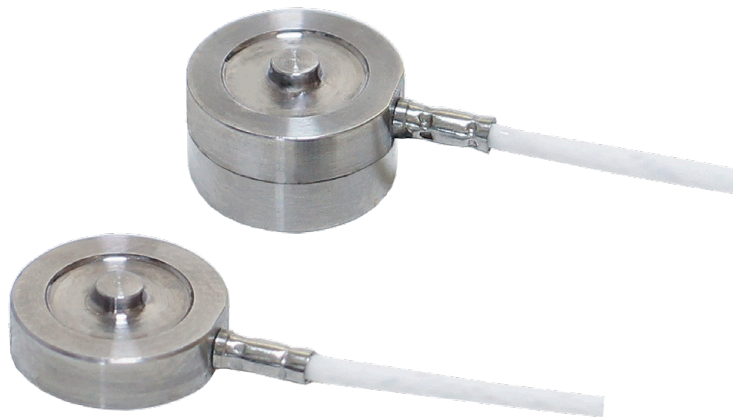


Subminiature Load Cell

Model 8413

Model 8414 with overload protection

Code:	8413 EN
Delivery:	ex stock
Warranty:	24 months



- Measuring ranges 0 ... 2.5 N to 0 ... 5 kN
- Especially flat design from 3.3 mm
- Non-linearity 0.25 % of full scale
- Model 8414 with mechanical overload protection
- Temperature compensation - 55 °C ... 120 °C
- Made of high quality stainless steel
- High frequencies of resonance

Application

This miniature force sensor was optimised with respect to its height and is, at only 3.4 mm, the lowest known sensor with strain gauge technology. Hardly higher than the diameter of its connection cable, it can also be housed in conditions where space is limited. Along with its minimal geometry, the force sensor is also particularly light. It has a high resonance frequency to follow quickly changing load alternations. Despite its extreme miniaturisation, in its application it remains completely robust and suitable for industry, not only with regard to the highly flexible cable connections or the full welding of sensors for the measurement ranges $\geq 0 \dots 10$ N.

Examples of applications are

- ▶ Adjustment of gauges
- ▶ Force measurements on the inside of precision tools
- ▶ Monitoring of control elements
- ▶ Regulation of forces in medical technology
- ▶ Control instruments in precision machinery
- ▶ Adjustment and pre-load of devices
- ▶ Measurement technology in aircraft construction
- ▶ Fitting of test components and prototypes

Description

The miniature compression force sensors are flat, cylindrical discs with covered bottoms. The central load application button for taking on compression forces is an integrated part of the top, which is the sensor's membrane. On its bottom, the strain gauges are fixed on the inside of the housing and interconnected with a full Wheatstone bridge. This passes on, for force applications, an output voltage which is directly proportional to the size of the measurement.

The connection cable exits radially from the sensor housing and is additionally stabilised by a case for measurement ranges $\geq 0 \dots 10$ N. The support area of the bottom of the sensor is circular, however arranged circularly for measurement ranges $\leq 0 \dots 5$ N.

8413 EN

Technical Data

Model 8413

Order Code	Measuring Range		Dimensions [mm]										Resonance Frequency [kHz]	Nominal Value [mV/V]	Weight without Cable [g]
			Ø D 1	Ø D 2	Ø D 3	H 1	H 2	A	M	Ø L	Ø K				
8413-5002	0 ...	2.5 N	9.7	-*	2.3	3.3	2.6	11.0**	1.2	-	1.2	3	15	1.2	
8413-5005	0 ...	5 N	9.7	-*	2.3	3.3	2.6	11.0**	1.2	-	1.2	4	15	1.2	
8413-5010	0 ...	10 N	9.7	8.3	2.2	3.4	2.6	9.0	1.0	1.6	1.0	4	1	1.5	
8413-5020	0 ...	20 N	9.7	8.3	2.2	3.4	2.6	9.0	1.0	1.6	1.0	6	1	1.5	
8413-5050	0 ...	50 N	9.7	8.3	2.2	3.4	2.6	9.0	1.0	1.6	1.0	12	1	1.5	
8413-5100	0 ...	100 N	9.7	8.3	2.2	3.4	2.6	9.0	1.0	1.6	1.0	15	1	1.5	
8413-5200	0 ...	200 N	9.7	8.3	2.2	3.4	2.6	9.0	1.0	1.6	1.0	15	2	2.0	
8413-5500	0 ...	500 N	12.7	10.0	3.0	3.8	3.3	10.5	1.0	1.6	1.0	16	2	3.0	
8413-6001	0 ...	1000 N	12.7	10.0	3.0	3.8	3.3	10.5	1.0	1.6	1.0	20	2	3.0	
8413-6002	0 ...	2000 N	19.1	16.0	6.4	6.4	5.7	13.7	1.5	1.6	1.0	13	2	10.0	
8413-6005	0 ...	5000 N	19.1	16.0	6.4	6.4	5.7	13.7	1.5	1.6	1.0	15	2	10.0	

Model 8414 with overload protection

Order Code	Measuring Range		Dimensions [mm]										Resonance Frequency [kHz]	Nominal Value [mV/V]	Weight without Cable [g]
			Ø D 1	Ø D 2	Ø D 3	H 1	H 2	A	M	Ø L	Ø K				
8414-5002	0 ...	2,5 N	9.4	-*	2.3	6.4	5.8	11.0**	4.2	-	1.2	3	12	3.8	
8414-5005	0 ...	5 N	9.4	-*	2.3	6.4	5.8	11.0**	4.2	-	1.2	4	12	3.8	
8414-5010	0 ...	10 N	9.7	7.0	2.2	6.4	5.6	9.0	4.0	1.6	1.0	4	1	4.0	
8414-5020	0 ...	20 N	9.7	7.0	2.2	6.4	5.6	9.0	4.0	1.6	1.0	6	1	4.0	
8414-5050	0 ...	50 N	9.7	7.0	2.2	6.4	5.6	9.0	4.0	1.6	1.0	12	1	4.0	
8414-5100	0 ...	100 N	9.7	7.0	2.2	6.4	5.6	9.0	4.0	1.6	1.0	15	1	4.0	

* Measurement ranges ≤ 0 ... 5 N have circular contact surfaces on the bottom with Ø 8.5 mm

** Cable at this length rigid but without a case

Electrical values

Bridge resistance (full bridge):

measuring ranges ≤ 0 ... 5 N semiconductor 500 Ω, nominal
measuring ranges ≥ 0 ... 10 N foil 350 Ω, nominal

Excitation: 5 V DC

Nominal value: refer to table

Insulation resistance: > 5000 MΩ by 50 V DC

Shunt calibration resistor:

measuring ranges ≤ 0 ... 5 N 10 kΩ ± 0.1 %
measuring ranges 0 ... 10 N to 0 ... 100 N 100 kΩ ± 0.1 %
measuring ranges ≥ 0 ... 200 N 59 kΩ ± 0.1 %

The bridge output voltage caused by a shunt of this value is shown in the calibration certificate.

Environmental conditions

Range of operating temperature: - 55 °C ... + 120 °C

Nominal temperature range: + 15 °C ... + 70 °C

Influence of temperature on zero: ± 0.02 % F.S./K

Influence of temperature on sensitivity: < + 0.02 % Rdg./K

Mechanical values

Non-linearity: < ± 0.5 % F.S.

Accuracy: < ± 0.5 % F.S.

Non-repeatability: < ± 0.1 % F.S.

Deflection full scale:

measuring ranges ≤ 0 ... 5 N 13 µm ... 38 µm
measuring ranges ≥ 0 ... 10 N 25 µm ... 50 µm

Static overload capacity: model 8413, 150 % of nominal load

Maximum static overload stop: model 8414, 500 % of nominal load

Dynamic load: recommended 70 % of nominal load
maximum 100 % of nominal load

Material: stainless steel 17-4 PH (similar to 1.4542)

Electrical connection: length approx. 1.5 m

Measuring range ≤ 0 ... 5 N

Highly flexible teflon isolated with open ends for soldering. Length approx. 1.5 m. Steep board, with approx. 7 mm, length 50 mm, for bridge balance, calibration and temperature compensation approx. 0.6 m away from the sensor body. Open cable shielding between sensor and board. Covered in housing without case.

Measuring range ≤ 0 ... 10 N

Shielded, highly flexible, Teflon-insulated cable, 1 mm diameter.

Minimal bend radius 15 mm, for static use 10 mm.

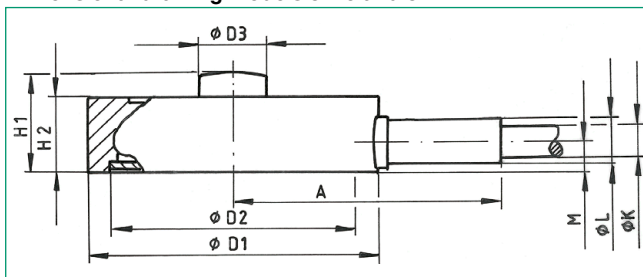
Protecting class: measuring range ≤ 0 ... 10 N acc. to EN 60529 IP54

Wiring code: red excitation voltage positive
black excitation voltage negative
green signal output negative
white signal output positive

Dimensions: refer to table and dimensional drawing

Weight: refer to table

Dimensional drawing models 8413 and 8414



The CAD drawing (3D/2D) for this sensor can be imported online directly into your CAD system.

Download via www.burster.com or directly at www.traceparts.com. For further information about the burster traceparts cooperation refer to data sheet 80-CAD-EN.

Order Information

Subminiature load cell, measuring range 0 ... 50 N **8413-5050**

Accessories

Connector

12 pin, suitable to all burster desktop devices **Model 9941**

9 pin, suitable to SENSORMASTER and DIGIFORCE® **Model 9900-V209**

Mounting of mating connector to conductor cable

Order Code: 99004

Only for connection of sensor to SENSORMASTER Model 9163

desktop housing **Order Code: 99002**

Amplifiers, sensor supply instruments and process controllers as e.g. digital indicator model 9163, model 9243 or DIGIFORCE® 9307

refer to section 9 of the catalog.

Option

Standardization of the nominal value only for measuring range ≥ 0 ... 10 N in the connection cable to 1.0 mV/V ± 0.25 % **...-V010**

Extension of the nominal temperature range to - 55 ° ... 120 °C

for measuring range ≥ 0 ... 10 N **...-Vx1xxxxx**

Factory Calibration Certificate (WKS)

Calibration of a load cell separately as well as connected to an indicator. Standard is a certificate with 11 points, starting at zero, running up and down in 20% increments covering the complete measuring range for preferential direction. Special calibrations on request. Calculation of costs by base price plus additional costs per point.

Order Code 84WKS-84...

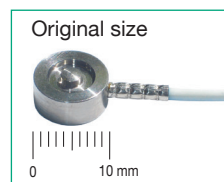
Ultra-Miniature Load Cell

Model 8416

Code:	8416 EN
Delivery:	ex stock
Warranty:	24 months



NEW
now measuring ranges
from 0 ... 20 N



- Inexpensive
- Measuring ranges from 0 ... 20 N to 0 ... 5 kN
- Dragchain cable
- Option standardization the nominal sensitivity
- Option temperature compensated range
- 40 °C ... 90 °C

Application

Due to their extremely compact design, these load cells can be used wherever static or dynamic load forces have to be measured in very tight spaces.

Model 8416 is perfect for use in micro-technology and just as suitable for measuring tasks in the research and development sector.

Typical applications for these ultra-miniature compression load cells include

- ▶ Equipment construction
- ▶ Production lines
- ▶ Measuring and control equipment
- ▶ Testing systems
- ▶ Handling gear
- ▶ Universal testing machines, etc.

Description

The ultra-miniature compression load cell model 8416 is a flat, circular disc, the bottom of which is sealed with a cover. The load application button for receiving the compression forces is an integrated part of the sensor.

The sensor element inside the body carries a strain gauge full bridge which outputs voltage directly proportional to the measurement variable upon application of force.

The short nominal measurement distance of the ultra-miniature compression load cells due to their design provides a high degree of rigidity. If needed, the nominal characteristic value can be standardized in the sensor connection cable. This allows for quick and easy interchange or simultaneous connection of several sensors to a single evaluation unit.

8416 EN

Technical Data

Order Code	Measuring Range	Dimensions [mm]					Resonance Frequency [kHz]
		ø D1	ø D2	ø D3	H1	H2	
8416-5020-V100	0 ... 20 N	10.6	3	7.6	4.5	5	6
8416-5050-V100	0 ... 50 N	10.6	3	7.6	4.5	5	6
8416-5100	0 ... 100 N	10.6	3	7.6	4.5	5	6
8416-5200	0 ... 200 N	10.6	3	7.6	4.5	5	20
8416-5500	0 ... 500 N	10.6	3	7.6	5.5	6	18
8416-6001	0 ... 1000 N	10.6	3	7.6	6.5	7	30
8416-6002	0 ... 2000 N	10.6	3	7.6	6.5	7	45
8416-6005	0 ... 5000 N	12.6	3	7.6	6.5	7.5	80

Electrical values

Bridge resistance:	350 Ω, nominal*
Excitation:	5 V DC
Nominal sensitivity:	1 mV/V, nominal*
Insulation resistance:	> 10 MΩ

*Deviations from the stated value are possible.

Environmental conditions

Nominal temperature range:	
measuring range ≤ 0 ... 50 N	+ 15 °C ... + 60 °C
measuring range ≥ 0 ... 100 N	+ 15 °C ... + 70 °C
Operating temperature:	0 °C ... + 80 °C
Influence of temperature on zero:	± 0.3 % F.S./10 K
Influence of temperature on sensitivity:	± 0.3 % Rdg./10 K

Mechanical values

Non-linearity:	< 0.5 % F.S.
Hysteresis:	0.25 % F.S.
Non-repeatability on unchanged mounting position:	< 0.1 % F.S.
Deflection:	approx. 20 µm
Static overload safe:	150 % of capacity
Dynamic performance:	
recommended	50 % of capacity
maximum	70 % of capacity

Material: High-grade stainless steel 1.4542

Electrical connection:	
shielded, dragchain TPE coated cable with bare ends for soldering,	PUR coat
	cable length approx. 1.7 m
with standardization in cable	cable length approx. 2.0 m
bending radius ≥ 20 mm moving,	≥ 6 mm rigidly laid
Protection class:	acc. to EN 60529 IP54
Wiring code:	
white	excitation voltage positive
brown	excitation voltage negative
yellow	signal output positive
green	signal output negative

Dimensions:	refer to table and scale drawing
General tolerance of dimensioning:	acc. to ISO 2768-f
Weight:	approx. 10 g without cable

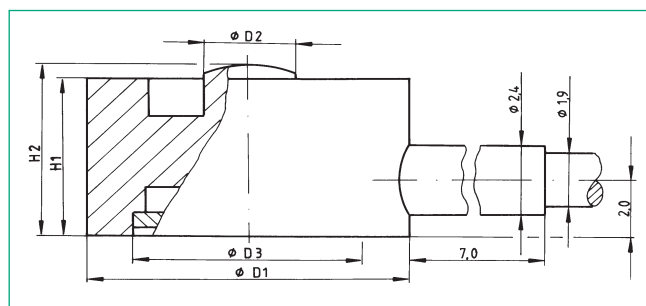
Mounting Instructions

The measuring force is to be applied centrally and free from lateral force. To prevent contact at just a few points, ensure that the sensor is installed on a flat surface.

The sensor can be secured using silicon, wax or an adhesive for example. Do not subject the sensor to lateral clamping forces as these would result in measurement errors.

When handling and installing the sensor, ensure that the cable outlet and sensor cable are not subjected to excessively high tensile or lateral forces. Strain relief may be necessary.

Dimensional drawing model 8416



The CAD drawing (3D/2D) for this sensor can be imported online directly into your CAD system.

Download via www.burster.com or directly at www.traceparts.com. For further information about the burster traceparts cooperation refer to data sheet 80-CAD-EN.

Order Information

Ultra-miniature compression load cell,
measuring range 0 ... 200 N

Model 8416-5200

Accessories

Mating connector	
12 pins, to 9180 and 9186 in table housings	Model 9941
9 pins, to TRANS CAL, SENSORMASTER and DIGIFORCE®	Order Code: 9900-V209

Mounting of a connector to the sensor cable	Order Code: 99004
Only for connection of 8415 to SENSORMASTER model 9163 desktop version	Order Code: 99002

Amplifiers, sensor supplying instruments and process controllers as e.g. digital measuring indicator for strain gauges model 9180, model 9163, modular amplifier model 9243

refer to section 9 of the catalog.

Option

Standardization of the sensitivity in the sensor connection cable, only for measuring ranges > 0 ... 100 N to 0.8 mV/V ± 0,25 % **...-V008**

Extension of temperature compensated range
- 40 °C ... 90 °C **...-V420**

Temperatures < - 20 °C: not approved for moving cable

Factory Calibration Certificate (WKS)

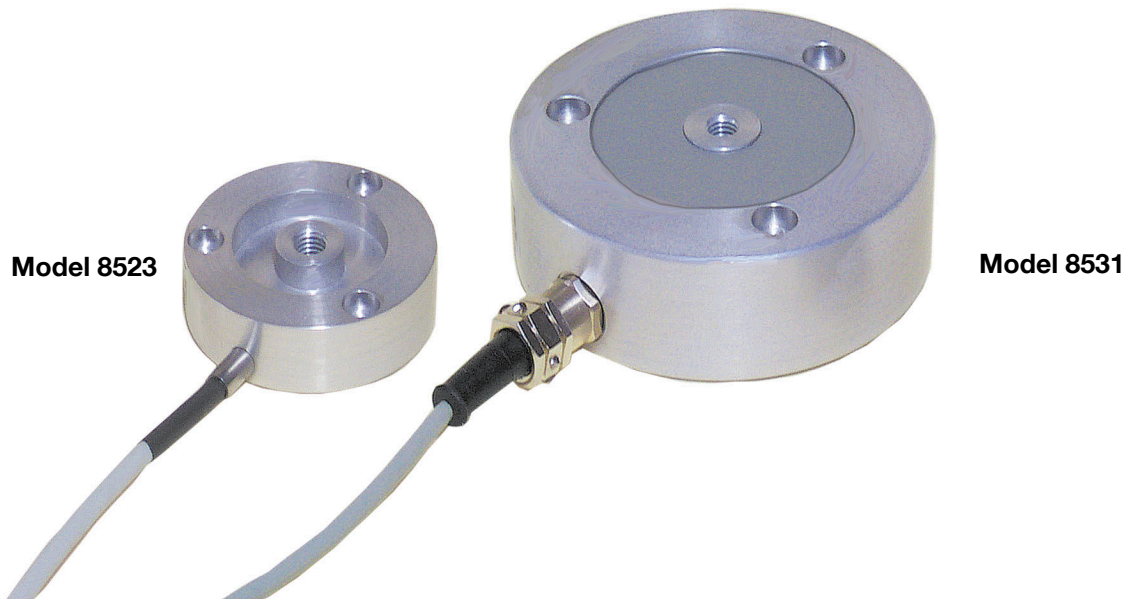
Calibration of a load cell separately as well as connected to an indicator. Standard is a certificate with 11 points, starting at zero, running up and down in 20% increments covering the complete measuring range for preferential direction. Special calibrations on request. Calculation of costs by base price plus additional costs per point.

Order Code 84WKS-84...

Tension-Compression Load Cells

Model 8523
Model 8531

Code:	8523 EN
Delivery:	ex stock
Warranty:	24 months



- Measuring ranges from 0 ... 20 N to 0 ... 5000 N
- High measurement accuracy up to 0.15 % F.S.
- Material high-strength aluminium
- Standardized nominal characteristic value starting with a measurement range of 0 ... 100 N
- Especially inexpensive

Application

These sensor series are especially suitable for the measurement of static and semi-static tension and compression measurements. The membrane load cells are designed based on proven principles. Their compact design and very solid construction makes them suitable for use in manufacturing plants as well as in laboratories and testing. Sensor characteristic value is standardized with the exception of model 8523-20/50 N. This makes it possible to replace the measurement amplifier without adjusting it. Furthermore it is possible to connect several load with the same measurement range at the same time by totaling the individual forces.

Applications:

- ▶ Cable force
- ▶ Measurement of bar, rods and framework forces
- ▶ Press-fit processes
- ▶ Balance and test scales
- ▶ Friction forces
- ▶ Withdrawal forces

Description

The load to be measured is applied either using a load button or an application specific thread part to the load cell via a M8 thread, which is located in the axis of the tension and compression sensors. A strain gauge full bridge is in the sensor element, which converts the applied load into an electrical signal.

The mounting of the load cells is unproblematic due to the three-point support. This reduces the mounting surface requirements.

In order to achieve an optimal measuring result, the force to be measured must be applied to the sensor axially.

Lateral forces can be avoided by constructional measures like mounting the load cell on movable bearings, guiding sleeves, etc.

Load buttons (see drawings) enable an optimal appliance of the compression forces to the load cells. The measurement error upon non-axial load application is negligible up to an angle error of 3° due to the sensor's convex surface. The output signal is positive in the calibrated direction of motion (compression force). The characteristic value in the direction of tension can deviate from the calibrated direction of compression by up to 0.3 %.

Technical Data

Order Code	Load Range	Accuracy ¹⁾ [%F.S.]	Sensitivity [mV/V]	ø D [mm]	H [mm]	Natural Frequency [kHz]	Weight [kg]	Wrench Torque for Mounting Screw 12.9
8523-5020	0 ... 20 N	≤ ± 0.5	nominal ²⁾ 1.0	54.5	16	0.5	0.15	3 Nm
8523-5050	0 ... 50 N	≤ ± 0.5	nominal ²⁾ 1.0	54.5	16	0.75	0.15	3 Nm
8523-5100	0 ... 100 N	≤ ± 0.5	standardized 1.5 ± 0.5	54.5	16	0.80	0.15	3 Nm
8523-5200	0 ... 200 N	≤ ± 0.2	standardized 1.5 ± 0.2 %	54.5	16	1.1	0.15	3 Nm
8523-5500	0 ... 500 N	≤ ± 0.2	standardized 1.5 ± 0.2 %	54.5	16	2.3	0.15	3 Nm
8531-6001	0 ... 1000 N	≤ ± 0.25	standardized 1.5 ± 0.2 %	89.5	22	1.0	0.35	6 Nm
8531-6002	0 ... 2000 N	≤ ± 0.15	standardized 1.5 ± 0.2 %	99.5	30	1.8	0.35	6 Nm
8531-6005	0 ... 5000 N	≤ ± 0.15	standardized 1.5 ± 0.2 %	99.5	30	3.0	0.35	6 Nm

¹⁾ Combined value consisting of non-linearity, hysteresis and non-repeatability in constant installation position.

²⁾ More or less deviation from stated is possible.

Electrical values

Bridge resistance (full bridges): foil strain gauges 350 Ω, nominal²⁾

Calibration resistor: model 8523-5020 150 kΩ ± 0.1 %
model 8523-5050 100 kΩ ± 0.1 %
others 80 kΩ ± 0.1 %

The bridge output voltage resulting from a shunt resistor of these values is shown in the calibration certificate.

Excitation:

range 0 ... 20 N

max. 5 V DC or AC

range ≥ 0 ... 50 N

max. 10 V DC or AC

Environmental condition

Temperature operating: - 30 °C ... + 80 °C

Temperature compensated: + 15 °C ... + 70 °C

Temperature effect:

model 8523 ≤ ± 0.01 % F.S./K

model 8531 ≤ ± 0.02 % F.S./K

Temperature effect to span: ≤ + 0.02 % Rdg./K

Mechanical values

Kind of measurement: tension or compression direction
(calibrated in compression direction)

Deflection full scale: approx. 80 μm

Overload safe: 130 % of capacity

Overload burst: approx. 300 % of capacity

Dynamic performance: recommended 50 % of capacity,
not suitable for large number of load cycles in tension or compression direction.

Casing material: high-grade aluminium, anodized

Natural frequency: see table

Protection class: acc. EN 60529

model 8523 IP52

model 8531 IP64

Electrical termination:

Screened, highly flexible cable with free soldered ends, length approx. 2 m, ø 4.5 mm, bending radius > 40 mm. For model 8523 range ≥ 0 ... 100 N the standardization is integrated in the sensor cable (length 7 cm, ø 8 mm, distance from cable end 30 cm).

Wiring code:

white	excitation	positive
brown	excitation	negative
yellow	signal output	positive
green	signal output	negative

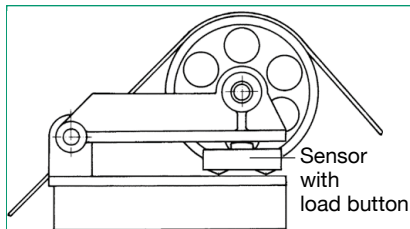
Dimension: see table and dimensions drawing

Weight: see table

Mounting: wrench torque for mounting screws, strength class 12.9 see table

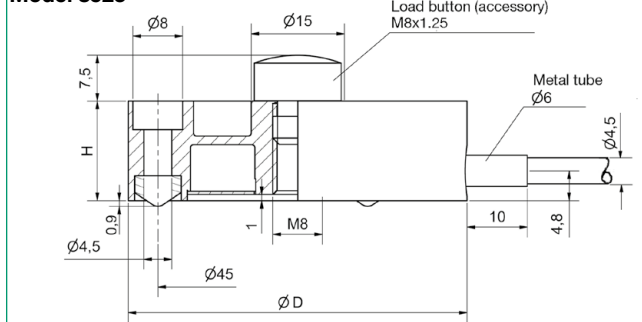
Application example

A stable joint fastening of the arm protects the load cell against impermissible lateral and torsion forces.

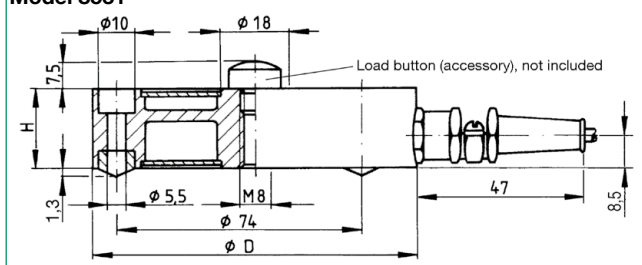


Dimensional drawing

Model 8523



Model 8531



The CAD drawing (3D/2D) for this sensor can be imported online directly into your CAD system.

Download via www.burster.com or directly at www.traceparts.com. For further information about the burster traceparts cooperation refer to data sheet 80-CAD-EN.

Order Information

Compression and tension load cell, range 200 N **Model 8523-5200**

Accessories

Mating connector, 12 pin for burster desktop units except for 9163 **Model 9941**

Mating connector, 9 pins, for 9163-V3xxx, 9235, 9311 and 7281 **Model 9900-V209**

Mounting of mating connector to conductor cable for general use in preferential direction

in preferential direction (positive signal for compression)

Order Code 99004

Against preferential direction (positive signal for tension)

Order Code 99007

Load button for introduction of compressive forces polished and induction hardened (not included delivery) **Model 8580-V008**

Pull plate for measuring tension and compression forces (on both sides rings can be mounted)

for model 8523 **Model 8590-V002**

for model 8531 range 0...1 kN **Model 8590-V006**

for model 8531 range 0...2 kN and 0...5 kN **Model 8590-V007**

Amplifier, analysis and process control devices e.g. digital display 9180, In-line amplifier model 9235, modular amplifier model 9243, DIGIFORCE® 9307, TRANS CAL 7281

refer to section 9 of the catalog.

Factory Calibration Certificate (WKS)

Calibration of a load cell separately as well as connected to an indicator. Standard is a certificate with 11 points, starting at zero, running up and down in 20% increments covering the complete measuring range for preferential direction. Special calibrations on request. Calculation of costs by base price plus additional costs per point.

Order Code 85WKS-85...

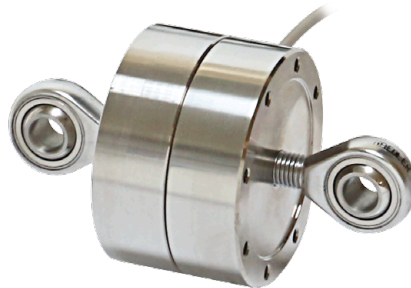
Precision Tension and Compression Load Cell

Model 8524

Code:	8524 EN
Delivery:	ex stock
Warranty:	24 months



Small measurement ranges



Medium measurement ranges



Large measurement ranges

**Optional
overload protection
up to the fivefold of
measurement range**

- Measuring ranges from 0 ... 500 N to 0 ... 200 kN
- Measurement accuracy better than 0.25 % F.S.
- Output signal 1.5 mV/V, standardized
- Highly versatile and for universal use
- Type of protection acc. EN 60529
IP67 for measuring ranges $\geq 0 \dots 20 \text{ kN}$
- Measuring accuracy 0.1 % F.S.
for measuring ranges $\leq 0 \dots 5 \text{ kN}$ (option)
- Cable suitable for drag chains and highly flexible

Application

Due to their compact design and construction, these tension-pressure load cells can be operated without any problems in laboratories as well as in industrial environments. Made of corrosion-resistant steel, these load cells can be integrated easily in existing structures, due to their standardized nominal characteristic value and simple assembly. Model 8524 can be used to measure static, semi-static and dynamic tension and compression forces depending on the measurement task.

Areas of application include:

- ▶ Measurement of press-in and insertion forces
- ▶ Measurement of spring forces
- ▶ Measurement of shearing and cutting forces
- ▶ Force measurement and control during assembly
- ▶ Measurement of pressure on drilling machines

A load-centering plate mounted on the load cell can be used to measure joint lugs, tension forces in ropes, chains, etc. (refer to page 4: load-centering plate).

Description

The bending diaphragm inside the load cell is equipped with strain gauges which, on the exertion of a force, supply a bridge-output voltage directly proportional to the measurement variable. The center axis of the tension/compression load cells incorporates a continuous thread through which the measurement force is applied free from lateral or torsion force either using a load application button or an application-specific adapter part. Starting at a measurement range of 0 ... 5 kN, the measurement accuracy is ideal if the load cell has been mounted on a levelled, hard and polished base. This condition is not necessary for small measurement ranges of 0 ... 2 kN due to 3 special knife-edge bearings (see dimensional drawing 1).

Structural measures should be taken to avoid exposing the load cell to lateral forces (for instance, mounting on movable bearings, levers held by roller bearings). Attachment via the clearance bore holes integrated in the external ring allows simple handling of the sensor.

A stop serves as overload protection against damages caused by impermissible high compression forces (option up to measurement range 0 ... 20 kN). Lateral forces of up to 5 % nominal strength only have little influence.

Technical Data

Dim. tolerances acc. ISO 2768-f

Order Code	Measuring Range	Dimensions [mm]								Thread T	Number of Holes on øG	Natural Frequency [kHz]	Mass [kg]	Wrench for Mounting Screws 12.9	Designated Mounting Screws
		øD1	øD2	øD3	øD4	H	øG	øX	øY						
8524-5500	0 ... 0.5 kN	54.5	15	35.5	33.5	16	45	4.5	8	M 8x1.25	3	> 2	0.25	3 Nm	M 4
8524-6001	0 ... 1 kN	54.5	15	35.5	33.5	16	45	4.5	8	M 8x1.25	3	> 3	0.25	3 Nm	M 4
8524-6002	0 ... 2 kN	54.5	15	35.5	33.5	16	45	4.5	8	M 8x1.25	3	> 5	0.25	3 Nm	M 4
8524-6005	0 ... 5 kN	54.5	15	35.5	34.5	16	45	4.5	8	M 8x1.25	6	> 8	0.25	3 Nm	M 4
8524-6010	0 ... 10 kN	54.5	15	35.5	34.5	16	45	4.5	8	M 8x1.25	6	> 12	0.25	3 Nm	M 4
8524-6020	0 ... 20 kN	79	22	59	58.6	25	68	4.5	8	M 12x1.5	8	> 4	0.65	3 Nm	M 4
8524-6050	0 ... 50 kN	119	44	94	92.6	35	105	6.6	11	M 24x1.5	8	> 3	2	10 Nm	M 6
8524-6100	0 ... 100 kN	155	60	109	107	50	129	13.5	20	M 36x3	8	> 3	5	100 Nm	M 12
8524-6200	0 ... 200 kN	155	60	109	107	50	129	13.5	20	M 36x3	8	> 5	5	100 Nm	M 12

Electrical values

Bridge resistance (full bridge): foil strain gauge 350 Ω, nominal*

Excitation: max. 10 V DC or AC

Sensitivity: 1.5 mV/V ± 0.25 %
positive output at compression

Calibration resistor (burster model 1148-6080): 80 kΩ; 0.1 %

The bridge output signal resulting from a shunt of this value is shown in the calibration certificate. Calibration certificate includes the traceability verification of measuring equipment and is part of delivery.

* Deviation from stated values are possible.

Environmental conditions

Temperature compensated: 15 °C ... 70 °C

Temperature operating: - 30 °C ... 80 °C

Temperature effect zero shift: ≤ 0.02 % F.S./K

Temperature effect span shift: ≤ 0.02 % Rdg./K

Mechanical values

Accuracy: ≤ ± 0.25 % F.S.

Combined value consisting of non-linearity, hysteresis and non-repeatability in constant installation position.

Kind of measurement: Tension and compression

Load calibration in compression direction (preferential direction, output signal positive).

At use with tension load deviant output signal can be expected.

Deflection full scale: < 80 μm

Overload safe: 150 % of capacity

Overload burst: > 250 % of capacity

Dynamic performance:

recommended 70 % of capacity

maximum 100 % of capacity

Material: stainless steel 1.4542

Protection class: acc. EN 60529 measuring range ≤ 0 ... 10 kN: IP65

measuring range ≥ 0 ... 20 kN: IP67

Electrical termination:

highly flexible, oil resistant, drag chains suitable, shielded cable with bare ends for soldering. Bending radius three times the diameter for fixed cable, ten times the diameter for cable permanently moving, length 2 m. Further details see dimensional drawing.

range ≤ 0 ... 50 kN

PUR, ø 4.2 mm

range ≥ 0 ... 100 kN

TPE-V, ø 6,3 mm

Wiring code:

white excitation positive
brown excitation negative
yellow signal output positive
green signal output negative

Dimensions:

see table dimensional drawing
Units with range ≤ 0 ... 2 kN are equipped with bearing edges within clearance holes. Therefore they are 1 mm higher.

Mass: 250 g ... 5 kg, see table

Assembly:

measuring ranges up to 0 ... 2 kN: 3 clearance holes with edges for three-point-support (see dimension drawing 1)

measuring ranges from 0 ... 5 kN: 6 resp. 8 clearance holes (see dimensions drawing 2-4)

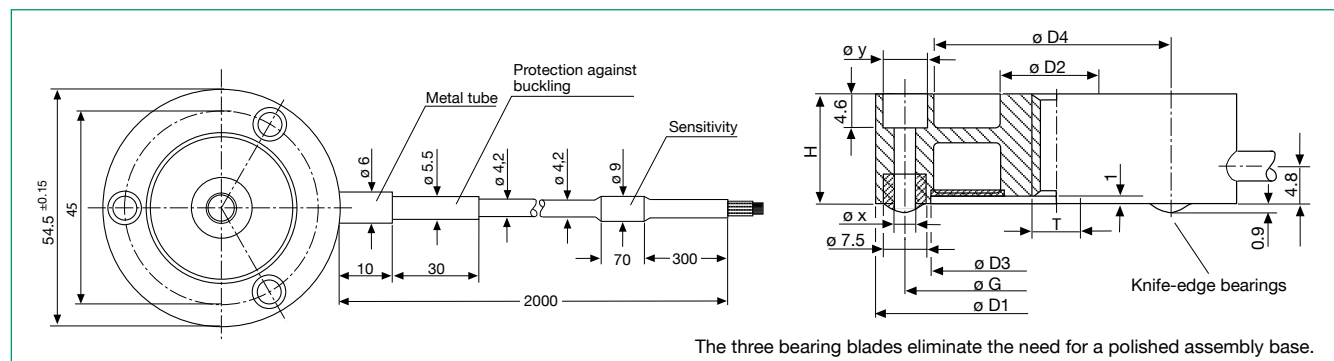
The entire bearing area of the sensor must be mounted on a base which is hardened (60 HRC), flat, polished or better lapped.

Counter bores in compliance with DIN 74-km, in compliance with DIN 912 head cap screws.

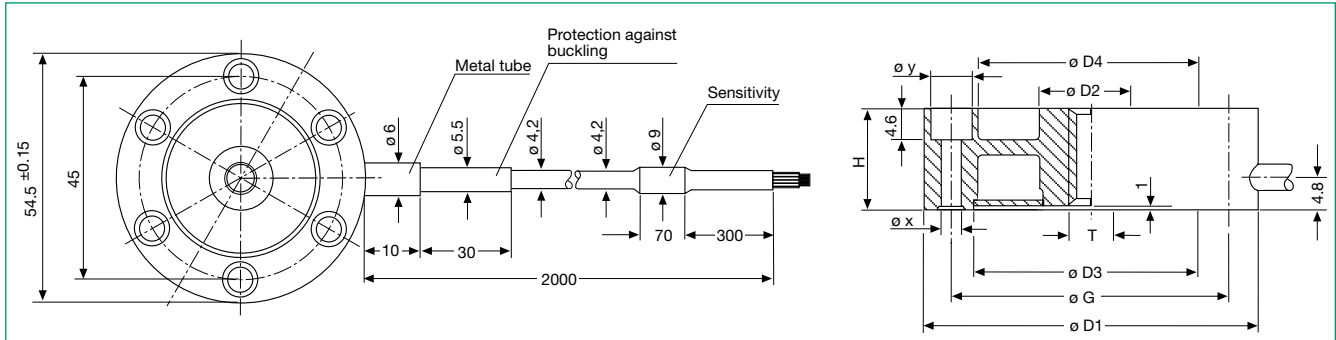
Mechanical strength of screws: 12.9 or better

Also refer to the accessories comprising load-centering plates and load introduction buttons, page 4.

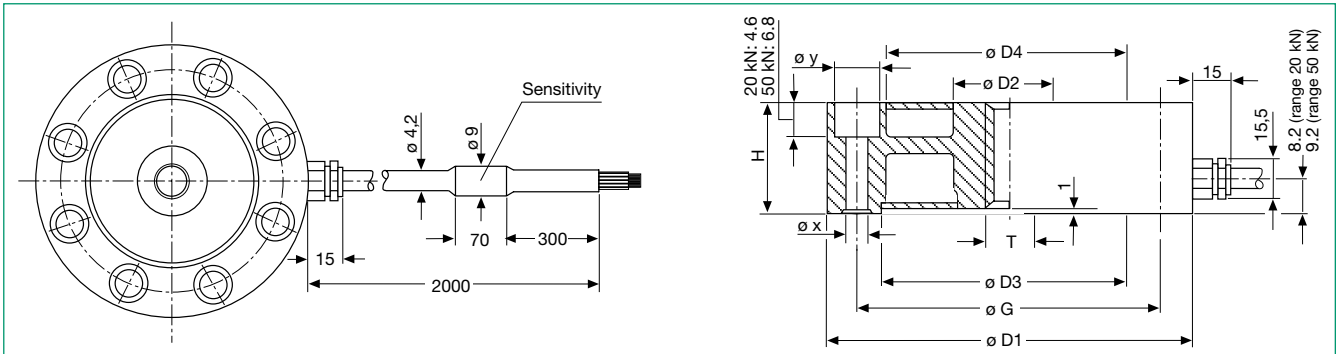
Dimensional drawing 1 measuring range 0 ... 0.5 kN and 0 ... 2 kN



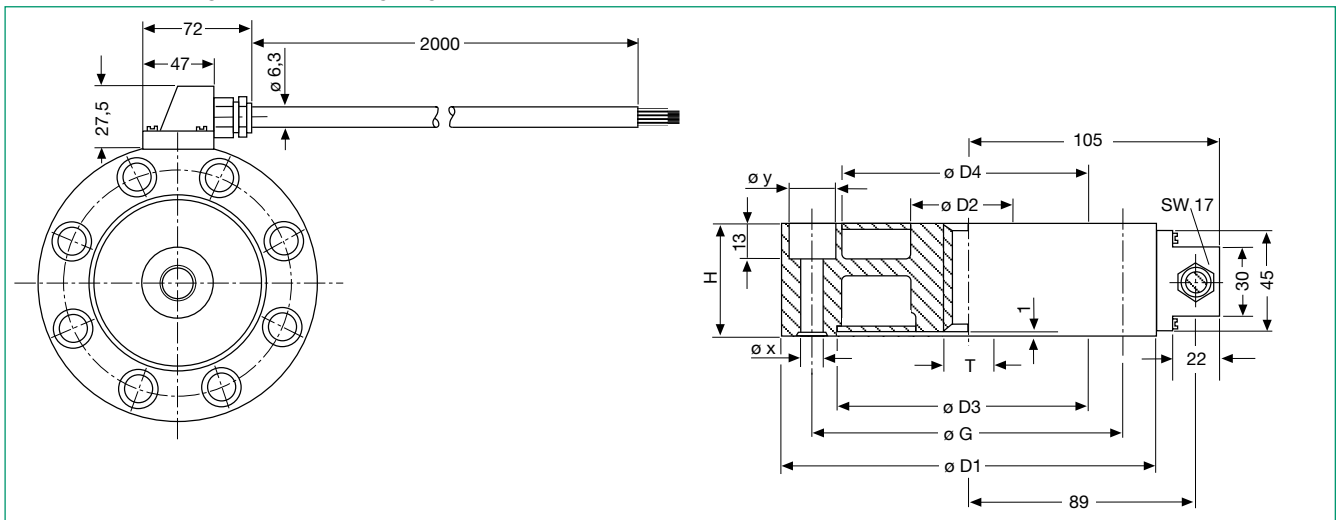
Dimensional drawing 2 measuring ranges 0 ... 5 kN and 0 ... 10 kN



Dimensional drawing 3 measuring ranges 0 ... 20 kN and 0 ... 50 kN



Dimensional drawing 4 measuring ranges 0 ... 100 kN and 0 ... 200 kN



The CAD drawings (3D/2D) for this sensors can be imported online directly into your CAD system.

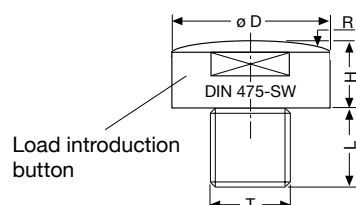
Download via www.burster.com or directly at www.traceparts.com. For further information about the burster traceparts cooperation refer to data sheet 80-CAD-EN.

Accessories

Load buttons

load buttons for introducing compressive forces

Order Code	for Load Cell with Nominal Load	Dimensions [mm]							Tightening Torque	Mass [kg]
		øD	H	L	T	SW	R			
8580-V008	0.5 ... 10 kN	14	7.3	7	M 8 x 1.25	-	20		up to 2 kN: max. 5 Nm / 5 kN and 10 kN: max. 8 Nm	0.01
8580-V012	20 kN	20	15.1	12	M 12 x 1.5	16	25		10 Nm	0.05
8580-V024	50 kN	40	20	17	M 24 x 1.5	32	100		20 Nm	0.25
8580-V036	100 kN, 200 kN	57	30	40	M 36 x 3	46	200		50 Nm	1



These load buttons prove extremely useful if a mechanical coupling (for instance, by means of a threaded rod) is not necessary or possible for a measurement of compressive forces. The spherical surface minimizes measurement errors in case of not axial force introduction.

The compression force needs to be introduced into the load button by means of a component with a plane surface, hardness ≥ 60 HRC. Calibration Certificates for compression load require a load button, which consequently is part of the load cell and must be ordered along with.

Pull Plates

A pull plate extends the range of application of flat-design tension-pressure load cells to include the measurement of tensile forces in freely movable arrangements (rope tension, joint tension ...).

A pull plate has roughly the same dimensions as the sensor body and is mounted on the load cell (see drawing). The central tapped holes allow an installation of customer-specific or standard threaded components (for example, joint heads).

Order Code	for Nominal Load [kN]	Centric Thread	Mass [kg]	max. Wrench Torque for Screws 12.9
8590-V002	bis 10	M 8 x 1.25	0.28	3 Nm
8590-V003	20	M 12 x 1.5	0.70	3 Nm
8590-V004	50	M 24 x 1.5	2.2	100 Nm
8590-V005	100, 200	M 36 x 3	5.5	100 Nm

Screws of strength class 12.9 are required for attaching the pull plates to the load cells.

Strain gauge simulator serves as appliance for the controlled generation of strain gauge sensor signals 0/0.5/1/1.5/2/3 mV/V for the adjustment or verification of amplifiers or indicator devices

Model 9405

refer to data sheet 76-9405 in section 7 of the catalog.

Mating connection, 12 pins for burster desktop devices **Model 9941**

Mating connection, 9 pins for 9163-V3, 9235 and 9310

Model 9900-V209

Mounting of mating connector on sensor cable upon prevalent use of the load cell

in preferential direction (output signal is positive) **Order Code 99004**

only for connection to SENSORMASTER model 9163 desktop

version **Order Code 99002**

opposite to preferential direction (output signal is positive)

Order Code 99007

only for connection of the sensor to SENSORMASTER model 9163

desktop version **Order Code 99008**

Options

Overload protection compression direction (see drawing on the right)

Order Code V400

Load cell with option overload protection for compression direction						
Order Code	Measuring Range	Protected up to	Dimensions [mm]	øD1	H1	H
8524-5500-V400	0 ... 500 N	2.5 kN	54.5	19	16	
8524-6001-V400	0 ... 1 kN	5 kN	54.5	19	16	
8524-6002-V400	0 ... 2 kN	10 kN	54.5	19	16	
8524-6005-V400	0 ... 5 kN	20 kN	54.5	19	16	
8524-6010-V400	0 ... 10 kN	30 kN	54.5	19	16	
8524-6020-V400	0 ... 20 kN	80 kN	79	25	25	

The overload protection protects the load cell against damages resulting from loads higher than the operating load value (150 % of the nominal load). The overload protection is realized through a dead stop limiting the displacement of the spring bellow upon load application to max. 130 % of the nominal load. The measurement of tension forces is possible also with mounted overload stop. For this reason the overload protection has the same external mounting bores as the sensor itself.

Useful Information

- Overload protection for compression only.
- Overload protection mounting by factory only.
- Tolerance of standardized output of load cell at overload protection $\pm 0.5\%$.
- Do not use the overload protection often.
- It is not allowed to introduce overload on load cell by thread (allowed are load buttons, see accessories or similar parts.)
- The overload protection does not have any centric threaded holes.

Options

Standardized sensitivity, 1 mV/V $\pm 0.25\%$

- **V010**

Cable length 3 m

- **V203**

Cable length 5 m

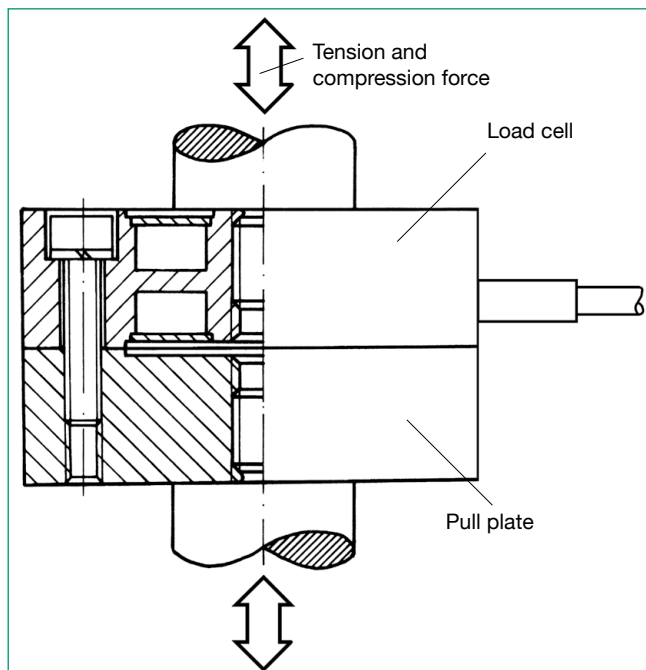
- **V206**

Better accuracy $\pm 0.1\%$ F.S.

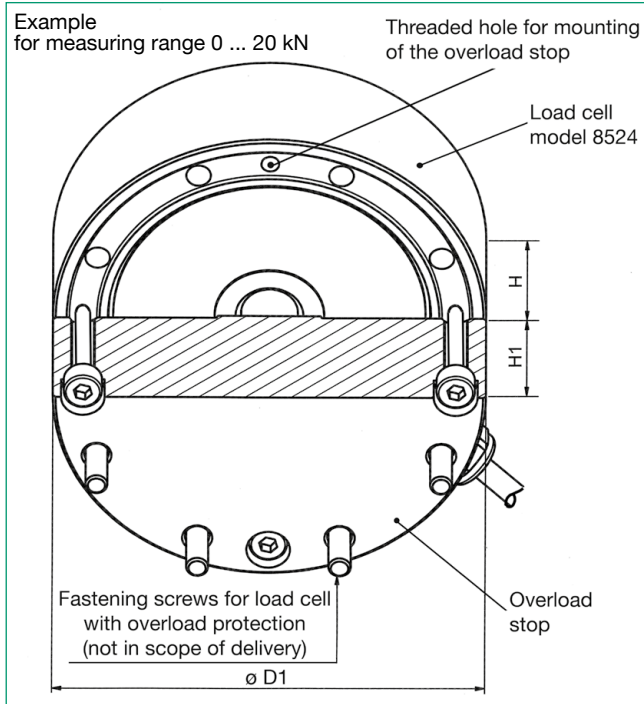
(only for measurement ranges $\leq 0 \dots 5$ kN)

- **V502**

Sensor with pull plate



Sensor with overload protection; available up to $\leq 0 \dots 20$ kN



Order Information

Tension and compression, range 0 ... 20 kN

Model 8524-6020

Tension and compression, range 0 ... 5 kN,

overload protection up to 20 kN

Model 8524-6005-V400

Signal conditioning

Digital indicator e.g. model 9180, amplifier e.g. model 9243 or DIGIFORCE®

refer to section 9 of the catalog.

Factory Calibration Certificate (WKS)

Calibration of a load cell separately as well as connected to an indicator. Standard is a certificate with 11 points, starting at zero, running up and down in 20% increments covering the complete measuring range for preferential direction. Special calibrations on request. Calculation of costs by base price plus additional costs per point.

Order Code 85WKS-85...

Presses Load Cell

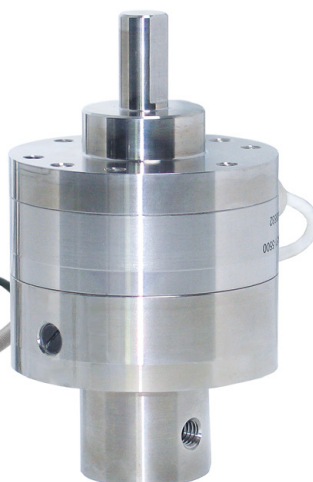
For hand and automatic operated presses

Model 8552
Model 8451

Code:	8552, 8451
Delivery:	ex stock
Warranty:	24 months



Model 8552
Standard model for
manual presses up to 25 kN



Model 8451-6002
Precision model for
up to 2 kN



Model 8451-6100
for high compression forces
of up to 100 kN

**Low installation height
with up to tenfold
overload protection**

- Measuring ranges from 0 ... 100 N up to 0 ... 100 kN
- Measurement range to 25 kN with mechanical overload protection
- Simplest mounting on press ram
- Compact and very robust construction
- Suitable for all standard manual presses with stamp holes of 8 H7 resp. 20 H7
- Choice of diameter for pin and hole

Application

Load cell models 8451 and 8552 have been developed for measuring the forces that occur during press operation. The internal measuring elements have a rugged design, which mean they can cope reliably with the steep force curves that are typical of press applications. They can be fitted or replaced quickly and easily on the press ram without the need for additional components around them. With a compact overall height of just 50 mm, the load cell is placed between tool and press ram and can therefore measure the actual compression force directly in the axis of operation.

Typical applications include:

- ▶ Forces in component joining
- ▶ Press-fitting
- ▶ Bending forces during material deformation
- ▶ Cutting forces when severing material
- ▶ Forces during stamping processes
- ▶ Punching forces for blanks
- ▶ Break-out forces used in destructive testing

Description

The load cell measures the compression forces between the circular contact surfaces of plunger and tool. The pin on its top side and hole on its lower face are simply provided for mechanical fixing and centering the components correctly. To provide as large a range of mechanical compatibility as possible, the pins/holes are available in different diameters. The connecting cables are designed like robot cables to allow frequent movement and are fixed securely to the sensor housing. Attachments are available which clamp onto the press sensors to enable easy mounting of displacement sensors according to the circumstances of use.

8451

- ▶ Measurement precision of 0.5 % of full scale for small measurement ranges
- ▶ Rugged construction, works even under transverse forces
- ▶ Protection class IP67

8552

- ▶ Short, compact design
- ▶ Pin/hole diameter from 8 mm to 16 mm
- ▶ Mechanical overload protection for all measurement ranges
- ▶ Choice of diameter for pin and hole

Technical Data

Model 8552 - Standard version

Order Code	Measurement Range	Max. Overload [kN]
8552-5100-V0000	0 ... 100 N	1
8552-5250-V0000	0 ... 250 N	2,5
8552-5500-V0000	0 ... 500 N	5
8552-6001-V0000	0 ... 1 kN	10
8552-6002-V0000	0 ... 2.5 kN	25
8552-6005-V0000	0 ... 5 kN	30
8552-6010-V0000	0 ... 10 kN	30
8552-6025-V0000	0 ... 25 kN	30

Standard version

The standard version of the 8552 sensor model has the following features:

- ▶ Fixing pin diameter 10 e7 (dimension A)
- ▶ Receiving hole diameter 10 H7 (dimension B)
- ▶ Cable length 1 m
- ▶ With nominal sensitivity and open cable end (no connector fitted)

Electrical values

Bridge resistance:	350 Ω , nominal*
Reference excitation voltage:	max. 10 VDC
Nominal sensitivity:	1.0 mV/V, nominal*
Isolation resistance:	> 10 M Ω

* Deviations from stated value are possible.

Environmental conditions

Operation temperature range:	0 °C ... 70 °C
Nominal temperature range:	0 °C ... 70 °C
Influence of temperature on zero:	0.03 % F.S.
Influence of temperature on sensitivity:	0.03 % F.S.

Mechanical values

Measurement accuracy:	2 % F.S.
Deflection:	< 0.1 mm
Maximum static operation load:	120 % of nominal load
Overload protection:	mechanical, refer to table
Material:	
measurement range \leq 0 ... 1 kN	Sensor body made of high-grade anodized aluminum
measurement range \geq 0 ... 2.5 kN	Sensor body made of stainless steel 1.4542

Electrical connection:
shielded, 4 wire, TPE isolated cable, length 1 m, with open ends for soldering, outer diameter 4 mm

Bending radius: > 30 mm

Protection class: according to EN 60529 IP65

Wiring code:	
red	excitation voltage positive
black	excitation voltage negative
white	output signal positive
green	output signal negative

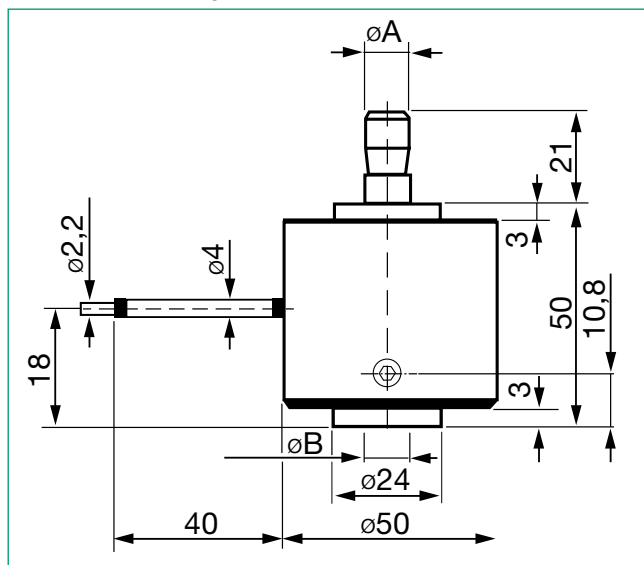
Dimensions: refer to dimensional drawing

General tolerance of dimensions: according to ISO 2768-f

Clamping screws for tool pin: M6

Weight: approx. 300 g

Dimensional drawing model 8552



The CAD drawings (3D/2D) for this sensors can be imported online directly into your CAD system. Download via www.burster.com or directly at www.traceparts.com. For further information about the burster traceparts cooperation refer to data sheet 80-CAD-EN.

Order Code

Press load cell

Model 8552-XXXX-V

Measuring range, refer to table

Nominal sensitivity	0
Mounted connector model 9900-V245 for ForceMaster 9110	1
Standardized sensitivity 0.8 mV/V	2
Diameter for pin 10 mm	0
Diameter for pin 8 mm	1
Diameter for pin 12 mm	2
Diameter for pin 15 mm	3
Diameter for pin 16 mm	4
Diameter for hole 10 mm	0
Diameter for hole 8 mm	1
Diameter for hole 12 mm	2
Diameter for hole 15 mm	3
Diameter for hole 16 mm	4

Accessories 8552

Mounting parts for fixing potentiometric displacement sensors from the 871x model range to the press head or the sensor body. The kit comprises mounting plate, bracket for clamping onto 8552 model load cells with 50 mm housing diameter, pivoting adapter for angle adjustment, all fixing screws, small parts and installation diagram.

Model 5501-Z004

(Picture see page 4 of the data sheet)

Options

Electrical

- With standardized sensitivity of 0.8 mV/V, achieved by inserting a circuit board populated with suitable resistors 30 cm before end of cable
- Available with different cable lengths

Mechanical

- Comes in range of pin/hole diameters, which are not necessarily identical: \varnothing 8 mm, \varnothing 10 mm, \varnothing 12 mm, \varnothing 15 mm, \varnothing 16 mm. The f7/H7 tolerance pair always applies to the pin and hole.
- Longer connecting cable available on request

The order code shows the option notations.

Example showing use of mounting parts to fit displacement sensor, Model 5501-Z004

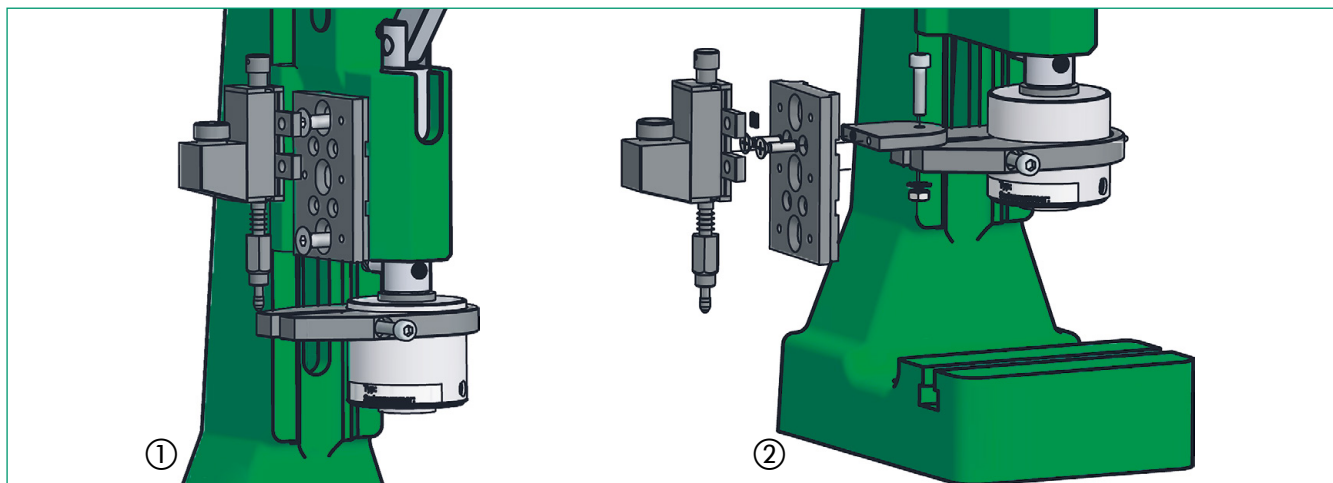
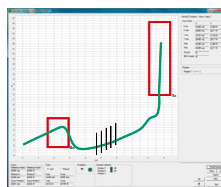


Figure 1: The displacement sensor is mounted on the press head. Its push rod rests on the bracket that is clamped onto the load cell.

Figure 2: The displacement sensor is flange-mounted to the bracket and requires its own external reference from which to measure the displacement.

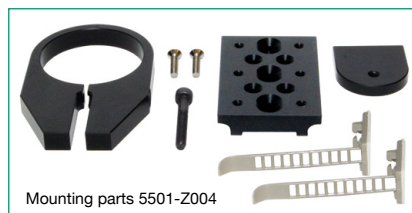
Example of a measuring chain

Load cell	8552-6005-V1000
Displacement sensor	8713-50
Connector plug	9900-V221
Fitting of plug	99005
Mounting parts	5501-Z004
ForceMaster	9110-V0000

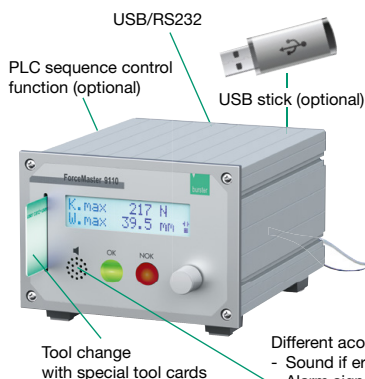


Analysis and configuration software 9110-P001

Displacement sensor e.g. Model 8713-50

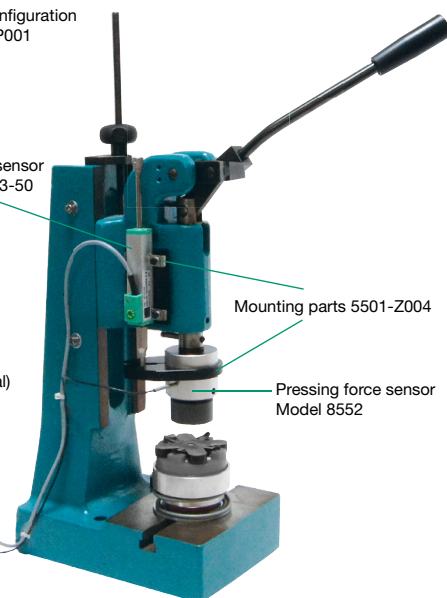


Mounting parts 5501-Z004



Tool change with special tool cards

Different acoustic signals
- Sound if error
- Alarm signal if activated again without confirmation



Mounting parts 5501-Z004

Pressing force sensor Model 8552

Mounting Instruction

The cylindrically shaped body of the load cell has to be mounted until its block touches the ring shaped contact areas of the press stamp. A good fit and a homogenous force distribution is assured this way. For the specific measuring accuracy and long-life stability an axial introduction of the force is recommended.

The immersing pin, flattened on both sides of the upper end, has to be mounted to the press stamp by means of a screw with flat surface. The two parallel flattened surfaces on the pin allow the alignment of the cable outlet in a way that left handed workers as well as right handed workers may operate the press.

The tool will be fastened and centered in the boring of the sensor body clamping M6 resp. M8 ($\geq 0 \dots 50$ kN).

The sensor cable must not be exposed to tensile or buckling stress. Because of this, install the cable with enough space.

Accessories

Force displacement controlled hand lever presses like series 5501, evaluation electronics or process control units like ForceMaster model 9110 and DIGIFORCE® model 9311.

Connector

9 pin, suitable for e.g. DIGIFORCE® 9307/9311

Model 9900-V209

Fitting of plug for compression load cells

Model 99004

8 pin, for potentiometric displacement sensors suitable for ForceMaster 9110

Model 9900-V221

Fitting of plug

Model 99005

Strain gauge simulator as extra tool for generating specific strain gauge signals in order to calibrate amplifiers and display equipment

Model 9405