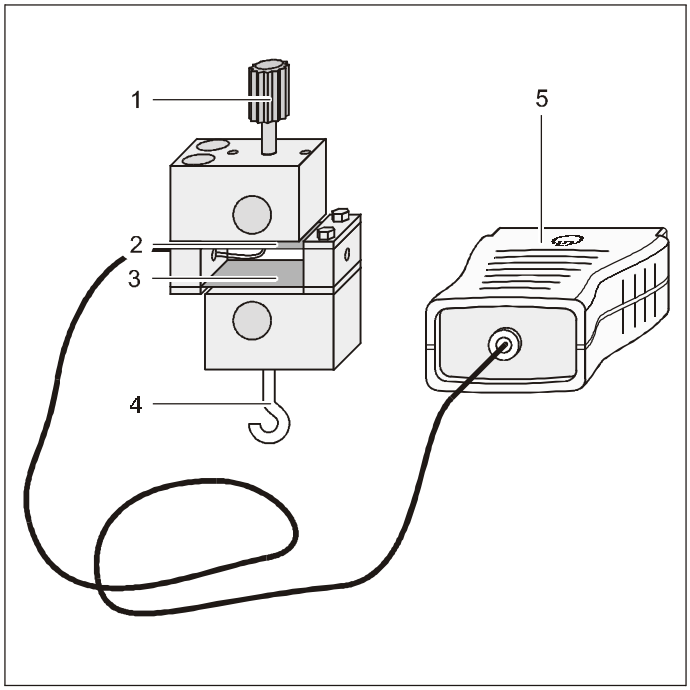
Lehr– und Didaktiksysteme
LD Didactic GmbH
Leyboldstrasse 1 · D-50354 Huerth

06/05-W97-Sel



Instruction sheet 524 042

Force sensor S, ± 50 N (524 042)

1 Knurled screw
2 Elastic element 1, with strain gauge full bridge
3 Elastic element 2
4 Hook provided with screw thread
5 Plug

1 Description

The force sensor S, ± 50 N is used as a sensor in conjunction with the CASSY® computer-assisted measurement system. It enables forces to be measured up to ±50 N. Regardless of the sensor's position, the component of the force in the direction of the sensor axis is measured.

Experiment examples are found on the CD of the CASSY Lab software (524 200) or in the download version of the software under http://www.ld-didactic.com or in the manual of the CASSY Lab software (524 201).

Attention!

The force sensor S may be damaged irreversibly if it is not used appropriately.

- Do not load the force sensor with more than ±50 N to prevent irreversible deformation.
- Do not pull the wires inside the force sensor.
- Protect the force sensor from moisture.

2 Measurement quantities

Measure-ment quantity	CASSY Lab /1/ (524 200)	CASSY-Display /2/ (524 020)	Mobile-CASSY (524 009)	Measuring ranges
Force	F	✓	F	±0.500 N, ±1.50 N /3/, ±5.00 N, ±15.0 N /3/, ±50.0 N
Accelera-tion /4/	a	—	—	±10.00 m/s², ±30.0 m/s², ±100.0 m/s², ±300 m/s², ±1000 m/s²

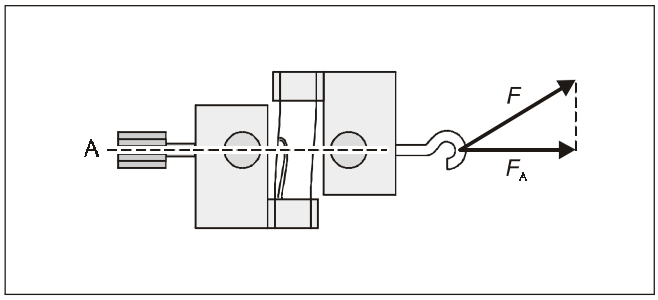
/1/ for Sensor-CASSY (524 010), Pocket-CASSY (524 006) or Mobile-CASSY (524 009) at a PC

/2/ in conjunction with Sensor-CASSY (524 010)

/3/ only in CASSY Lab

/4/ The acceleration is calculated from the force of inertia acting on the movable part of the force sensor without knurled screw and hook while the fixed part is fixed, e.g, to the trolley.

3 Principle of operation



The force sensor S consists of two elastic elements (spring steel sheet), which form a resilient parallelogram and are subject to an S-shaped deformation when loaded. On the upper elastic element a strain gauge full bridge is attached whose resistance changes and which generates an electric signal when it is bent. The stiffness of the construction ensures that always the component F_A of the force F acting in the direction A of the sensor axis is measured, whereby the sensor axis is perpendicular to the two elastic elements.

Remark:

The part of the force sensor S which is equipped with the strain gauge and the cable is loaded with the cable in addition to the weight of the metal parts; this part should always be the "fixed part" of the sensor.

4 Operation

4.1 Preparation:

Remark: the force sensor S reacts very quickly.
Avoid vibrations and, if possible, carry out experiments on a solid base.

- Mount the force sensor in the desired operating position and connect it to a CASSY module.
- Select the desired measuring range.

4.2 Compensation:

The compensation is dependent on the operating position of the force sensor S and has to be carried out anew for every setup. The force to be compensated should be as constant as possible during the compensation.

CASSY Lab:

- Click on the "→ 0 ←" button in the "Sensor Input Settings" dialog window.

CASSY-Display:

- Press the OFFSET key twice.

Mobile-CASSY:

- Using the key ▲ or ▼, respectively, select the menu item "Correct Offset" in the "Properties" menu of the measurement quantity F.
- Set the offset to zero with the right · key.
- Return to the measured value display with the left · key.

4.3 Carrying out the measurement:

- Attach the object on which the measurement is carried out.
- If necessary, change the measurement quantity.
- Read the measured value (if necessary, wait some minutes before the first measurement in the most sensitive measuring range).

5 Technical data

Resolution:	0.1 % of range
Compensation (tare):	max. ±50 N in each measuring range
Max. load:	±50 N
Max. frequency:	20 Hz
Position of normal use:	arbitrary
Plug:	Sub-D-15

6 Compatibility

The force sensor S, ± 50 N can be used in conjunction with the following CASSY modules:

	Sensor-CASSY (524 010)	Pocket-CASSY (524 006)	Mobile-CASSY (524 009)
With PC	CASSY Lab software 1.20 or higher version		
Without PC	CASSY-Display firmware 1.08 or higher version	—	Firmware 1.00 or higher version

As a member of the CASSY family this sensor has the following features:

- The sensor can be plugged in at any time.
- The connected sensor is recognized automatically.
- Measurement quantities and measuring ranges are set using the menu-driven software.

7 Updates

If the software or firmware used is older than that given above, an update of the software or firmware is required. The current version of the CASSY Lab software is available on the internet under http://www.ld-didactic.com.

- Install the current version of the CASSY Lab software and start it.
- Connect all available CASSY modules to the PC one after another.
- As soon as you are prompted, bring the firmware up to date with "Update CASSY Modules" so that it matches with CASSY Lab.

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