

press a certain button on the device—by means of an optical stimulus implemented by different colored LEDs, or an acoustic stimulus. The period of time that the test subject requires to carry out the action is measured. Depending on the type and use of the stimulus, different reaction times can be recorded. In addition to the simple reaction
5 time, a decision or selection component can also be incorporated into the movement task. The device also has an accelerometer. This detects changes in acceleration and thus implements a stopwatch. The device has a simple display which outputs the information about the time difference measured in each case.

JP 55-43019 discloses an electromagnetically held drop rod, in which the triggering—
10 the starting of the clock—is indicated by certain stimuli. For example, the test subject's eyes are closed and an acoustic signal is selected by the examiner. If this signal is the triggering signal, the reaction time of the movement task to be performed to a purely acoustic stimulus can be measured with the optical analyzer switched off. Similarly, various lamps are attached to the measuring setup. The examiner lights up the lamps.
15 If the lamp with the triggering signal is displayed, the test subject has to react and the hand-eye reaction time is measured.

In the prior art, only measuring systems which derive physiological statements regarding the reaction times of the test subject exclusively from two measured points in time are proposed. None of the technical solutions mentioned are able to perform
20 measurement tasks which go beyond the capabilities of a randomly started stopwatch.

The problem addressed by the invention is that of proposing a measuring system in which a necessarily dense point cloud of measurement data is recorded, which log the curve of the force exerted by the test subject on the measuring system and the acceleration behavior of the instrument during catching and shortly after catching,
25 processing the data obtained in this way, and subjecting it to a comparison with limit values and/or data from a normative database.

The problem is solved by the features of the main claim and the features of the additional independent claims. Preferred designs are the subject of the dependent claims, which refer back in each case.

30 The measuring system in this case comprises at least one measuring body for measuring hand-eye reaction ability in a complex neurocognitive movement task. Said measuring body is accelerated out of the at least one holding device thereof by means

In embodiments of the invention, the measuring system is used to monitor the improvement in hand-eye coordination and gripping function brought about by recreational sports.

5 The creation of a broad and anonymous database is advantageous when using the measuring system in broad fields of application of physical training. This creates a potentially huge control group and, if necessary, also creates the possibility of comparability, due to the use of network-based data processing systems (e.g. a cloud solution).

10 In embodiments of the invention, the measuring system is used in the medical field. It is in particular used when measuring reaction time curves and gripping function on test subjects with neurodegenerative diseases, even at an early stage.

15 The measuring system is in particular used in the indication and/or identification of neurodegenerative diseases from the group of synucleinopathies, for example Parkinson's disease, multiple system atrophies and Lewy body dementia, or in the indication of neurodegenerative diseases from the group of tauopathies, for example Alzheimer's disease.

20 The advantage of using the measuring system in medical fields of application for indicating and/or identifying neurodegenerative diseases is the creation of a broad and anonymous database, along with the creation and expansion of at least one normative database. In this way, a potentially huge group is created for the relevant illness and, if necessary, also provides the possibility of comparability, due to the use of network-based data processing systems, e.g. a cloud solution.

25 A non-invasive early indication and/or identification of neurodegenerative diseases in the context of screening tests is advantageously made possible by a well-founded data situation in the normative database.

In embodiments of the invention, the measuring body is a rod having a length of 50 cm and the force source is a return spring which produces an average acceleration of the measuring body of 10 m/s^2 . On a suspension means, the return spring is tensioned and the rod is locked in a holder.

30 The sensor recording is started. A triggering unit separates the connection between the rod and the holder and releases the spring. The rod is accelerated and is caught

The body of the drop rod, the "body", has a round cross section. The rod is made of nylon by means of 3D printing, as nylon is transparent to radio waves and does not interfere with the communication units, and has the following external dimensions:

diameter: 30 mm

5 length rod: 767.1 mm

total mass of the drop rod: 405 g

Two force sensors are mounted on and mechanically connected to the outer surface of the rod. These force sensors are designed as long strips having a length of 610 mm. This results in the length of the force-sensitive surface:

10 - length of the measuring range of the force sensor: 610 mm

The body houses a mother board for the control tasks in the interior of the rod, a power supply, a WiFi communication unit, and the interface for sensors and the processor CPU with firmware.

15 The power supply of the rod, in order to enable data acquisition, storage and transmission independently of the external energy source of the charging platform, is designed in the form of a Li-ion battery.

The upper end cap of the rod, the top cap, is made of the same material as the rod. The top cap has the following external dimensions:

- 20
- length: 108 mm,
 - width: 118 mm,
 - height: 13 mm.

Three spring contacts are installed on the upper surface of the top cap as an interface for the charging function using the charging platform. In addition to the acceleration sensors, an optical distance sensor is also integrated into the top cap.

25 The acceleration sensors are arranged to measure the three orthogonal spatial directions. The acceleration sensors primarily determine the exact catch time. The distance between the upper edge of the rod and the charging platform is measured by means of the optical distance sensor. There is no need to specify an exact zero line, defined by the lower edge of the hand at the start position.