

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 ( $-40^{\circ}\text{C}$  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

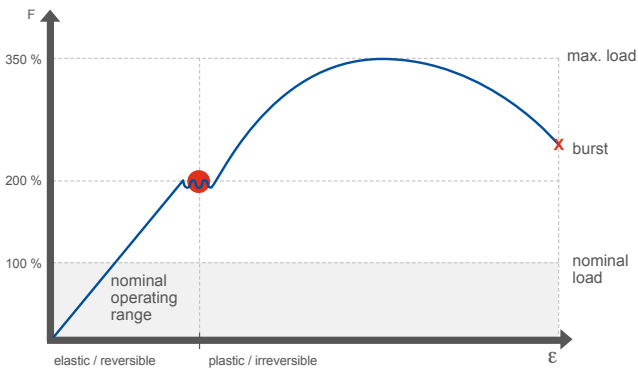
All products meet the high safety standards of WIKA Mobile Control.

## 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

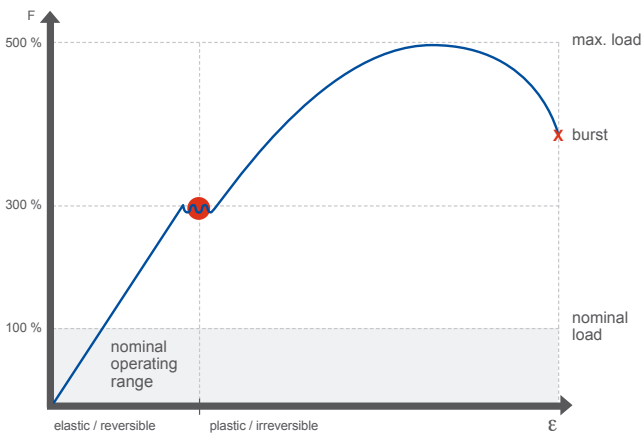
### → Double safety:

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



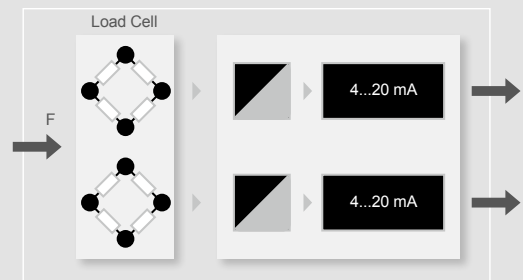
### • PL b/c implementation

- 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

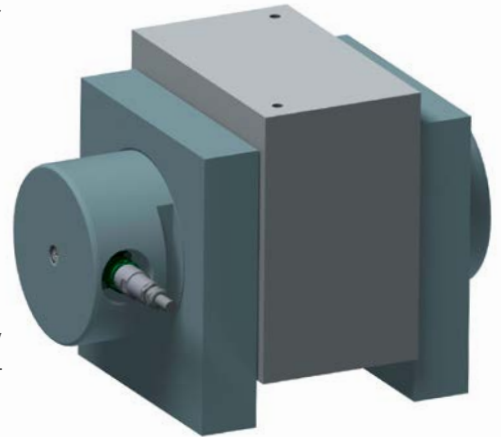
- Non-linearity
- Hysteresis caused by used materials
- Zero-point deviation and time drift
- Temperature drift of components
- Influence of installation conditions
- Random, systematic, and stochastic errors
- Test equipment limitations

**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.

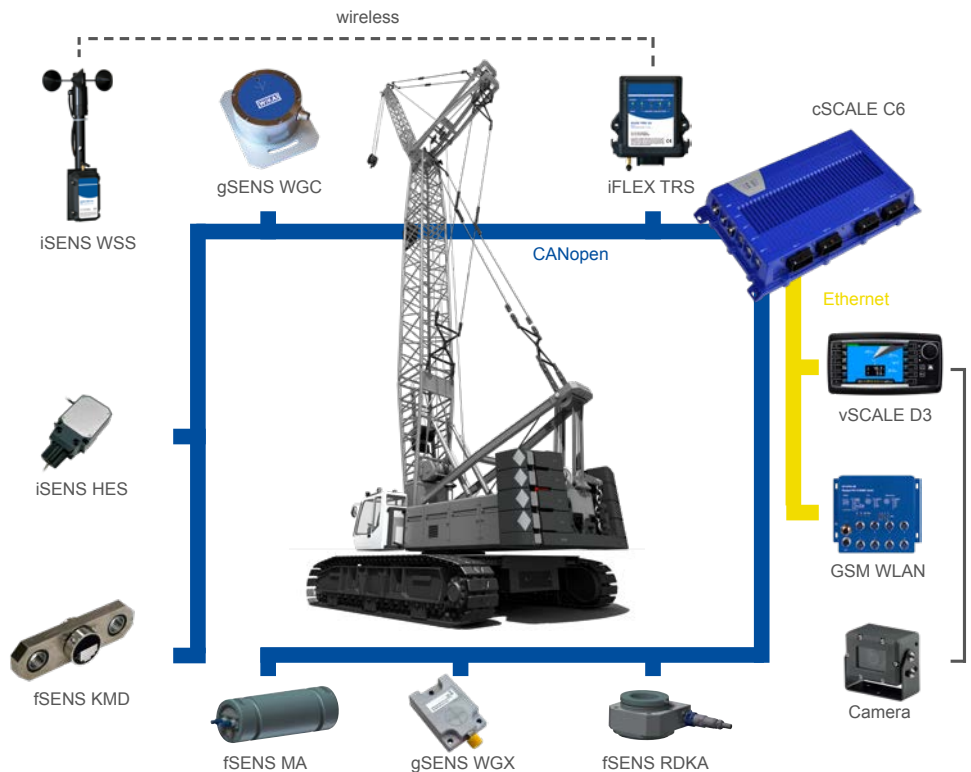


Load Pin with calibration supports

# fSENS and iSCALE Control System: Controlled Force

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

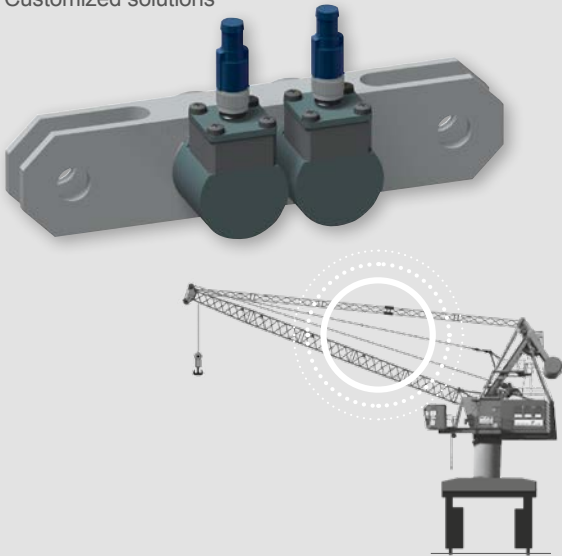
- Overload protection
- Easy to control via cSCALE Controllers, vSCALE Consoles, xSENS Sensors, and the qSCALE LMI Software
- Modularity and scalability from one source, optimally geared to the required system's design, choice of components, wiring, final acceptance testing, and startup
- Wide controller 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

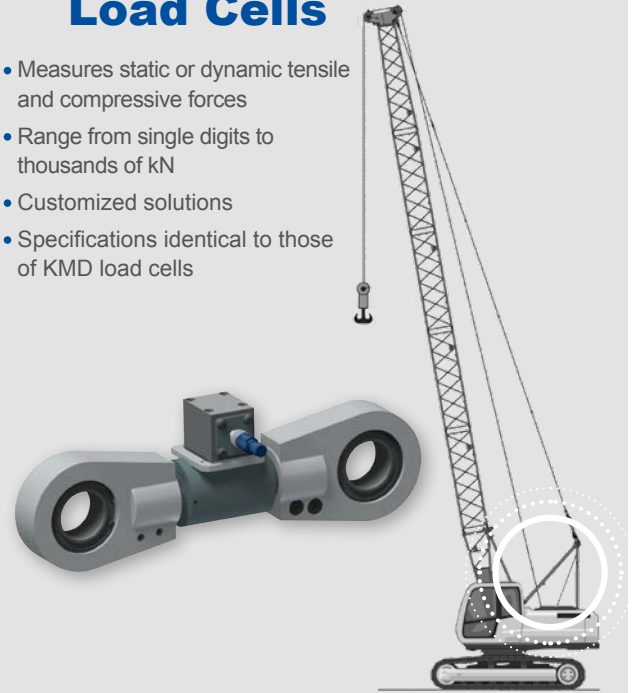
## ↗ fSENS KMD Load Cells

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



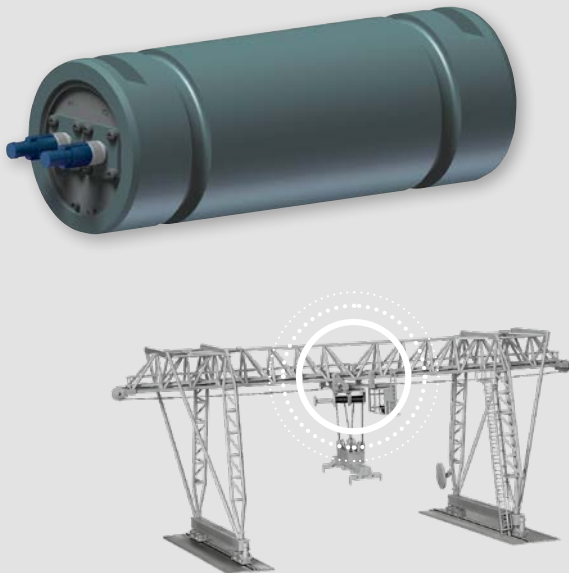
## ↗ fSENS ZKA Tensile Load Cells

- 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



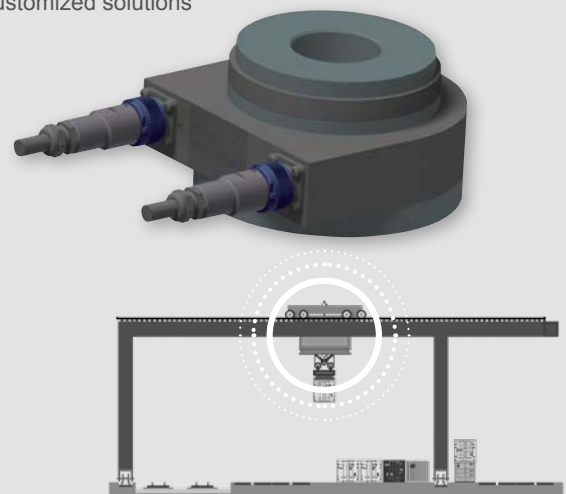
## ↗ fSENS MA Load Pins

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



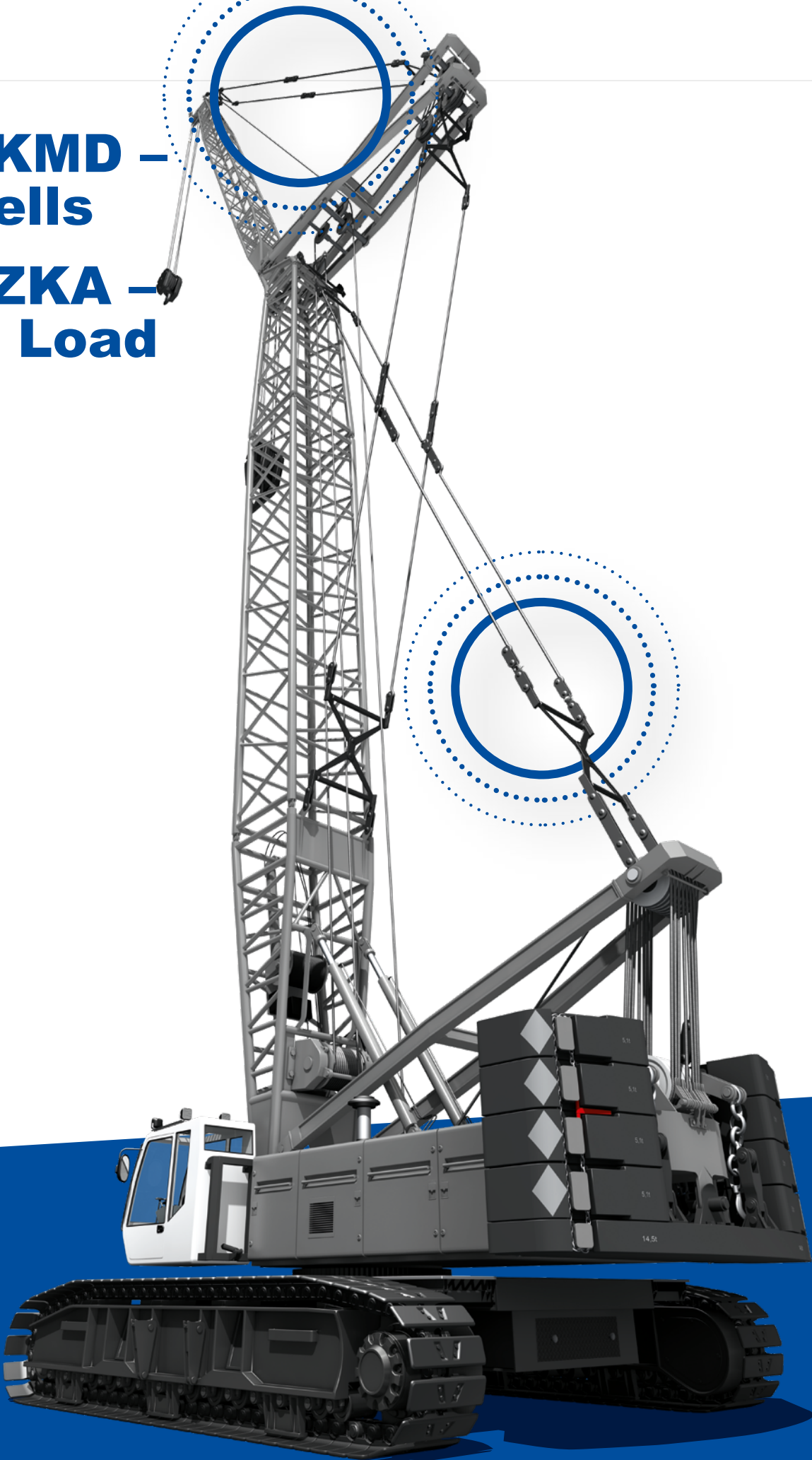
## ↗ fSENS DKA/RDKA Compression Load Cells

- 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:

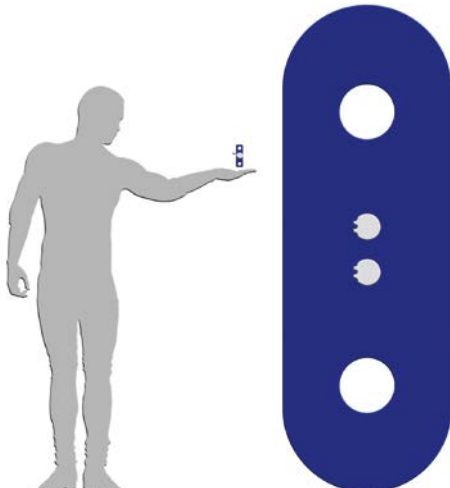
- For measurement ranges <7 t and >240 t
- Individual mounting requirements
- Individually adapted for any installation situation
- Alternative materials for higher corrosion resistance
- They can be equipped with:
  - different interfaces
  - optional mechanical design (forks, bushings, or bearings)



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

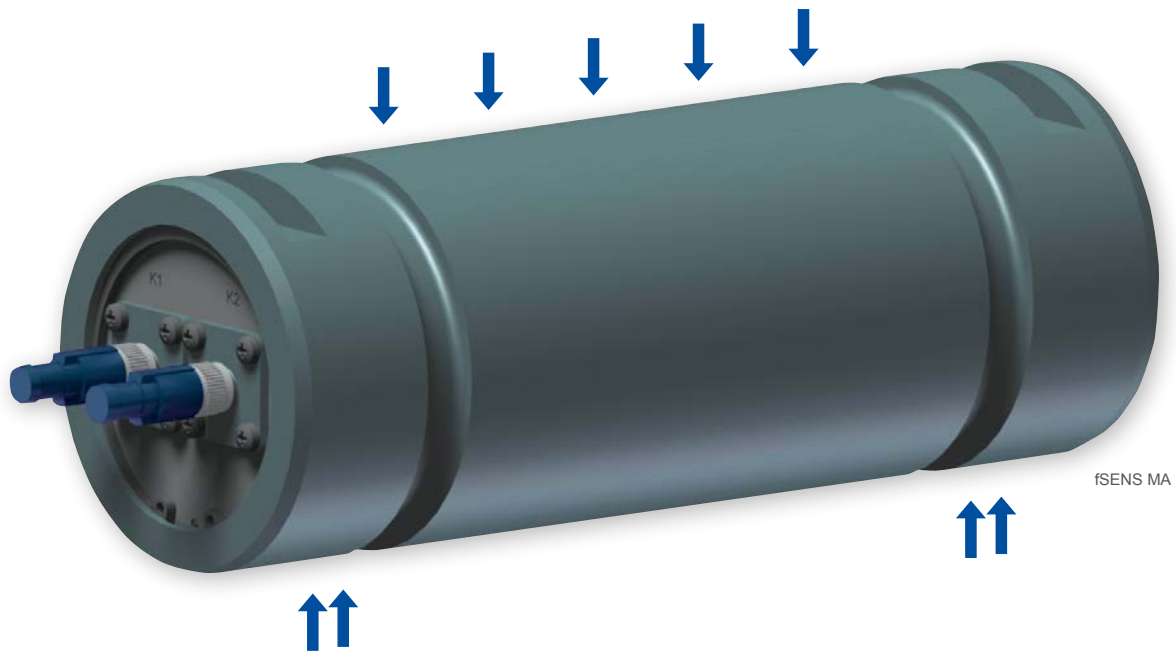
\*\* Depending on material

# 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:

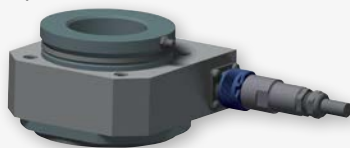
	Dimensions (Ø x H)	Double Safety
1	Ø 55 x 47 [mm]	10-30 kN (1 to 3t)
2	Ø 55 x 47 [mm]	40-100 kN (4 to 10t)
3	Ø 55 x 47 [mm]	110-180 kN (11 to 18t)
4	Ø 85 x 59 [mm]	250-700 kN (25 to 70t)

## 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.

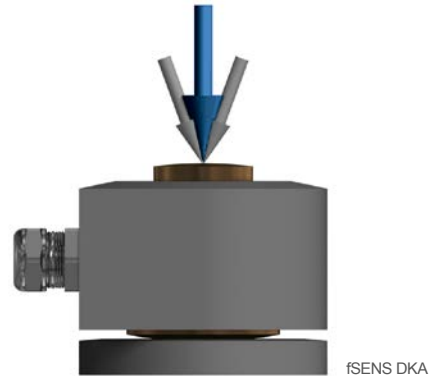
**Compression force transducers of the fSENS RDKA series are an ideal choice when design constraints rule out bolt replacements or “dead-end” installations.**

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



fSENS RDKA

## An innovative solution for advanced requirements



fSENS DKA

## 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

# Worldwide



## **We make lifting loads safer!**

As an experienced specialist, we have spent many years providing reliable safety solutions for lifting loads, setting innovative standards in the process and ensuring dependable communication between machines and their operators, particularly in harsh environments.

By developing application software, mobile controllers and robust sensors, we ensure that our customers benefit from maximum safety and equipment uptime.

We are system integrators, supporting our customers through all project phases: from

analysis and concept evaluation, through system design and project planning to prototype testing and field launches. Our safety experts support certification processes and are available for seamless life cycle management.

## **WIKA Mobile Control GmbH & Co. KG**

Hertzstr. 32-34  
76275 Ettlingen, Germany  
Phone: +49 (0) 7243 709-0  
sales.wmc@wika.com  
www.wika-mc.com

## **USA WIKA Mobile Control LP**

1540 Orchard Drive  
Chambersburg, PA 17201  
Phone: +1 717 263 7655  
sales.us.wmc@wika.com  
www.wika-mc.com/en

## **China Xuzhou WIKA Electronics Control Technology Co. Ltd.**

No.11 Baoliansi Road,  
Xuzhou Economic Development Zone  
Xuzhou, JiangSu, 221001  
Phone: +86 (0) 516 8788 5799  
info@wika-mc.cn  
www.wika-mc.cn

**Check out our global  
partner network online:  
[www.wika-mc.com](http://www.wika-mc.com)**

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LOADS SAFER** 