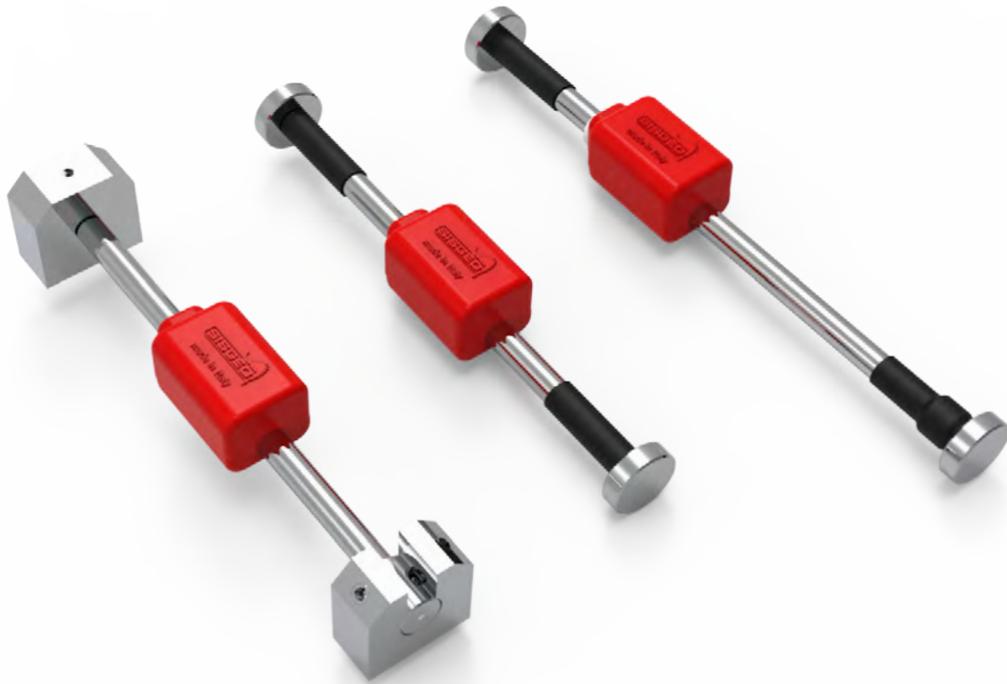


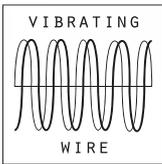
VK40

— VIBRATING WIRE
STRAIN GAUGES

STRAIN GAUGES
& THERMOMETERS



VIBRATING WIRE STRAIN GAUGES



Vibrating wire strain gauges provide measurements of strain in steel or concrete structures. The measurements are used to calculate structural loads or stresses.

Arc-weldable strain gauges are fixed to steel structures via weldable end-blocks. On concrete surfaces they can be installed by means of mounting blocks that include rebar-bolts.

Embedment strain gauges are cast into concrete structures and are available also as "shot crete" model with adjustable tensioning collar. For high concrete pressure, e.g in deep piles, an embedment strain gage for deep applications is recommended.

APPLICATIONS

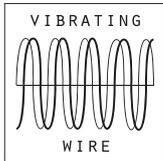
- Piles and mass concrete
- Concrete structures, beams and columns
- Concrete foundations and diaphragm walls
- Tunnel segments
- Steel structures, pipes and arch supports
- Gravity and arch dams
- RCC dams
- Bridges and viaducts

FEATURES

- Reliable long term performance
- Robust design, suitable for demanding environments
- Aged thermally to minimize long-term drift
- Built-in temperature sensor
- Totally waterproof
- Accurate readings even with long cable lengths

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

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 then to return a frequency signal to the readout units.

Deformation of the structure changes the distance between the two end blocks, altering the tension of the wire and its resonant frequency. The returned signal is converted to units of microstrain. Gauges may be read up to 1000 meters away from their location.

The strain gauge has a built-in thermistor to provide temperature data for detecting thermal effects if necessary.

TECHNICAL SPECIFICATIONS

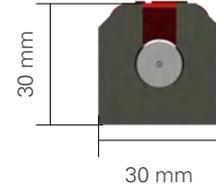
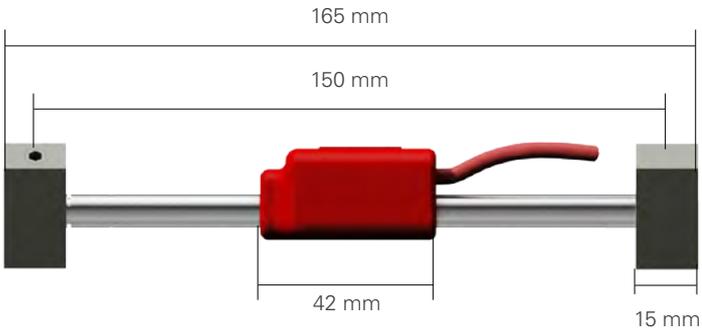
PRODUCT CODE	0VK4000VS00	0VK4000VSCO	0VK4200VC00	0VK4200VCHP	0VK4000SM00
Description	weldable SG	concrete surface SG	embedment SG	embedment SG for deep application	shotcrete SG with adjustable tensioning
Measuring principle	vibrating wire	vibrating wire	vibrating wire	vibrating wire	vibrating wire
Active 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 $\mu\epsilon$ ($\pm 1500 \mu\epsilon$)	3000 $\mu\epsilon$ ($\pm 1500 \mu\epsilon$)	3000 $\mu\epsilon$ ($\pm 1500 \mu\epsilon$)	3000 $\mu\epsilon$ ($\pm 1500 \mu\epsilon$)	10000 $\mu\epsilon$ ($\pm 5000 \mu\epsilon$)
Typical frequency range ⁽¹⁾	500 - 1000 Hz	500 - 1000 Hz	500 - 1015 Hz	520 - 1025 Hz	1800 - 2460 Hz
Repeatability	< $\pm 1 \mu\epsilon$	< $\pm 1 \mu\epsilon$	< $\pm 1 \mu\epsilon$	< $\pm 1 \mu\epsilon$	< $\pm 3 \mu\epsilon$
Sensitivity (nominal)	4.043 $\mu\epsilon$ / digit ⁽²⁾	4.043 $\mu\epsilon$ / digit ⁽²⁾	3.814 $\mu\epsilon$ / digit ⁽²⁾	3.814 $\mu\epsilon$ / digit ⁽²⁾	3.542 $\mu\epsilon$ / digit ⁽²⁾
Resolution	<1.0 $\mu\epsilon$	<1.0 $\mu\epsilon$	<1.0 $\mu\epsilon$	<1.0 $\mu\epsilon$	<1.0 $\mu\epsilon$
Accuracy	$\pm 0.5\%$ FS	$\pm 0.5\%$ FS	$\pm 0.5\%$ FS	$\pm 0.5\%$ FS	$\pm 3.0\%$ FS ⁽³⁾
Coil resistance (nominal)	150 ohm	150 ohm	150 ohm	150 ohm	150 ohm
Embedded thermistor type	NTC (Negative Temperature Coefficient) 3 k Ω				
Embedded thermistor accuracy	$\pm 1^\circ\text{C}$ ($\pm 0.5^\circ\text{C}$ within 0 - 50 $^\circ\text{C}$)				
Power supply	Automatically selected by readout (max 40 V)				
Output	Frequency (strain), Ohm (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 application in fresh concrete ⁽⁴⁾	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 circle plates	stainless steel circle plates	stainless steel circle plates
Coeff. of thermal expansion	12 x 10 ⁻⁶ / $^\circ\text{C}$				
Temperature range	-20 $^\circ\text{C}$ + 80 $^\circ\text{C}$				
Signal cable	0WE104SG0ZH or 0WE104SG0PV				
Max. cable length to logger	1000 m (for more information see FAQ#77)				

(1) The expressed values could have a $\pm 10\%$ variation (2) "Digit" means ($f^2 \times 10^{-3}$) where f is the vibration frequency of the wire in Hz

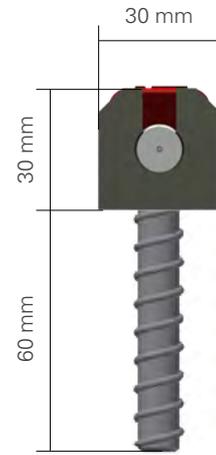
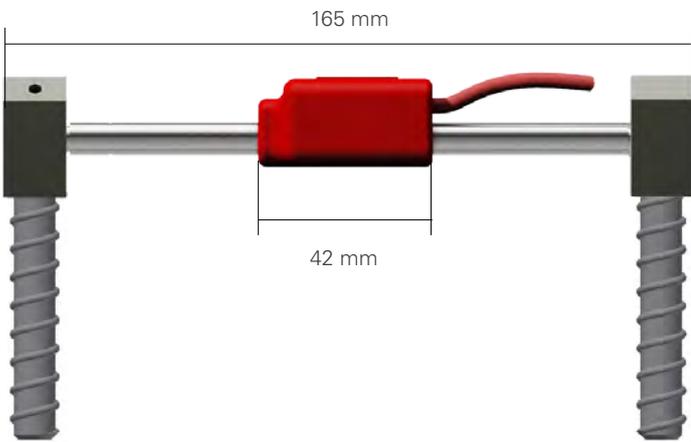
(3) $\pm 3.0\%$ FS with standard calibration batch; $\pm 0.5\%$ FS with individual calibration. (4) This is the maximum installation depth under fresh concrete column, i.e. in foundation piles.

PHYSICAL FEATURES (OVK4000VS00 AND OVK4000VSC0)

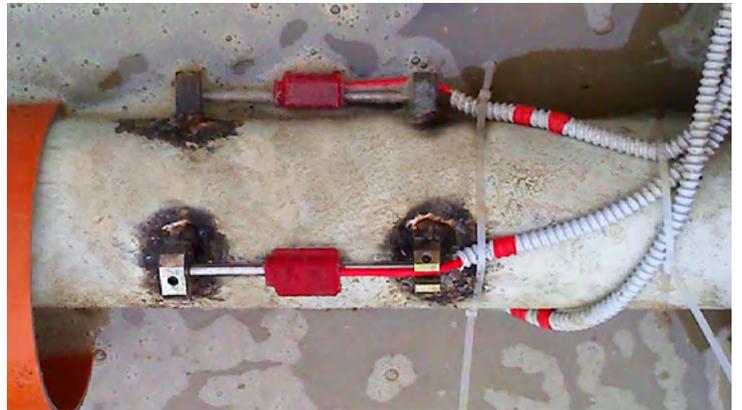
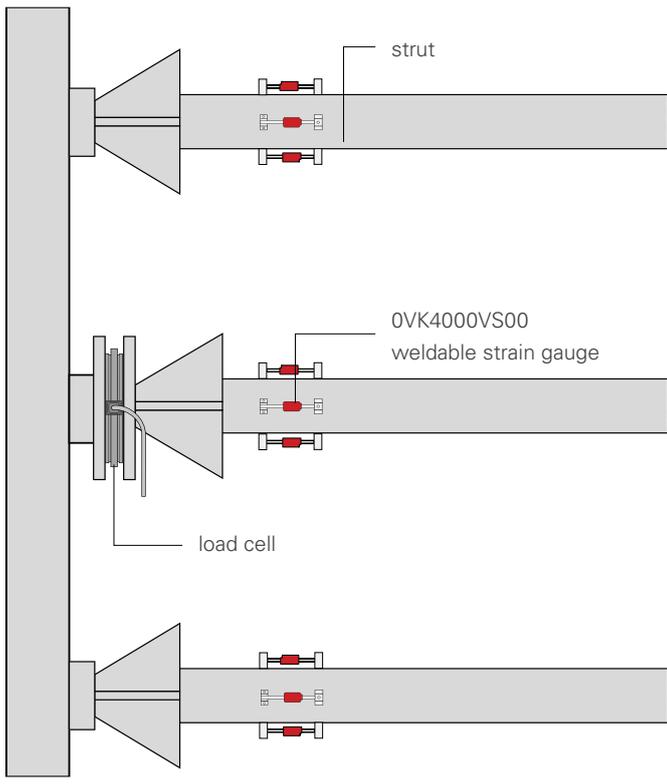
OVK4000VS00 - WELDABLE STRAIN GAUGE



OVK4000VSC0 - CONCRETE SURFACE STRAIN GAUGE

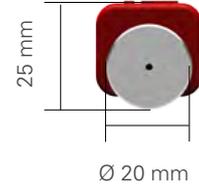
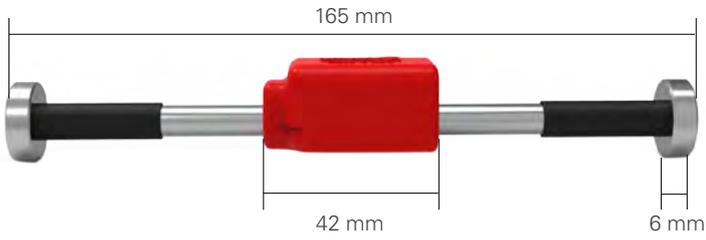


AN EXAMPLE OF APPLICATION ON STRUTS



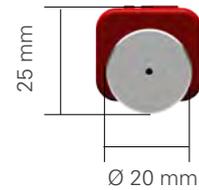
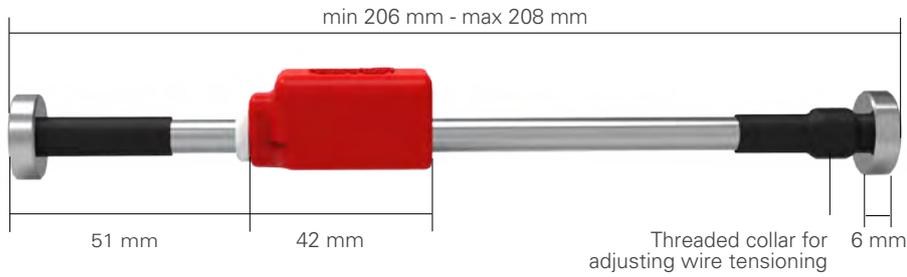
PHYSICAL FEATURES (OVK4200VC00 AND OVK4200VCHP)

OVK4200VC00 / OVK4200VCHP - EMBEDMENT STRAIN GAUGES

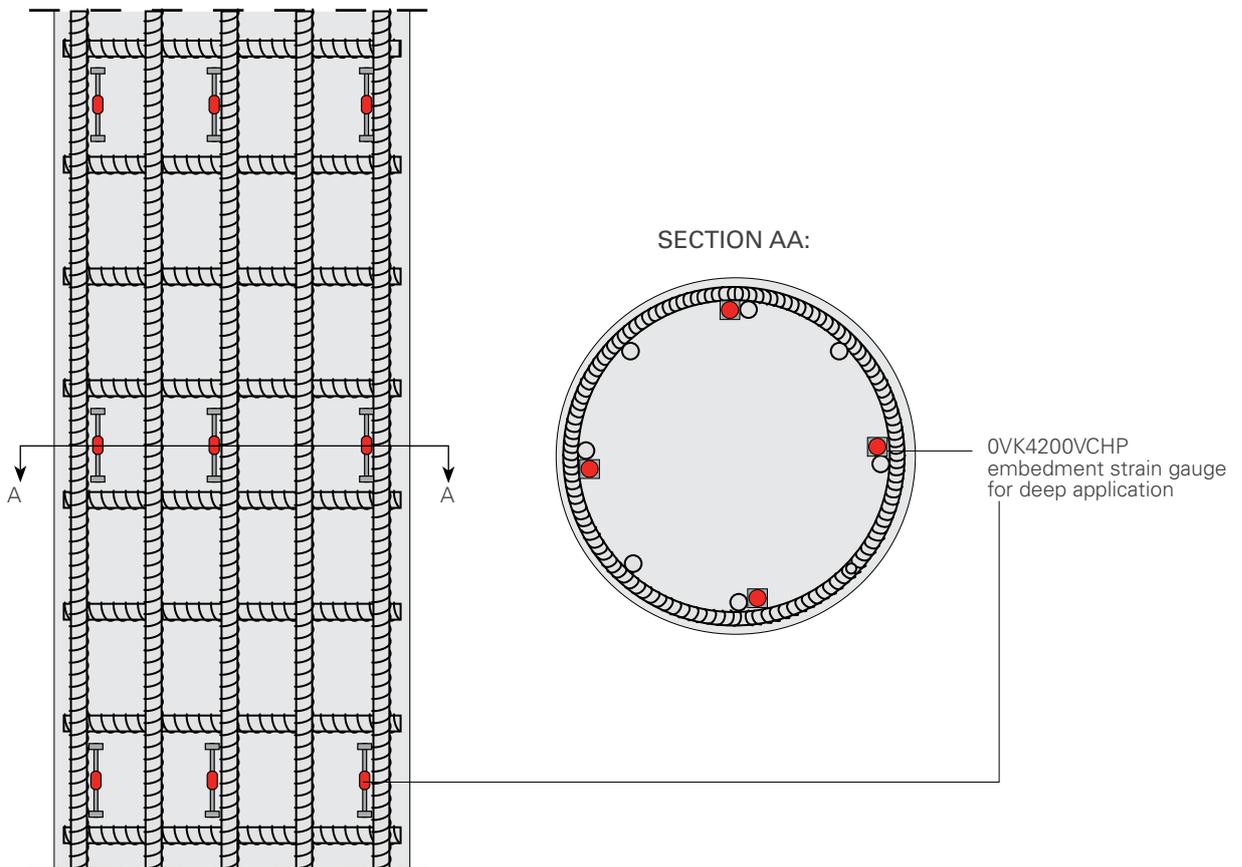


PHYSICAL FEATURES (OVK4000SM00)

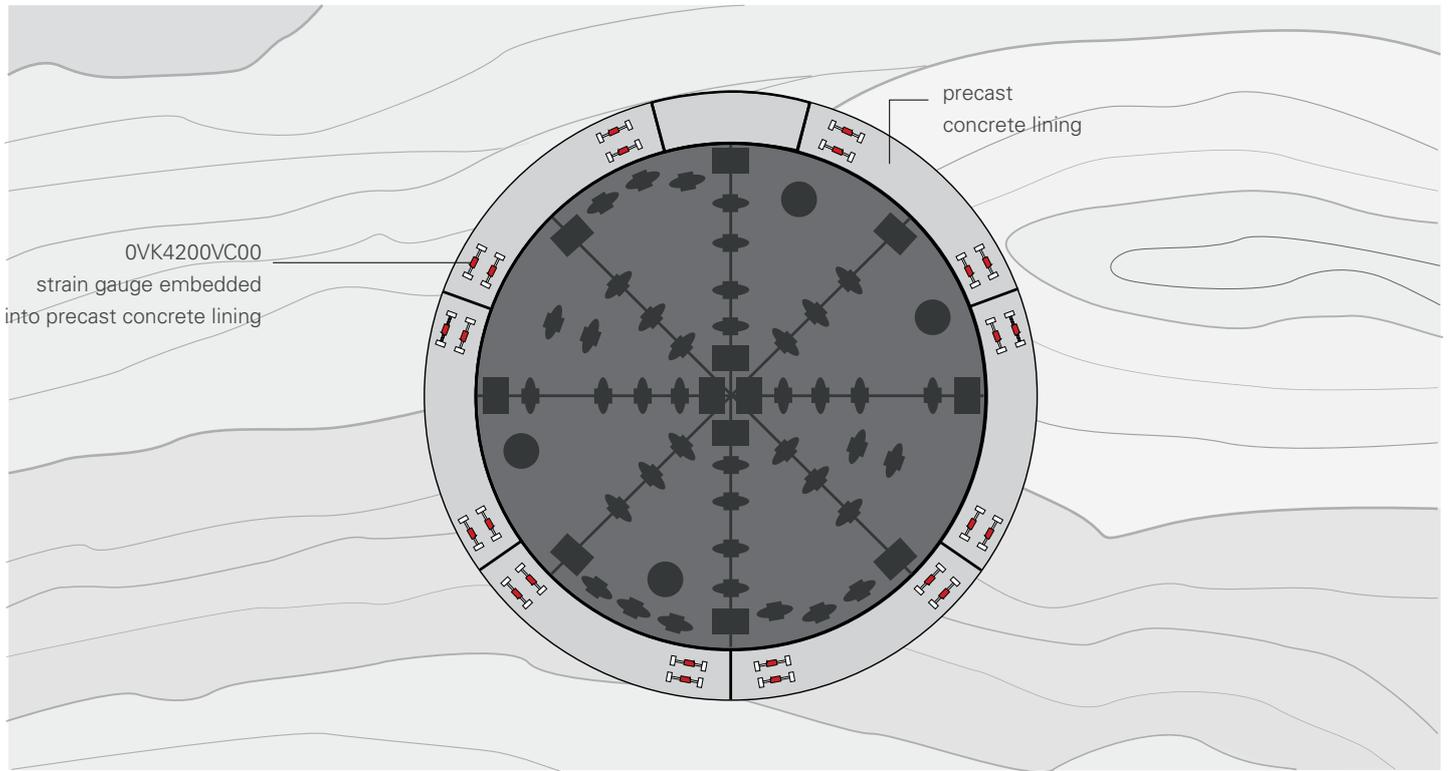
OVK4000SM00 - SHOTCRETE EMBEDMENT STRAIN GAUGE



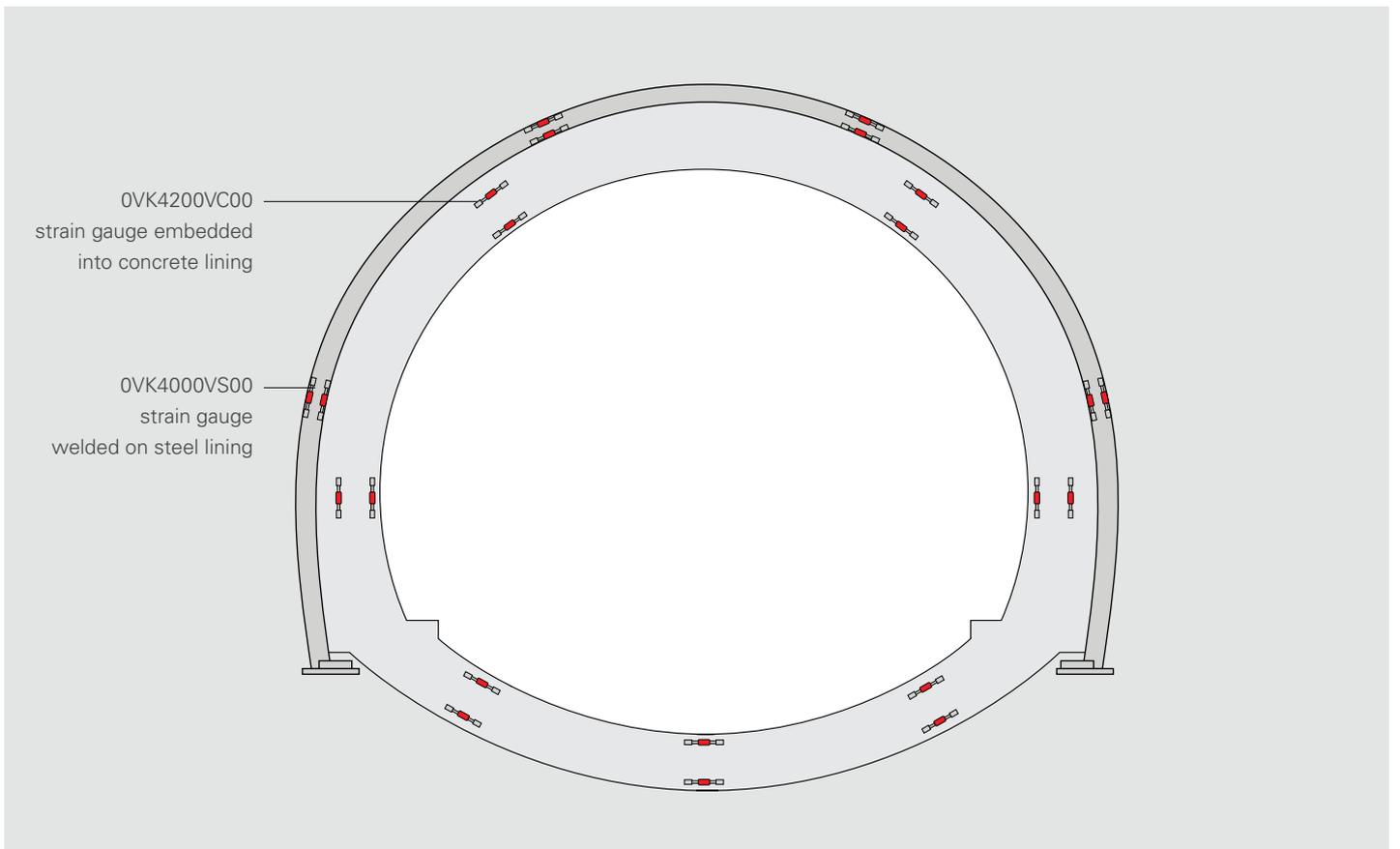
AN EXAMPLE OF APPLICATION ON PILE



AN EXAMPLE OF APPLICATION IN TBM TUNNEL



AN EXAMPLE OF TUNNEL APPLICATION WITH NATM METHOD



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

It is a block that permits to mount three embedment gauges in 3D rosette configuration.



PROTECTIVE COVER OVK400COVER

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



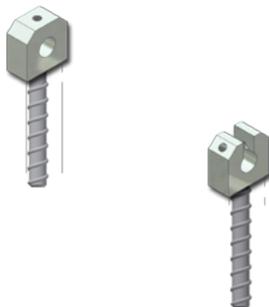
SPARE WELDABLE BLOCKS OVK400MB200

Pair of spare weldable end blocks for arc-weldable strain gauges. Galvanized steel made.

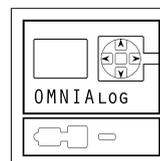
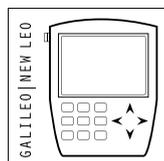
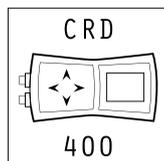


SPARE CONCRETE BLOCKS OVK400CMB20

Pair of spare concrete anchor end blocks for arc-weldable strain gauges. Galvanized steel made.



READABLE BY



Refer to separate datasheets for further information.

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