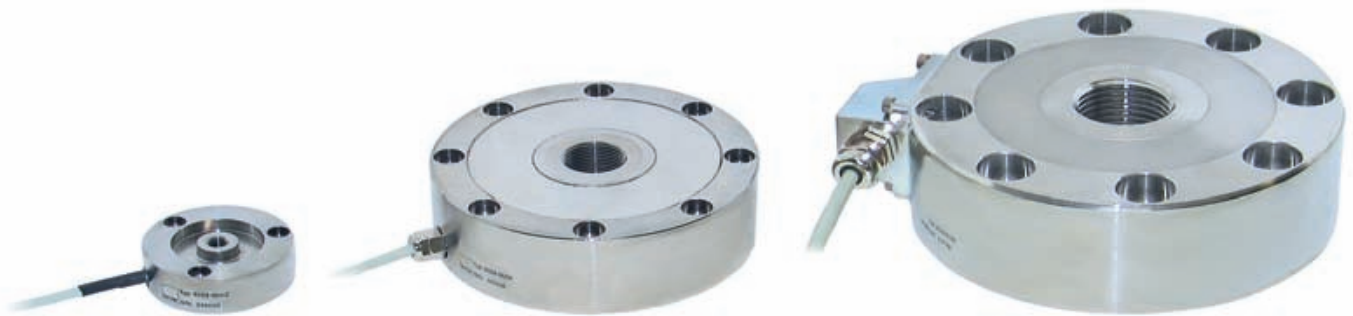


Tension and Compression Load Cell

Model 8524

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

CAD data 2D/3D for this sensor:
Download directly at www.traceparts.com
Info: refer to data sheet 80-CAD-EN



Small measurement ranges

Medium measurement ranges

Large measurement ranges

Optional
overload protection
for ranges up to 20 kN

- Measuring ranges from 0 ... 500 N to 0 ... 200 kN
- Measurement accuracy better than 0.25 % F.S.
- Measuring accuracy 0.1 % F.S. up to a measuring range of 0 ... 5 kN (option)
- Overload protection with the measuring ranges 0 ... 20 kN (option)
- Nominal characteristic value 1.5 mV/V
- Made of stainless steel

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 plate 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 level, 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 G | Natural Frequency [kHz] | Mass [kg] | Wrench for Mounting Screws 12.9 |
|------------|-----------------|-----------------|-----|------|------|----|-----|------|----|------|-------------|----------------------|-------------------------|-----------|---------------------------------|
| | | øD1 | øD2 | øD3 | øD4 | H | øG | øX | øY | W | | | | | |
| 8524-5500 | 0 ... ± 0.5 kN | 54.5 | 15 | 35.5 | 33.5 | 16 | 45 | 4.5 | 8 | 11.4 | M 8x1,25 | 3 | > 2 | 0.25 | 3 Nm |
| 8524-6001 | 0 ... ± 1 kN | 54.5 | 15 | 35.5 | 33.5 | 16 | 45 | 4.5 | 8 | 11.4 | M 8x1,25 | 3 | > 3 | 0,25 | 3 Nm |
| 8524-6002 | 0 ... ± 2 kN | 54.5 | 15 | 35.5 | 33.5 | 16 | 45 | 4.5 | 8 | 11.4 | M 8x1,25 | 3 | > 5 | 0,25 | 3 Nm |
| 8524-6005 | 0 ... ± 5 kN | 54.5 | 15 | 35.5 | 34.5 | 16 | 45 | 4.5 | 8 | 11.4 | M 8x1,25 | 6 | > 8 | 0,25 | 3 Nm |
| 8524-6010 | 0 ... ± 10 kN | 54.5 | 15 | 35.5 | 34.5 | 16 | 45 | 4.5 | 8 | 11.4 | M 8x1,25 | 6 | > 12 | 0,25 | 3 Nm |
| 8524-6020 | 0 ... ± 20 kN | 79 | 22 | 59 | 58.6 | 25 | 68 | 4.5 | 8 | 20.4 | M 12x1,5 | 8 | > 4 | 0,65 | 3 Nm |
| 8524-6050 | 0 ... ± 50 kN | 119 | 44 | 94 | 92.6 | 35 | 105 | 6.6 | 11 | 28.2 | M 24x1,5 | 8 | > 3 | 2 | 10 Nm |
| 8524-6100 | 0 ... ± 100 kN | 155 | 60 | 109 | 107 | 50 | 129 | 13.5 | 20 | 36.5 | M 36x3 | 8 | > 3 | 5 | 100 Nm |
| 8524-6200 | 0 ... ± 200 kN | 155 | 60 | 109 | 107 | 50 | 129 | 13.5 | 20 | 36.5 | M 36x3 | 8 | > 5 | 5 | 100 Nm |

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.

* 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 for non-linearity, hysteresis and repeatability
 Kind of measurement: Tension and compression (calibration in compression direction).
 The output signal in positive direction for compression load.
 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
 ≤ 0 ... 10 kN: IP52
 ≥ 0 ... 20 kN: IP67

Electrical termination: shielded, high flexible cable with bare ends for soldering, length 2 m
 Ranges up to 10 kN: cable diameter 5 mm
 radial cable output radial
 metal tube
 length 10 mm
 diameter 6 mm
 protection against buckling with shrinking hose
 length 30 mm
 diameter 5,5 mm
 bending radius min. 25 mm
 (see dimensions drawing 1 and 2)

Ranges 20 kN and 50 kN:

cable diameter 5 mm
 bending radius min 20 mm
 radial cable output
 PG screw connection
 standardization integrated in cable
 (see dimension drawing 3)

Ranges 100 kN and 200 kN:

cable diameter 7 mm
 bending radius min 35 mm
 tangential cable output
 PG screw connection of flange angle
 (see dimension drawing 4)

Wiring code:

| | | |
|--------|---------------|---------------------------------------|
| white | excitation | positive |
| brown | excitation | negative |
| yellow | signal output | by compression { positive negative |
| green | signal output | |

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

Masse: 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)

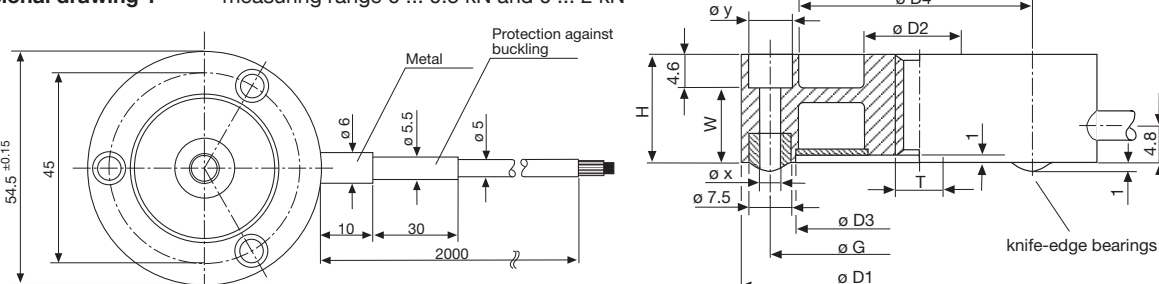
measuring ranges from 0 ... 5 kN: 6 resp. 8 clearance holes
 (see dimensions drawing 2-4)

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

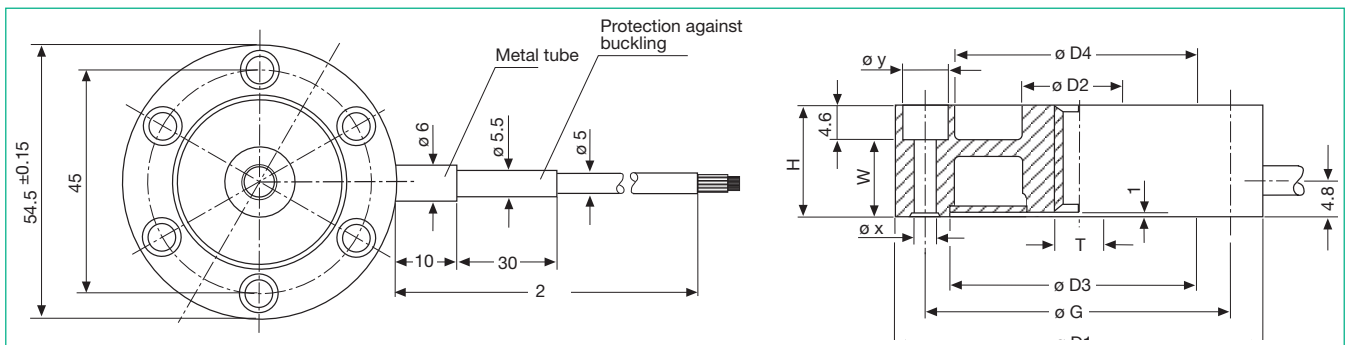
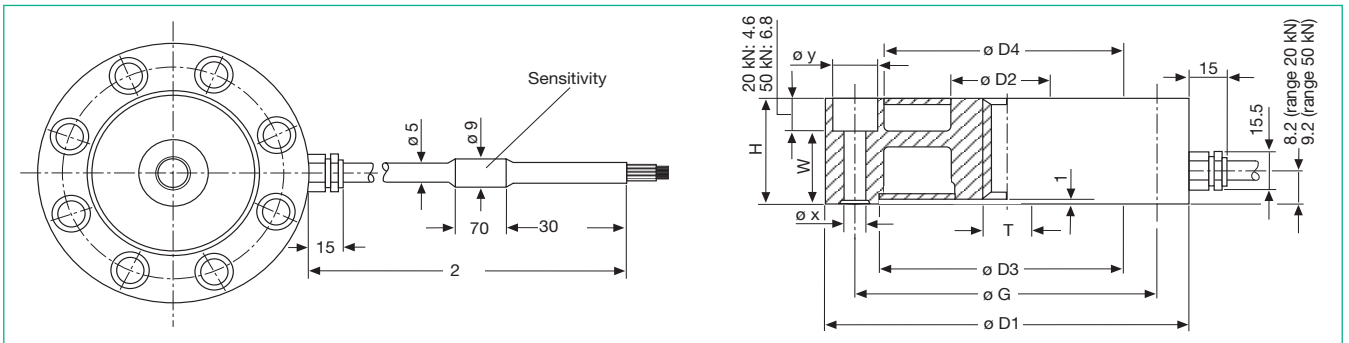
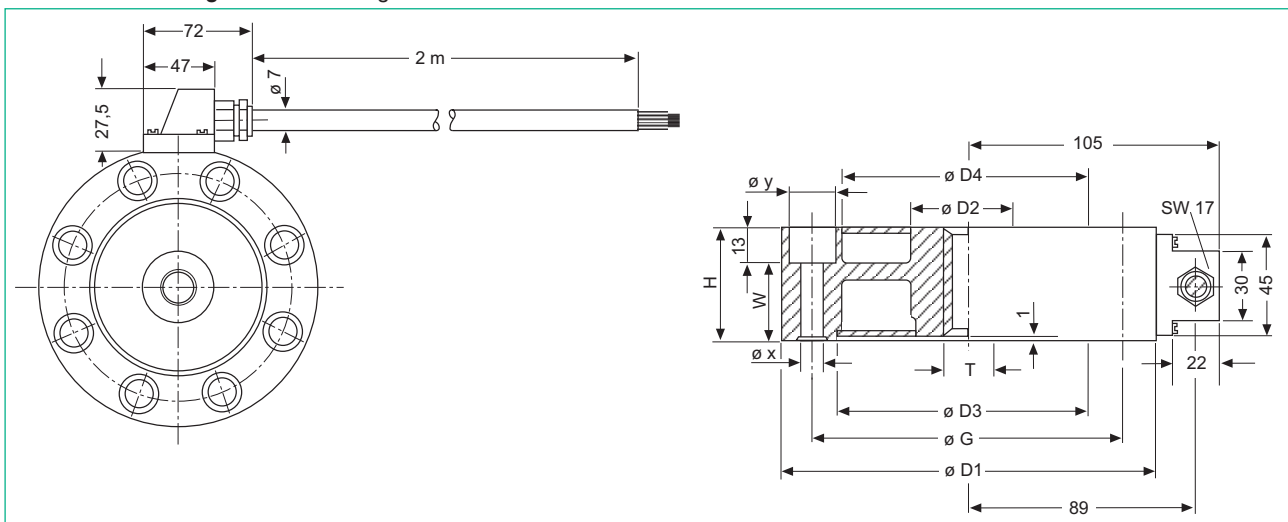
Counter bores in compliance with DIN 74-km, in compliance with DIN 912 head cap screws.

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


The three bearing blades eliminate the need for a polished assembly base.

Dimensional drawing 2 measuring ranges 0 ... 5 kN and 0 ... 10 kN**Dimensional drawing 3** measuring 0 ... 20 kN and 0 ... 50 kN**Dimensional drawing 4** measuring 0 ... 100 kN and 0 ... 200 kN

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

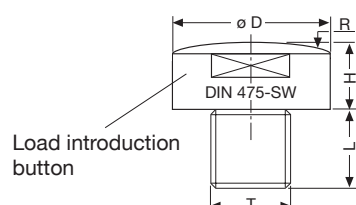
Download via www.burster.com or directly at www.traceparts.com. For further information about the burster traceparts cooperation refer to data sheet 80-CAD-EN.

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.

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 diagram). 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 | to 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 gauges 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 the sensor to SENSORMASTER model 9163

desktop version

Order Code 99008

Options

Overload protection compression direction (see drawing at the right side)

Order Code V400

Load cell with option overload protection for compression direction

| Order Code | Measuring Range | Protected up to | Dimensions [mm] | | |
|----------------|-----------------|-----------------|-----------------|----|----|
| | | | D1 | 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 like the sensor itself.

Useful Information

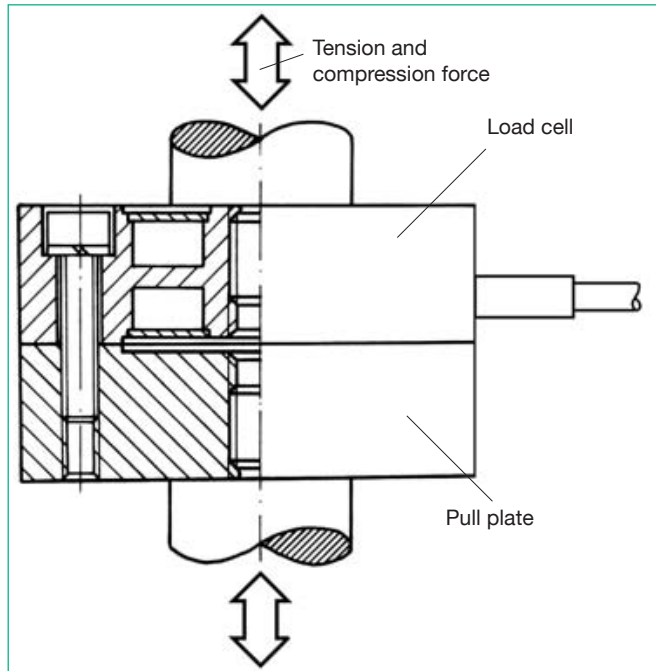
- ▶ Overload protection for compression only.
- ▶ Overload protection mounting by factory only.
- ▶ Tolerance of standardized output of load cell at overload protection $\pm 0.5\%$.
- ▶ Do not use the overload protection often.
- ▶ It is not allowed to introduce overload on load cell by thread (allowed are load button, 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 |
| High flexible cable, length 2 m | - V213 |
| Better accuracy $\pm 0.1\%$ F.S. (for measurement ranges up to 0 ... 5 kN) | - V502 |

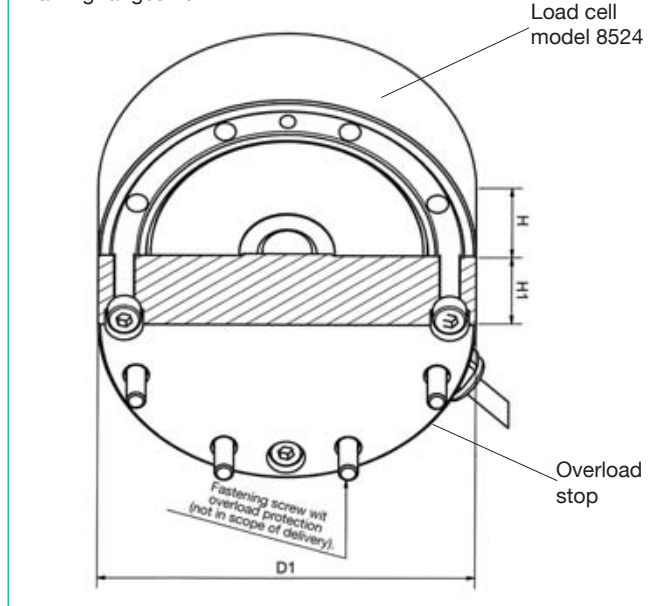
Technical changes reserved -
Latest updates of data sheet always under www.burster.com

Sensor with pull plate



Sensor with overload protection

Drawing ranges 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

Amplifier e.g. model 9243, digital indicator e.g. model 9181 or DIGIFORCE® model 9306/9310 refer to section 9 of the catalog.

Manufacturer Calibration Certificate (WKS)

Calibration of a load cell or a measuring chain in compressive or tensile direction. Calibration in 20 % steps of the range, up and down, in installation position.