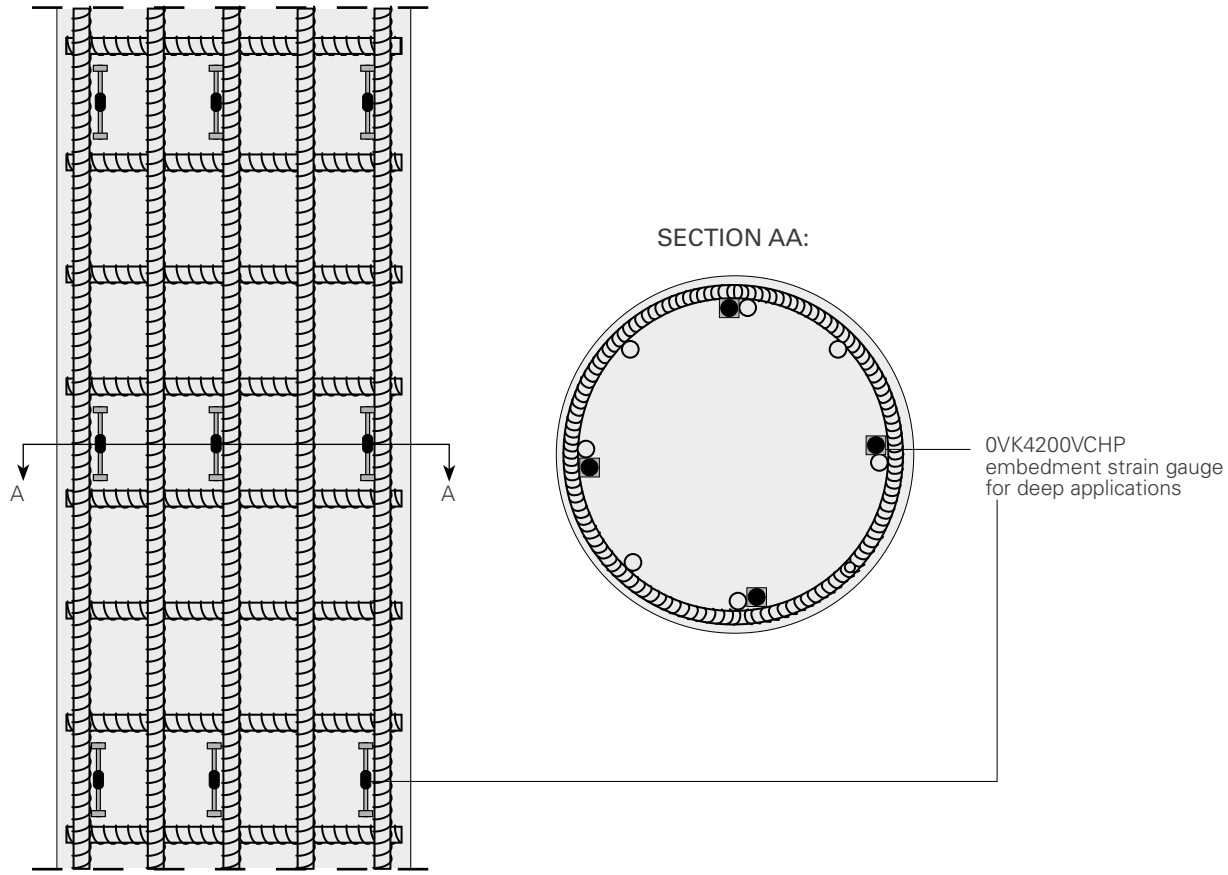


PHYSICAL FEATURES (0VK4000SM00)

0VK4000SM00 - SHOTCRETE EMBEDMENT STRAIN GAUGE

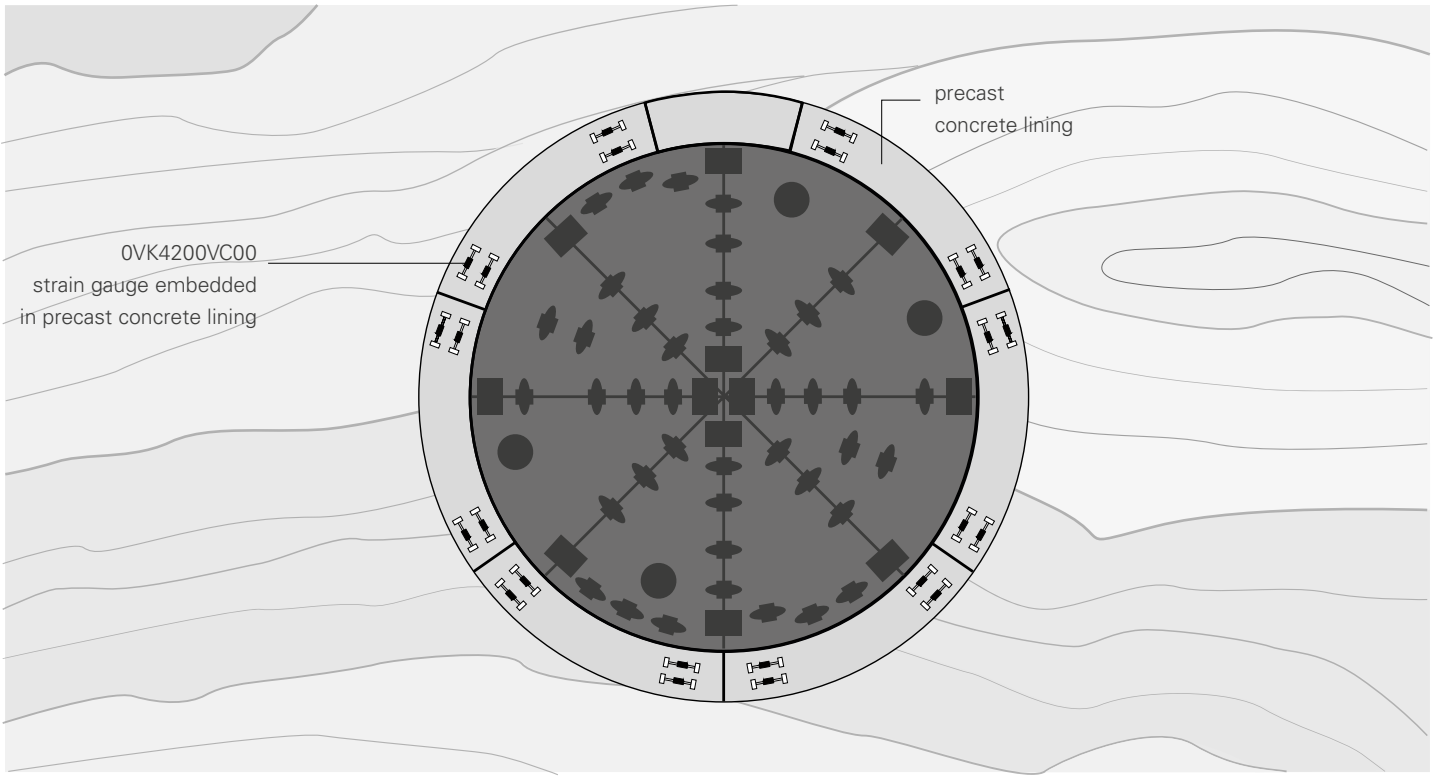


AN EXAMPLE OF PILE APPLICATION

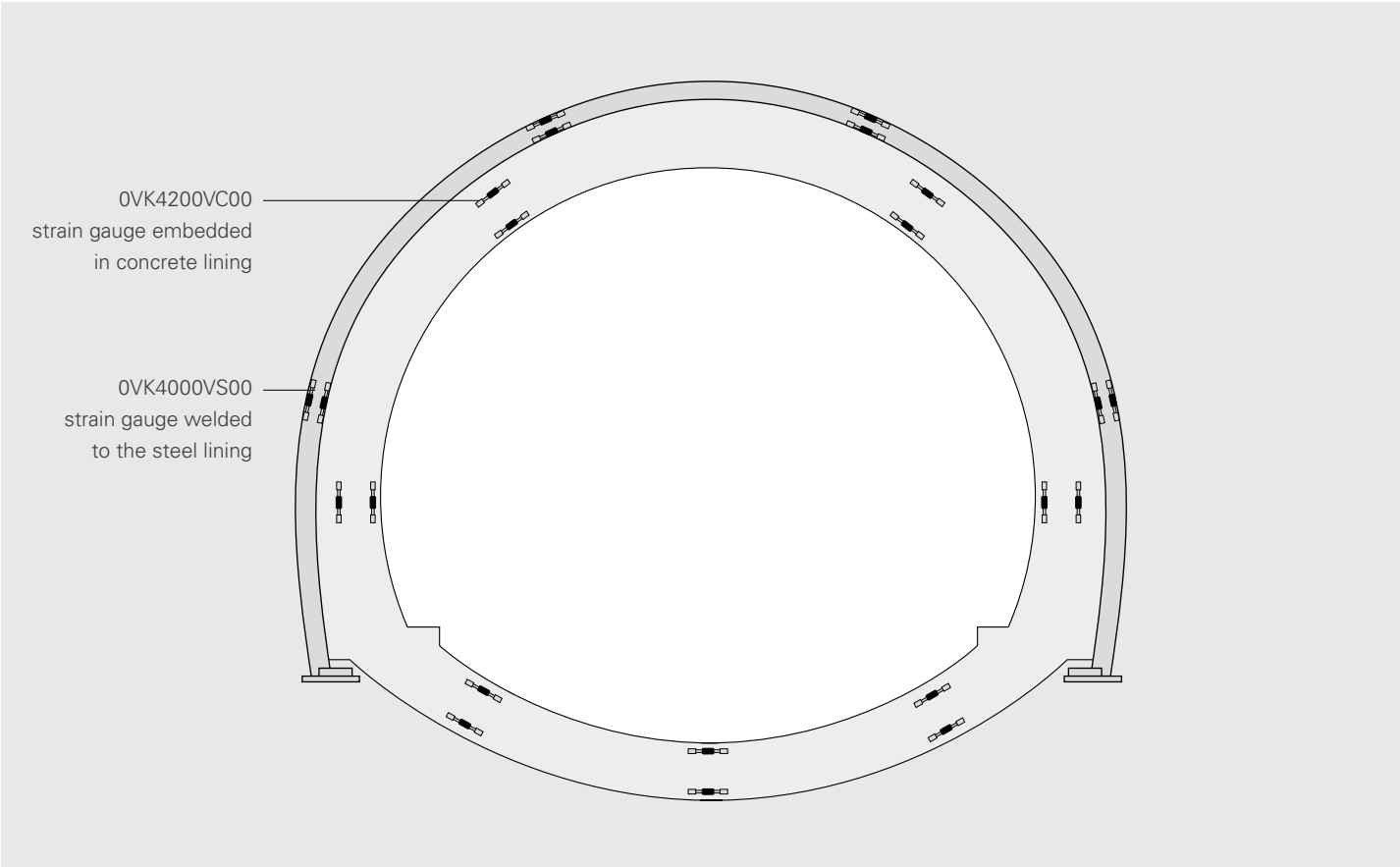


VK40_EN_05 - 04/2026

AN EXAMPLE OF TBM TUNNEL APPLICATION



AN EXAMPLE OF NATM TUNNEL APPLICATION



VK40_EN_05 - 04/2026

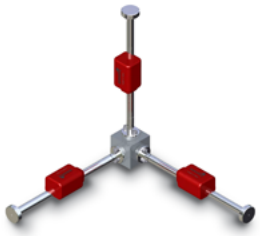
ACCESSORIES AND SPARE PARTS

SPACING JIG
OVK400JIG00

It allows to weld at the right distance the arc-weldable strain gauge end blocks.

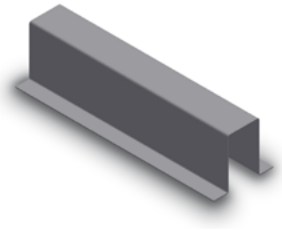
3D ROSETTE MOUNTING
OVK42VC3D00

This block allows three embedment strain gauges to be installed in a 3D rosette configuration. The strain gauges require specific machining: if additional SG are required, please contact Sisgeo, specifying the intended application.



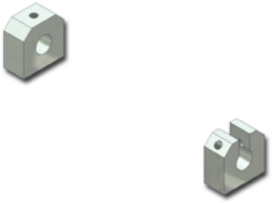
PROTECTIVE COVER
OVK400COVER

Stainless steel protective cover. Where thermal influence is expected the cover can be filled with expanding foam.



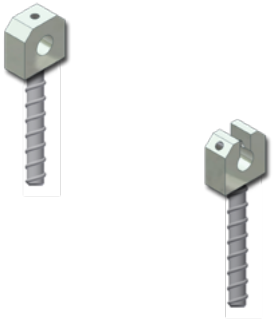
SPARE WELDING BLOCKS
OVK400MB200

Spare pair of weldable end blocks for arc-weldable strain gauges. Made of galvanized steel.

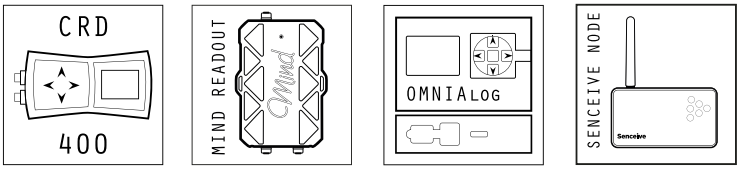


SPARE STEEL BLOCKS
OVK400CMB20

Spare pair of galvanized steel blocks, suitable for anchoring arc-weldable strain gauges to concrete.



READABLE BY



For further information, refer to the relevant readout datasheets.

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TECHNICAL ASSISTANCE

SISGEO offers technical support by e-mail to ensure correct installation and use, and to maximize system performance.
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