

Load cells are force sensors which are available in 3 basic types.  
Capacities 3 N to 100 kN

- **Shear beam type** : Compression or tension, mounted on 1 side by screws.
- **Button type or pancake type** : Compressive & compact.
- **S beam Type** : Special S shape, compression and tension.

**Shear Beam**



**Button / Pancake**



**S - Beam**



**Intelligent Load Cell**



## Button Force Sensors

### Functional Principle



Button force sensors are used for monitoring axial compressive force. All these force sensors are equipped with a load calotte on top for applying force. Therefore

this kind of sensors are very easy to handle.

All sensors show a low overall height, which enables them for use in application with less space.

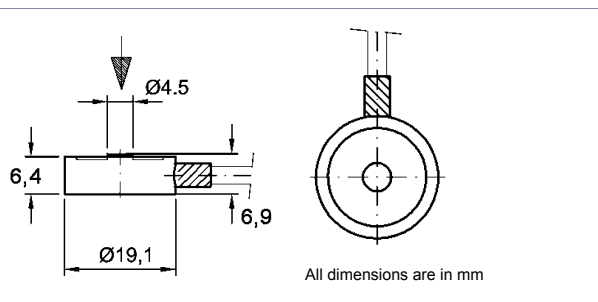
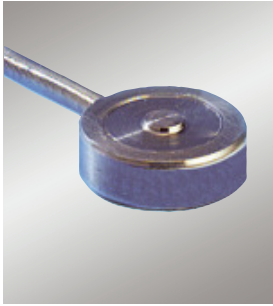
- Capacities from 100N to 100kN
- Very compact
- Low overall height
- Easy to assemble
- Defined force application provided by load calotte

#### Models with integrated microcontroller amplifier (KTB52 / KTB82)

- Standardized output signals, (0-10V / 4-20 mA)
- Tare function
- Advanced functions available like USB-, RS232-, RS485-interface, limiting value....

### KMB19

- Ø 19,1mm - Low profile miniature sensor, without amplifier

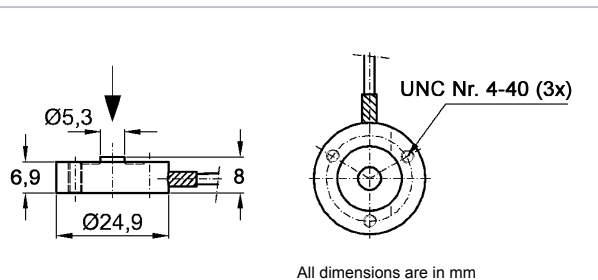


- Capacities from 100N to 4kN
- Height 6,9mm
- Nonlinearity 0,8% F.S.
- Output signal 2mV/V
- Protection class IP65
- Suitable for external microcontroller amplifier (SI, EMA3, IPG)

[www.megatronsensor.com/kmb19.pdf](http://www.megatronsensor.com/kmb19.pdf)

### KMB25

- Ø 24,9mm - Low profile miniature sensor, without amplifier

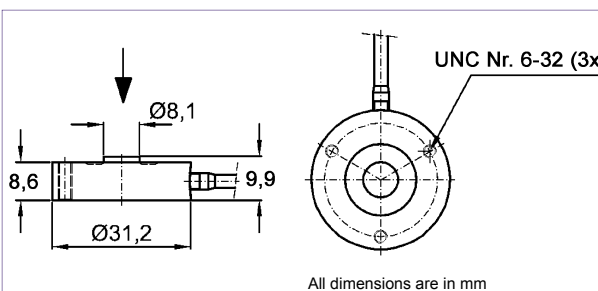


- Capacities from 200N to 400N
- Nonlinearity 0,8% F.S.
- Output signal 2mV/V
- Protection class IP65
- Through holes for convenient mounting
- Suitable for external microcontroller amplifier (SI, EMA3, IPG)

[www.megatronsensor.com/kmb25.pdf](http://www.megatronsensor.com/kmb25.pdf)

### KMB31

- Ø 31,2 – Convenient mounting sensor, without amplifier

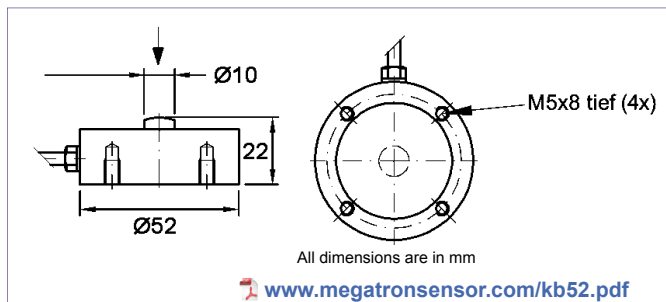
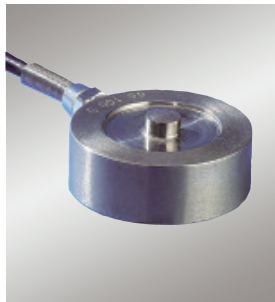


- Capacities from 400N to 10kN
- Nonlinearity 0,8% F.S.
- Output signal 2mV/V
- Protection class IP66
- Through holes for convenient mounting
- Suitable for external microcontroller amplifier (SI, EMA3, IPG)

[www.megatronsensor.com/kmb31.pdf](http://www.megatronsensor.com/kmb31.pdf)

## KMB52 / KTB52

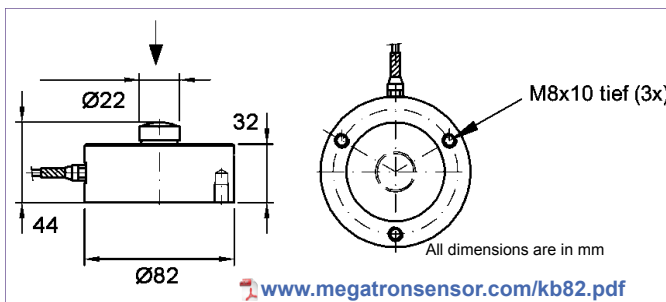
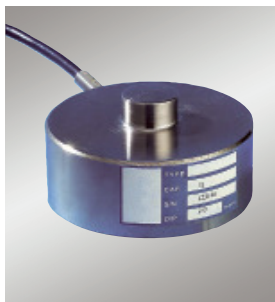
- Ø 52mm – With or without integrated microcontroller amplifier



- Capacities from 500N to 10kN
  - Linearity 0,08% F.S.
  - Output signal 2mV/V or 0-10V / 4-20mA for amplifier models
- KTB52:**
- Tare function
  - Digital interface (optional): USB, RS232, RS485
  - Advanced functions available, see pages "functions / options"

## KMB82 / KTB82

- Ø 82mm - With or without integrated microcontroller amplifier



- Capacities from 5kN to 100kN
  - Linearity 0,08% F.S.
  - Output signal 2mV/V or 0-10V / 4-20mA for amplifier models
- KTB82:**
- Tare function
  - Digital interface (optional): USB, RS232, RS485
  - Advanced functions available, see pages "functions / options"

Technical Data	KMB19	KMB25	KMB31	KMB52	KTB52	KMB82	KTB82
Capacity [kN]	0,1; 0,2; 0,4; 1; 4	0,2; 0,4	0,4; 2; 4; 8; 10	0,5; 1; 2; 5; 10		5; 10; 20; 50; 100	
Operating Overload [%F.S.]	120	120	120	120		120	
Safe Overload [%F.S.]	150	150	150	150		150	
Ultimate Overload [% F.S.]	>200	>200	>200	>200		>200	
Rated Output [mV/V]	2	2	2	2	---	2	
Rated Output Tolerance [%F.S.]	10	10	10	10	---	10	---
Zero Balance [%F.S.]	3	3	3	2	0,2	2	0,2
Nonlinearity [%F.S.]	0,8	0,8	0,8	0,08		0,08	
Hysteresis [%F.S.]	0,8	0,8	0,8	0,08		0,08	
Creep (30 min.) [%F.S.]	0,2	0,2	0,2	0,1		0,05	
Total Error [%F.S.]	2	2	2	0,2		0,2	
Repeatability [%F.S.]	0,8	0,3	0,3	0,05		0,05	
Temp.Effect on Zero [%F.S./10K]	0,2	0,2	0,2	0,05		0,05	
Temp.Effect on Output [%F.S./10K]	0,5	0,1	0,1	0,05		0,05	

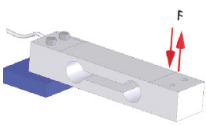
Mechanical Data	KMB19	KMB25	KMB31	KMB52	KTB52	KMB82	KTB82
Measuring Method	Foil strain gage full bridge						
Material Loadcell	100N = Aluminium ≥ 200N=Stainless Steel	Stainless Steel				Steel	

Environmental Conditions	KMB19	KMB25	KMB31	KMB52	KTB52	KMB82	KTB82
Compensated Temp.Range [°C]	-10 ... +40						
Operating Temp. Range [°C]	-20 ... +60						
Protection Class	IP65	IP65	IP66	IP66		IP66	

Electrical Data	KMB19	KMB25	KMB31	KMB52	KTB52	KMB82	KTB82
Input Impedance [Ω]	350 ± 30	350 ± 30	350 ± 30	750 ± 30	---	750 ± 30	---
Output Impedance [Ω]	350 ± 3	350 ± 3	350 ± 3	700 ± 4	---	700 ± 4	---
Insulation Resistance [Ω]	> 2000	> 2000	> 2000	> 2000	---	> 2000	---
Recommended Excitation [VDC]	5 (typical)	5 (typical)	5 (typical)	10 (typical)	24 ± 20%	10 (typical)	24 ± 20%
	7 max.	7 max.	7 max.	15 max.		15 max.	
Electrical Connection	cable	cable	cable	cable	cable	cable	cable
	4-wires, 2m	4-wires, 2m	4-wires, 2m	4-wires, 2m	8-wires, 2m	4-wires, 2m	8-wires, 2m

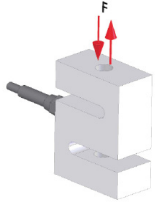
# Bending Beam Force Sensors / S-Beam Force Sensors

## Functional Principle



### Bending Beam Sensor

These force sensor type is mounted at threaded hole at one side. Force application happens on opposite side. Sensors are suitable for compression or tension.



### S-Beam Sensor

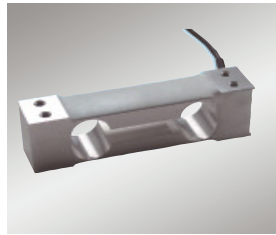
S-Beam Sensors are characterized by their special „S“-shaped body. Force input as well as force output are arranged along axis. Internal threads afford easy mounting and represent force introduction point for compression or tension.

- Capacities from 3N to 100kN
- Robust design
- Quick installation
- Small dimensions, also for integrated amplifier models

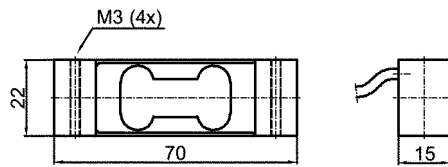
### Models with integrated microcontroller amplifier (KTxxx)

- Standardized output signals, (0-10V / 4-20 mA)
- Tare function
- Advanced functions available like USB-, RS232-,RS485-interface, limiting value....

## KM202



- Low cost bending beam sensor for small capacities



All dimensions are in mm

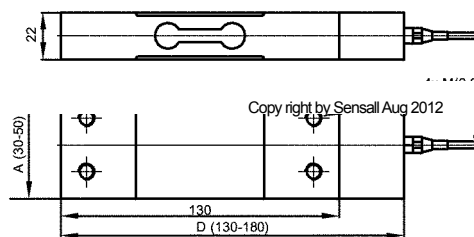
- Capacities from 3N to 100N
- Small dimensions
- Nonlinearity 0,04% F.S.
- Output signal 1mV/V or 2mV/V
- Protection class IP65
- Low cost sensor

[www.megatronsensor.com/km202.pdf](http://www.megatronsensor.com/km202.pdf)

## KM302 / KT302



- Low profile sensor with or without integrated microcontroller amplifier



All dimensions are in mm

[www.megatronsensor.com/k302.pdf](http://www.megatronsensor.com/k302.pdf)

- Capacities from 30N to 2kN
- Low price sensor
- Nonlinearity 0,04% F.S.
- Output signal 1mV/V or 0-10V / 4-20mA for amplifier models

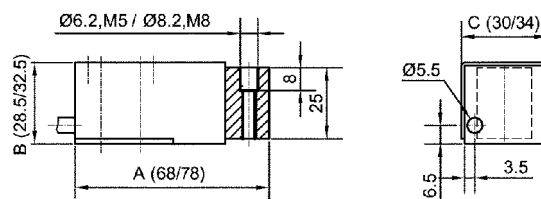
### KT302:

- Tare function
- Digital interface (opt.): USB, RS232, RS485
- Advanced functions available, see pages "functions / options"

## KM702 / KT702 KM802 / KT802



- Compact bending beam sensor with or without integrated microcontroller amplifier



All dimensions are in mm

[www.megatronsensor.com/k702.pdf](http://www.megatronsensor.com/k702.pdf)  
[www.megatronsensor.com/k802.pdf](http://www.megatronsensor.com/k802.pdf)

- Capacities from 200N to 5kN
- Compact design
- Nonlinearity 0,2% F.S.
- Output signal 2mV/V or 0-10V / 4-20mA for amplifier models

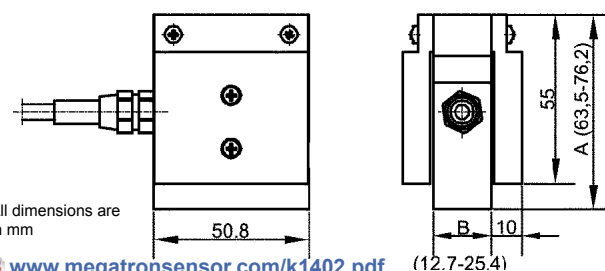
### KT702 / KT802:

- Tare function
- Digital interface (opt.): USB, RS232, RS485
- Advanced functions available, see pages "functions / options"

## KM1402 / KT1402



- Aluminium S-beam sensor with or without microcontroller amplifier



All dimensions are in mm

[www.megatronsensor.com/k1402.pdf](http://www.megatronsensor.com/k1402.pdf)

- Capacities from 50N to 2kN
- Nonlinearity 0,06% F.S.
- Output signal 2mV/V or 0-10V / 4-20mA for amplifier models

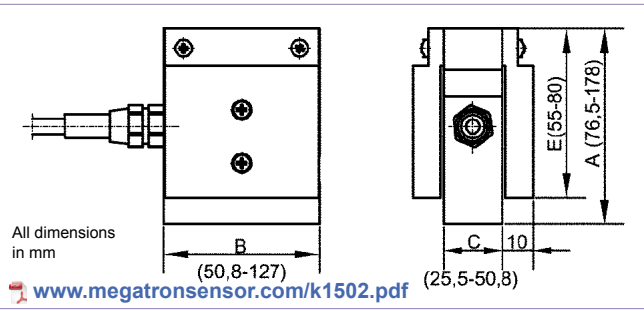
### KT1402:

- Tare function
- Digital interface (opt.): USB, RS232, RS485
- Advanced functions available, see pages "functions / options"



**KM1502 / KT1502**

## • Steel S-beam sensor with or without microcontroller amplifier



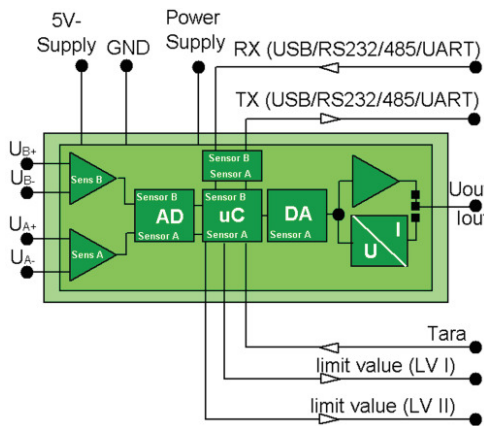
- Capacities from 5kN to 100kN
- Nonlinearity 0,06% F.S.
- Output signal 2mV/V or 0-10V / 4-20mA for amplifier models

**KT1502:**

- Tare function
- Digital interface (opt.): USB, RS232, RS485
- Advanced functions available, see pages "functions / options"

Technical Data	KM202	KM302	KT302	KM702	KT702	KM1402	KT1402	KM1502	KT1502
				KM802	KT802				
Capacity [kN]	0,003; 0,005; 0,01;	0,03; 0,05; 0,1;		0,2; 0,5;		0,05; 0,1; 0,2;		5; 10; 20; 30; 50	
	0,03; 0,05; 0,1	0,3; 0,5; 1; 2		1; 2; 5		0,5; 1; 2		100	-
Operating Overload [%F.S.]	120	120		130		120		120	
Safe Overload [%F.S.]	150	150		200		150		150	
Ultimate Overload [% F.S.]	>200	>200		>300		>200		>200	
Rated Output [mV/V]	1 / 2	2	---	2	---	2	---	2	
Rated Output Tolerance [%F.S.]	10	10	---	10	---	10	---	10	---
Zero Balance [%F.S.]	2	2	0,2	10	0,2	2	0,2	1	0,2
Nonlinearity [%F.S.]	0,04	0,04		0,2		0,06		0,06	
Hysteresis [%F.S.]	0,04	0,04		0,15		0,06		0,06	
Creep (30 min) [%F.S.]	0,06	0,04		0,12		0,06		0,06	
Total Error [%F.S.]	0,15	0,15		0,25		0,15		0,15	
Repeatability [%F.S.]	0,04	0,02		0,06		0,04		0,04	
Temp.Effect on Zero [%F.S./10K]	0,05	0,04		0,1	0,2	0,06		0,05	
Temp.Effect on Output [%F.S./10K]	0,05	0,04		0,15	0,2	0,06		0,05	
<b>Mechanical Data</b>									
Measuring Method	Foil strain gage full bridge								
Material Loadcell	Aluminium-Alloy	Aluminium-Alloy		Aluminium / Steel		Aluminium-Alloy		Steel	
<b>Environmental Conditions</b>									
Compensated Temp.Range [°C]	-10...+40	-10...+40	0...+40	-10...+55	0...+55	-10...+40	0...+40	-10...+40	0...+40
Operating Temp.Range [°C]	-20...+60			-25...+70	0...+70	-20...+60			
Protection Class	IP65	IP65	IP64	IP40		IP65	IP64	IP65	IP64
<b>Electrical Data</b>									
Input Impedance [Ω]	410 ± 15	410 ± 15	---	400 ± 50	---	410 ± 15	---	385 ± 15	---
Output Impedance [Ω]	350 ± 3	350 ± 3	---	350 ± 10	---	350 ± 3	---	350 ± 3	---
Insulation Resistance [Ω]	> 2000	> 2000		> 2000		> 2000		> 2000	
Recommended Excitation [VDC]	10 (typ.)	10 (typ.)	24±20%	10(typ.)	24±20%	10 (typ.)	24±20%	10 (typ.)	24±20%
	15 max.	15 max.		12 max.		15 max.		15 max.	
Electrical Connection	cable	cable		cable		cable		cable	
	4-wires	4-wires	8-wires	4-wires	8-wires	4-wires	8-wires	4-wires	8-wires

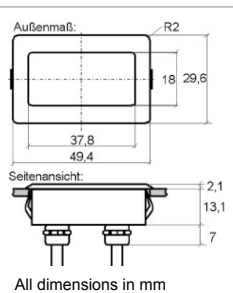
## Functional Principle



The external intelligent amplifier unit is usable for all sensors without enough space for integrated electronics. Also suitable for all applications where integrated solutions are not desired. With the intelligent amplifier parametrization and calibration via software of different sensor are easily possible. Main task of the intelligent amplifier is to transfer analogue sensor signals to analogue voltage/current outputs. Sensorsignals are also converted by serial interface USB, RS232, RS485 and UART to digital signals. Input signals: strain gage 2 mV/V (analogue signal differential) / potentiometer 0..10 kOhm – voltage 0..10 V – current 0..20 mA (analogue signal single ended). Up to 4 Sensorsignals can be processed (standard model processes two sensorsignals) Further functions are possible. For example: triggering of extra printers. The capability of the microcontroller system allows further factory set and user set functions.

## SI

### • External low cost small snap-in microcontroller amplifier

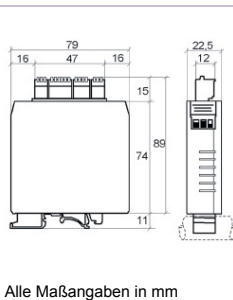
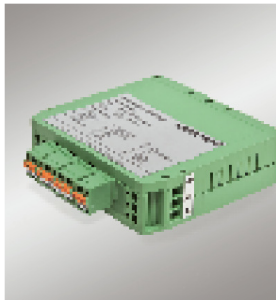


- Small dimensions 30x50mm snap-in
- Suitable for sensors without enough space for integrated electronics.
- Simple cabling and fast installation
- Inputsignals: strain gage 2mV (diff.) 0-10k, 0-10V, 0-20 mA(single ended)
- SI converts and process analogue sensorsignals to analogue voltage/current Output signals and converts also by serial Interface USB, RS232, RS485 and UART to digital signals
- 2 sensorsignals can be processed

[www.megatronsensor.com/si.pdf](http://www.megatronsensor.com/si.pdf)

## EMA3

### • Economical microcontroller amplifier in DIN mounting rails

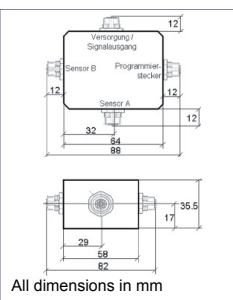


- DIN-Mounting-rail housing
- Suitable for sensors without enough space for integrated electronics
- Simple cabling and fast installation
- Inputsignals: strain gage 2mV (diff.) 0-10k, 0-10V, 0-20 mA(single ended)
- Output: 0-5 VDC, 0-10VDC, 4-20mA, processed. Digital:USB,RS232,5V TTL
- Special standard function: 2 freely programmable limiting values (relais output)
- 4 sensorsignals can be processed

[www.megatronsensor.com/ema3.pdf](http://www.megatronsensor.com/ema3.pdf)

## IPG

### • IP 65 heavy duty external microcontroller amplifier

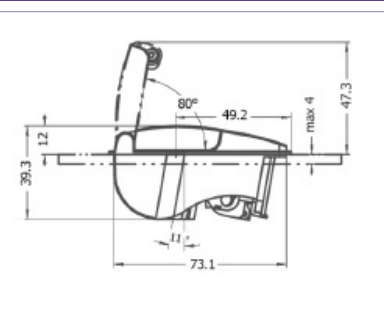


- IP 65 case M12 connector or cable
- Suitable for sensors without enough space for integrated electronics.
- Inputsignals: strain gage 2mV (diff.) 0-10k, 0-10V, 0-20 mA(single ended)
- Output: 0-5 VDC, 0-10VDC, 4-20mA, processed. Digital:USB,RS232,5V TTL
- 4 sensorsignals can be processed
- Special standard function: 2 freely programmable limiting values (relais output)

[www.megatronsensor.com/ipg.pdf](http://www.megatronsensor.com/ipg.pdf)

## SensoPrint

### • SensoPrint direct alphanumeric thermal dataprinter MHTS 2500



- Printer-Sensorcombination for direct sensor-data printing without computer /PLC
- Plainpaper or thermalprinter, panel-type
- 24, 32,40 Chr./line and graphics
- Printformat factoryset
- Samplingrate factory adjustable
- Other printer can be configured

[www.megatronsensor.com/plainpaper.pdf](http://www.megatronsensor.com/plainpaper.pdf)

[www.megatronsensor.com/thermalprinter.pdf](http://www.megatronsensor.com/thermalprinter.pdf)

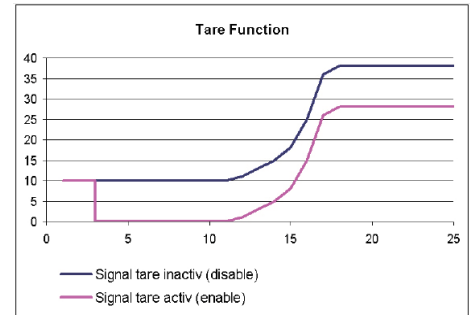
## Standard Functions

### Tare Function (Standard function for all models with integrated amplifier)

Tare function enables a reset of output signal (digital or analog) back to zero signal of calibration.

**Procedure:** Red cable wire has to be connected to ground (GND).

**Example:** KTB52 K 10KN 2442 D (i.e. 4mA = 0N, 20mA = 10KN)  
Sensor is loaded with 2,5KN, which means output signal is 8mA  
Connecting red cable wire to ground, resets output signal back to 4mA.



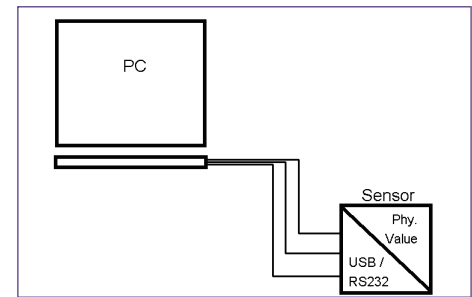
## Standard Options

### USB Interface (ordering option)

Integrated amplifier converts physical value to digital signal (data transfer rate = 115 kBaud). Signal transmission runs with USB Interface (USB standard 1.1.)

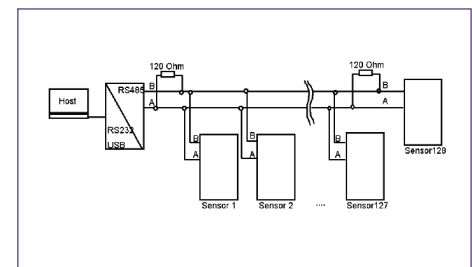
### RS232 Interface (ordering option)

Integrated amplifier models could be also equipped with RS232 Interface. Baudrate = 115,2 kBaud. Standard protocol = bit oriented. ASCII could be realized



### RS485 Interface (ordering option)

RS485 interface connects up to 128 sensors. Operation mode = half duplex. Data transfer rate = 128kBaud (reducible). Value updating will be made every 5ms. It is a bitoriented disposable protocol.



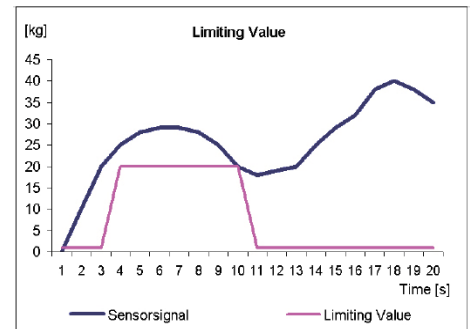
## Nonstandard Options

### Limiting Value (programmable option according to customer specification)

Limiting values show if a defined threshold passes over or falls below. As long as output signal stays below a fixed limiting value status shows low. As soon as it passes over status shows high.

**Types:** Up to 2 limiting values could be fixed for each sensor. In addition it is possible to fix a switching hysteresis.

**Example:** Limiting value = 20kg. Sensor is loaded with 15kg -> status = low



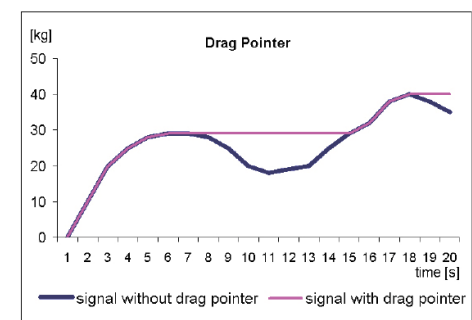
### Drag Pointer (programmable option according to customer specification)

Output signal (digital or analog) could be shown as drag pointer. I.e. as long as the sensor signal increases, output signal increases in the same way. But as soon as the sensor signals decreases, output signal will be fixed at the highest value.

**Types:** Drag pointer switched on constantly? Yes / no

Drag pointer switched on at sensor signal xxxx

**Reset:** A defined wire has to be connected with ground (GND)

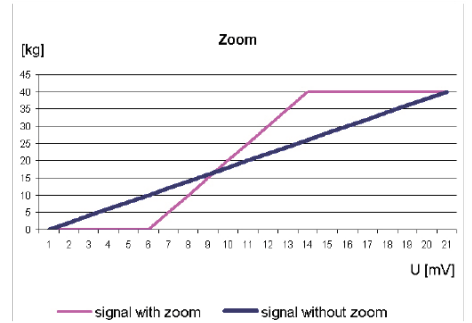


## Nonstandard Options

### Zoom (programmable option according to customer specification)

With zoom function it is possible to focus on a defined partial range of total measuring range.

**Types:** Before zooming area: output signal will be 0 or a custom defined value.  
Beyond zooming area: output signal will be fullscale or a custom defined value

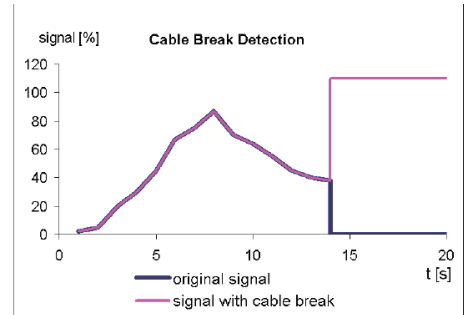


### Cable Break Detection (programmable option according to customer specification)

This function checks internal sensor wiring as well as the cable itself (supply- and signal-wires) for breaks.

A break will be indicated within 5ms.

**Types:** a) digital (additional display required): "break" is monitored  
b) analog: output signal increases to 110% and stays there constantly  
c) defined I/O-wire: low -> high

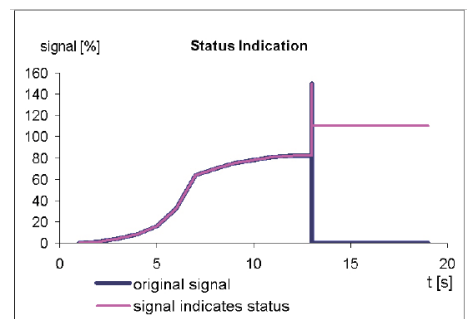


### Status Indication (programmable option according to customer specification)

Customized defined parameter could be shown or stored.

**Examples:**

- Sensor overload
  - a) digital (additional display required): "overload" is monitored
  - b) analog: output signal increases to 110% and stays there constantly
  - c) defined I/O-wire: low -> high
- indicating overload value (e.g. 110%, 130%, 150%) -> is there a constant deformation
- counting how often 100% load was applied
- counting numbers of load cycles (life time)
- remaining life time



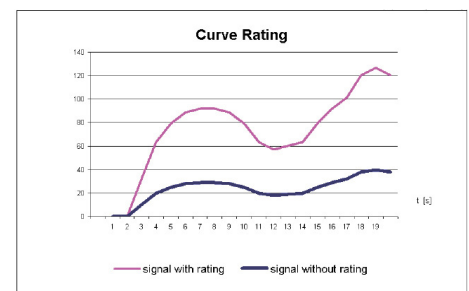
### Characteristic Curve Rating (programmable option according to customer specification)

Output signal (digital or analog) is rated, which means an arithmetic operation effects the sensor signal.

In general all basic arithmetic operations (addition, subtraction, multiplication or division) are possible, as well as combinations.

**Examples:**

Signal without rating = force in N  
Signal with rating = torque in Nm  
(force x torsion arm)



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