

Robust
Accurate
Safe

fSENS Force Measurement



Strong and Accurate

➤ fSENS Force Sensors

➤ Benefits of the fSENS Series

- Reliable and exact measurement results
- Standardized and customized
- Superior linearity and accuracy ($\leq \pm 1\%$)
- Technical expertise and close consultation with customers enable customized solutions
- Nominal forces ranging from single digits to thousands of kN
- Temperature compensation
- Sensors with E-modulus compensation also available
- IP66/67 protection class
- Use under extreme environmental conditions

- Wide operating temperature range (-40°C to $+70^{\circ}\text{C}$)
- Diverse range of sensor interfaces (passive, current loop, voltage, digital buses, etc.)
- All sensor bodies 100% tested and **CE**-compliant
- Integrated safety
- Made in Germany

➤ Certifications*



* Support on demand

Integrated Safety

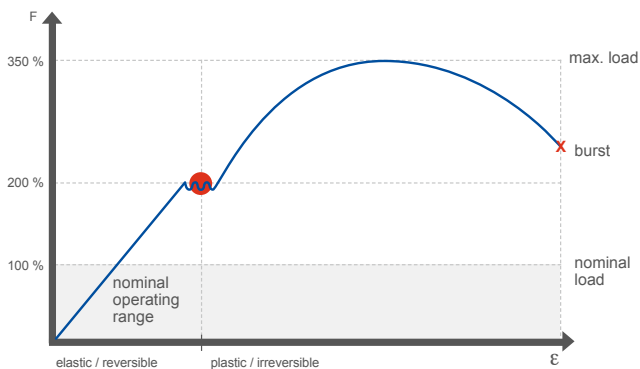
All products meet the high safety standards of WIKA Mobile Control.

Mechanical safety

- Shock and vibration resistance
acc. to IEC 60721-3-5 class 5 M3
- IP66/67 protection rating
- Steel material: 100% tested
acc. to EN 10204 inspection certificate 3.1
- Double or triple mechanical safety margins for sensor bodies
 - Yielding and breaking points as required
 - Wide range of nominal loads

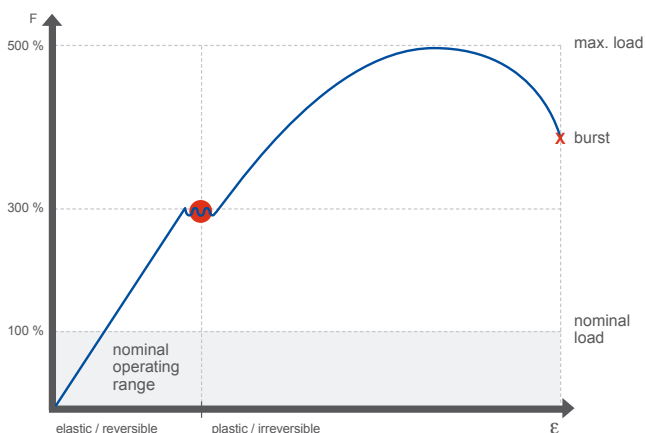
→ Double safety:

Protecting the fSENS Force Sensor against yielding at forces of up to 2 times rated force and breakage up to 3.5 times.



→ Triple safety:

For heavy duty applications; protecting the fSENS Force Sensor against yielding at forces of up to 3 times rated force and breakage up to 5 times.



Electrical safety

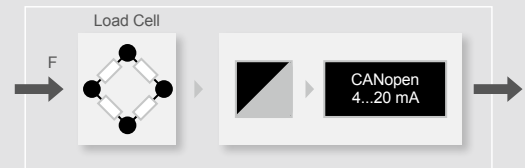
- EMC approved acc. to IEC 61326-3-1 Crit. A

Functional safety



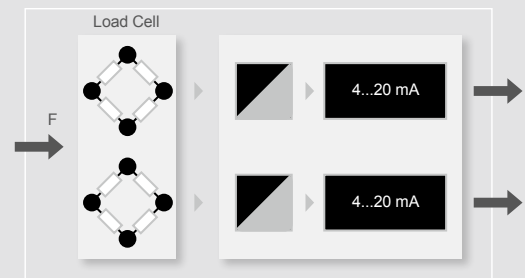
• PL b/c implementation

- Standard electronic components without conventional performance rating



• PL d (EN 13849)/SIL 2 (ISO 61508) implementation application safety solution

- 2-channel solution with standard implementation and redundant interface
- Dual current loop interface
- Combined with a flow-operated PL d control unit (e.g. iSCALE Control System)



The TÜV certification includes the standard models of the redundant load pin fSENS MA, the compression load cell fSENS DKA and the fSENS RDKA.



WIKA Mobile Control – tested quality:

- Electronics of the sensors
- Construction
- Bonding

Certified:

- Development
- Calculation and production process
- Material
- Redundancy
- Mechanical system and construction
- Quality management
- Service

Winning Accuracy

The fSENS Series from WIKA Mobile Control features outstanding accuracy by overcoming

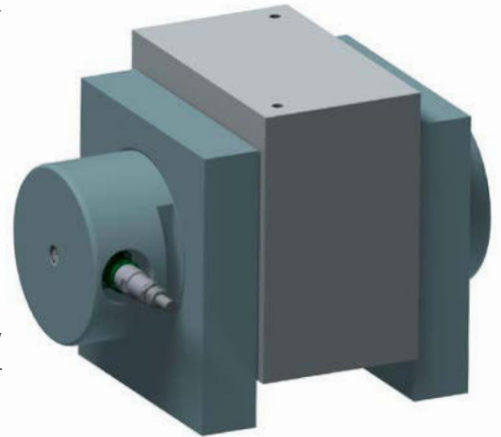
- Non-linearity
- Hysteresis caused by used materials
- Zero-point deviation and time drift
- Temperature drift of components
- Influence of installation conditions
- Random, systematic, and stochastic errors
- Test equipment limitations

Drawing on extensive experience, WIKA Mobile Control recommends the sensor that best meets individual requirements.

WIKA Mobile Control makes every effort to produce and supply sensors that deliver consistently repeatable and reproducible results.

Particular attention is given to their measurement instruments, testing methods, specifications, and staff training. Before delivery, every sensor of the fSENS Series receives a calibration sheet and a final inspection document showing that it complies with current design and product regulations.

All force sensors are calibrated specifically to corresponding applications. The accuracy of these sensors is assessed in accordance with the EN 612982 and VDI/VDE 2637/2638 standards.

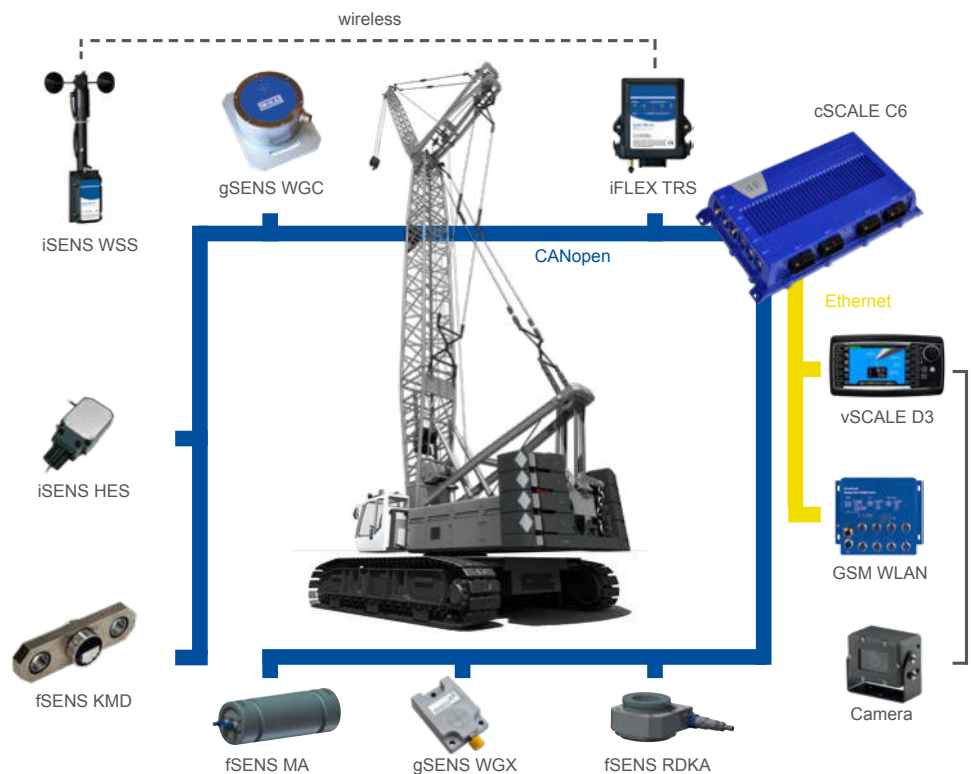


Load Pin with calibration supports

fSENS and iSCALE Control System: Controlled Force

Benefits of using products of the fSENS Series in combination with the iSCALE Control System:

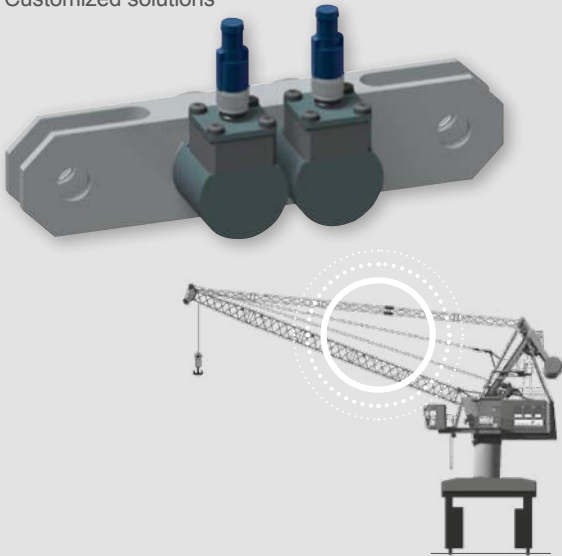
- Overload protection
- Easy to control via cSCALE Controllers, vSCALE Consoles, xSENS Sensors, and the qSCALE LMI Software
- Modularity and scalability from one source, optimally geared to the required system's design, choice of components, wiring, final acceptance testing, and startup
- Wide controller performance range
- Integrated diagnostic capabilities (for overload currents, short circuits, etc.)
- Customized software solutions for different application types
- Flexibility in meeting the needs of both OEMs and end users



Overview of the fSENS Series

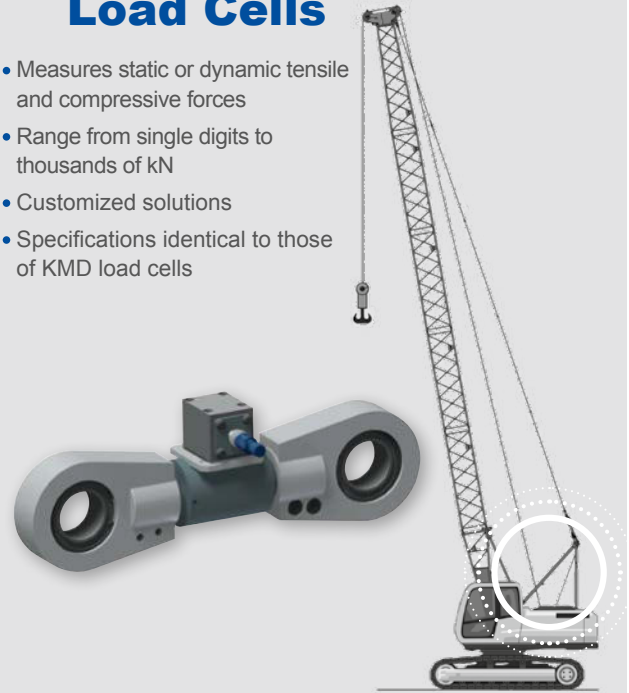
➤ fSENS KMD Load Cells

- Measures static or dynamic tensile and compressive forces
- Range from single digits to thousands of kN
- Standardized solutions
- Customized solutions



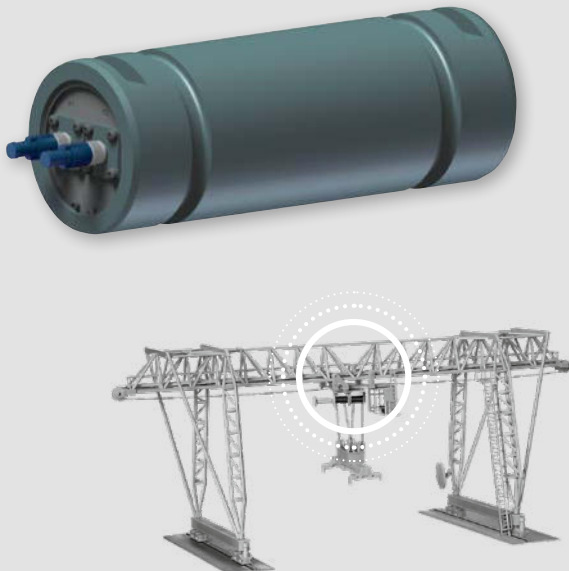
➤ fSENS ZKA Tensile Load Cells

- Measures static or dynamic tensile and compressive forces
- Range from single digits to thousands of kN
- Customized solutions
- Specifications identical to those of KMD load cells



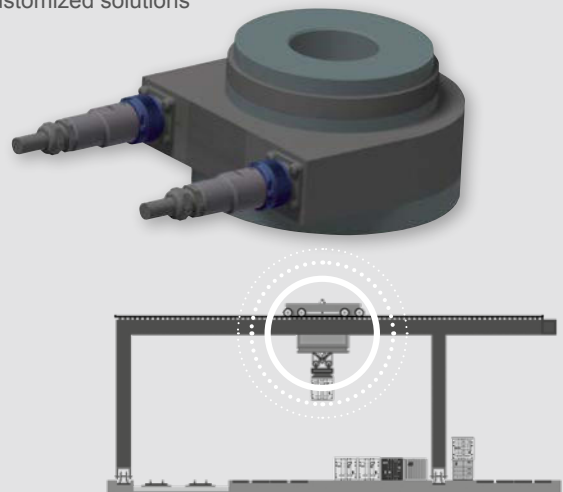
➤ fSENS MA Load Pins

- Measures static or dynamic shear forces
- Nominal loads from single digits to thousands of kN
- Customized solutions



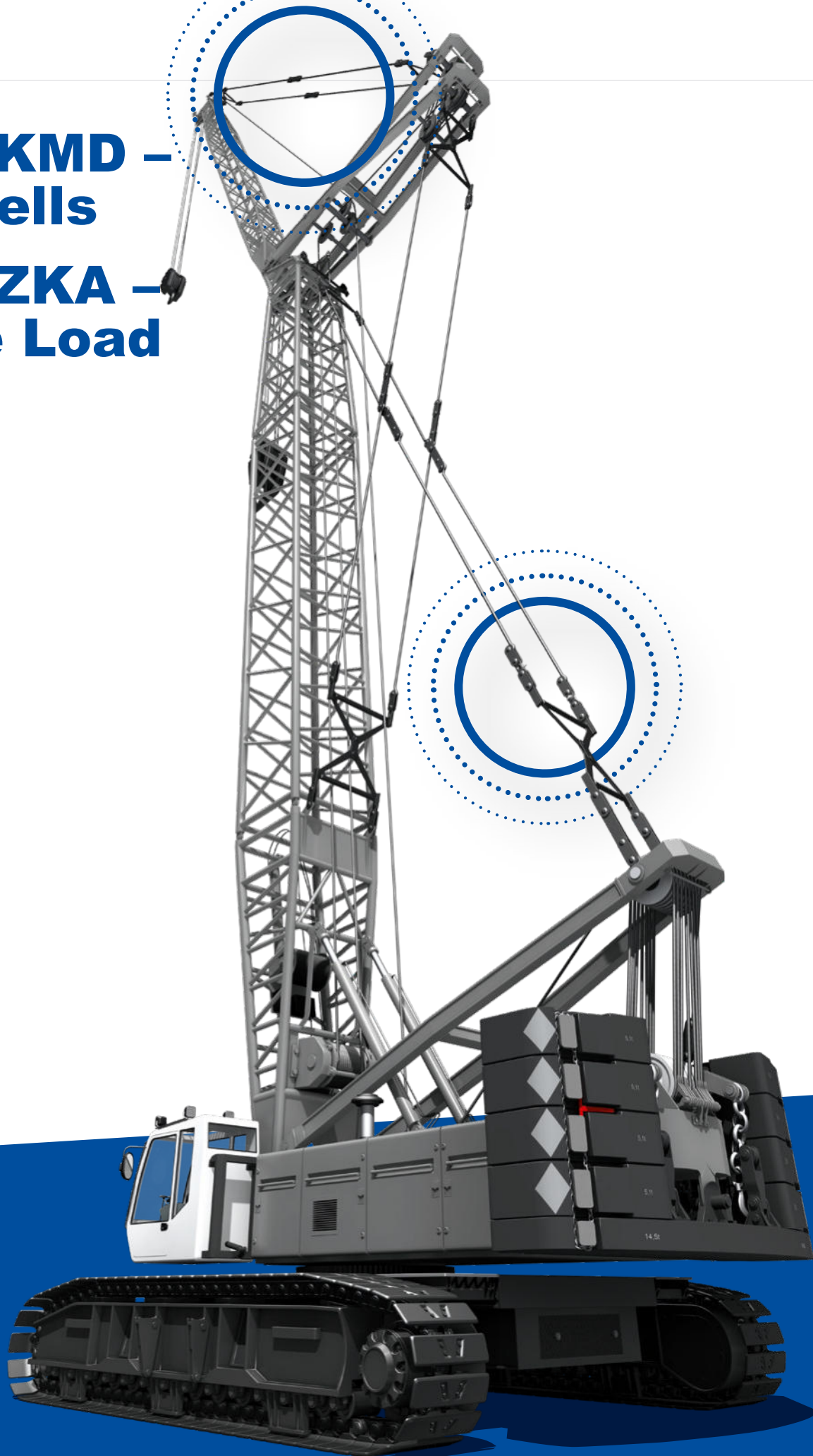
➤ fSENS DKA/RDKA Compression Load Cells

- Measures static or dynamic compressive forces
- Nominal loads from single digits to thousands of kN
- Standardized solutions
- Customized solutions



**fSENS KMD –
Load Cells**

**fSENS ZKA –
Tensile Load
Cells**



Standardized KMD Load Cells

The extremely robust fSENS KMD force transducers are available in standard versions for a variety of load ranges and safety requirements.

- Compact and robust design
- Adaptable to any application
- Modular structure: steel bushing, ball bearings of different diameters
- Interfaces: 4...20 mA or CANopen
2,5...7,5 V DC
1...5 V DC

	Dimensions (L x W x H)	Double Safety (L)		Triple Safety (K)	
1	266 x 65 x 17 [mm]	70-100 kN	(7-10t)	30-60 kN	(3-6t)
2	340 x 90 x 21 [mm]	140-200 kN	(14-20t)	70-120 kN	(7-12t)
3	420 x 120 x 38 [mm]	260-400 kN	(26-40t)	150-250 kN	(15-25t)
4	480 x 150 x 75 [mm]	650-900 kN	(65-90t)	300-600 kN	(30-60t)
5	590 x 160 x 85 [mm]	1100-1650 kN	(110-165t)	700-1000 kN	(70-100t)
6	690 x 190 x 90 [mm]	1700-2400 kN	(170-240t)	1100-1500 kN	(110-150t)

Standardized fSENS KMD Load Cells

Customized KMD Load Cells and ZKA Tensile Load Cells

KMD load cells in various designs and customer specific versions:

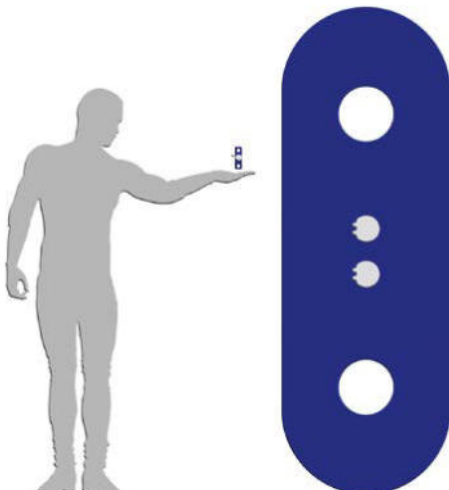
- For measurement ranges < 7 t and > 240 t
- Individual mounting requirements
- Individually adapted for any installation situation
- Alternative materials for higher corrosion resistance
- They can be equipped with:
 - different interfaces
 - optional mechanical design (forks, bushings, or bearings)



Load Cell with bearing on one side only



Tensile Load Cell with spherical plain bearings



Technical Specifications

Description	fSENS KMD/ZKA
Temperature range	-40°C to +70°C
Protection class	IP66/67 (IEC60529)
Operating voltage	10...30 V
Current consumption	< 50 mA (incl. amplifier)
Output signal	4...20 mA, CANopen, 2.5...7.5 V DC, 1...5 V DC
Temperature drift	0.1%/10°K
Linearity* (typical)	1 % FS
Hysteresis* (typical)	1 % FS
Connector*	M12 or CANNON
Sensor material	Stainless steel (chromium ratio > 12 %)
Preload*	150 % of nominal load
Safety margin against yielding*	> 200 % (300 %) of nominal load
Safety margin against breakage**	> 350 % (500 %) of nominal load
Support apertures	Bearings and bushings

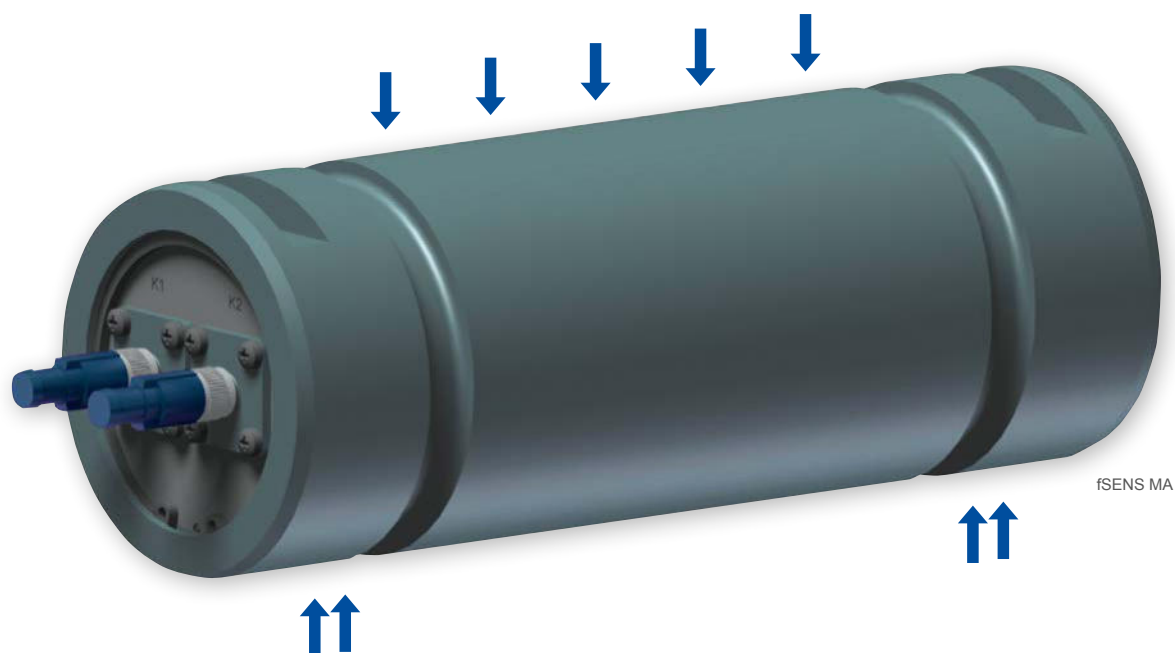
* Other values and types are available on request

** Depending on material

fSENS MA – Load Pins



Flexible & Configurable Load Pins



WIKA Mobile Control develops, produces, and supplies load pins for any range of force:

- Range of interfaces
- Produced to customer-specific geometries and dimensions
- Optional details such as grease holes with grease fittings and DIN 15058-compliant axle holders
- Shear forces sensed by a Wheatstone bridge system of strain gauges
- Can be installed in place of normal shafts such as axles of sheaves, shackles, etc.
- Output signal proportional to the load

Technical Specifications

Description	fSENS MA
Temperature range	-40°C to +70°C
Protection class	IP66/67 (IEC60529)
Operating voltage	10...30 V
Current consumption	< 50 mA (incl. amplifier)
Output signal	4...20 mA, CANopen, 2.5...7.5 V DC
Temperature drift	0.1 %/10°K
Linearity* (typical)	1 % FS
Hysteresis* (typical)	1 % FS
Connector*	M12 or CANNON
Sensor material	Stainless steel (chromium ratio > 12 %)
Preload*	150 % of nominal load
Safety margin against yielding*	> 200 % (300 %) of nominal load
Safety margin against breakage**	> 350 % (500 %) of nominal load
Support apertures	Axle holder and grease fittings

* Other values and types are available on request

** Depending on material

fSENS DKA/RDKA – Compression Load Cells



Standardized Compression Load Cells

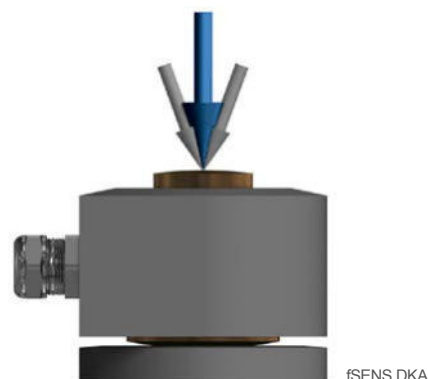
WIKA Mobile Control offers four standard Compression Load Cells of the enclosed fSENS DKA version

- Compact and robust design
- Corrosion-resistant: made of stainless steel with a chromium ratio > 15 %
- Self-adjusting in response to angle of force (up to 3°)
- Mounting plate and force path disconnected
- Simple assembly

Measurements ranges:

	Dimensions (Ø x H)	Double Safety
1	Ø 55 x 47 [mm]	10-30 kN (1 to 3t)
2	Ø 55 x 47 [mm]	40-100 kN (4 to 10t)
3	Ø 55 x 47 [mm]	110-180 kN (11 to 18t)
4	Ø 85 x 59 [mm]	250-700 kN (25 to 70t)

An innovative solution for advanced requirements

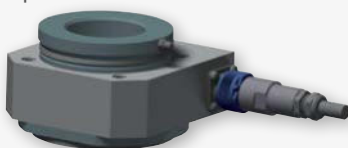


Customized Compression Load Cells

There are several different options for compression load cells. According to the assembly requirements, nearly any geometrical circumstance can be considered and an optimal solution can be achieved.

Compression force transducers of the fSENS RDKA series are an ideal choice when design constraints rule out bolt replacements or "dead-end" installations.

- Usable when replacing plungers or installation at the "dead-end" is impossible.
- External or integrated amplifier
- Customer-specified solutions



Technical Specifications

Description	fSENS DKA/RDKA
Temperature range	-40°C to +70°C
Protection class	IP66/67 (IEC60529)
Operating voltage	10...30 V
Current consumption	< 50 mA (incl. amplifier)
Output signal	4...20 mA, CANopen, 2.5...7.5 V DC
Temperature drift	0.1 %/10°K
Linearity* (typical)	< 0.3 % FS
Hysteresis* (typical)	< 0.5 % FS
Connector*	M12 or CANNON
Sensor material	Stainless steel (chromium ratio > 15 %)
Preload*	150 % of nominal load
Safety margin against yielding*	> 200 % (300 %) of nominal load
Safety margin against breakage**	> 350 % (500 %) of nominal load
Support apertures	Bearings and grease fittings

* Other values and types are available on request

** Depending on material

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