

Related topics

Weight measurement, resolution of a balance, use of an interface, tara option.

Principle and task

The force meter is mounted on a support rod in such a way that weights can be placed on the plate and/or hung from the hook. The program generates a large display of the measured weight and the corresponding force.

Equipment

COBRA-interface 2	12100.93	1
PC COBRA data cable RS232, 2 m	12100.01	1
Measuring module Newton	12110.00	1
Newton sensor	12110.01	1
Softw.COBRA Force (Win)	14290.61	1
Right angle clamp -PASS-	02040.55	1
Tripod base -PASS-	02002.55	1
Support rod -PASS-, square, l 250 mm	02025.55	1
Set of commercial weights, 1 g–500 g	44094.50	1
Basic Softw. f. PHYWE Windows prog.	14099.61	1

The PHYWE WINDOWS® Basic Software (14099.61) must be installed on the computer being used in order to run the software.

Set-up

— As shown in Fig. 1. Plug the force measuring module into the MODUL 1 input interface.

Procedure

- COBRA: Depending on whether COBRA is connected to COM1 or COM2 of the computer, start the program DIGIT COM1 or DIGIT COM2 by double clicking on the icon.
- The system performs a tare immediately after the program is started, this takes about 5 seconds. The force meter must not be moved or jarred during taring. If it is jarred, the system may briefly display the message “Overflow” accompanied by a beep. After incorrect taring, the message “Tara Error?” is displayed on the monitor. In this case, you can restart taring by pressing the <Tara> button once the yellow highlight has gone out. Should the „Tara Error?“ message not disappear even after several taring attempts, then either there are too many vibrations in the room or the set sample time <Delta tims> is too small. If you are using a slow computer, the set sample times should be greater than 300 ms. In principle, up to 400 g can be “tared off” for each measuring range. Keep in mind, though, that large weights alter the vibrational behaviour of the force meter, meaning that, under some circumstances, it is not possible to perform a tare for all measuring ranges if the surroundings are not free from vibrations. The message “Tara Error?” only means that the system could not perform a tare successfully in the most sensitive measuring ranges. An exact measurement is still possible in the less sensitive measuring ranges, though!
- By adjusting the scroll bar <Delta tims>, determine what the maximum sample rate is for the connected computer. If the sample rate is too high, errors occur in the data com-

Fig.1: Experimental set-up: Force measurement with PC interface.



munications evidenced by very slow changing of the digital numbers (every three seconds).

- You can change the measuring ranges with the buttons <4 N>, <0,4 N>, <0,04 N> and <0,004 N>. The respective measuring interval extends from the + key value to the – key value. If this interval is exceeded, the message “Overflow” is displayed accompanied by a warning tone. Generally, however, it is possible to exceed or fall short of the set measuring interval by a factor of almost 2 without a loss in precision.
- The button <N (mN) / g> switches the digital display back and forth between N and/or mN and g.

Measurement range in N	Resolution	
	in N	in g
4	0.01	1
04	0.001	0.1
0 04	0.0001	0.01
0 004	0.00001	0.001

- If there are large deviations in the displayed measurements in the unloaded or loaded state especially in the more sensitive measuring ranges, you can reduce the effect of interference by adjusting the <Average> slide bar to take the average of the displayed number of measurements. The greater the number is for <Average>, the more constant the display will be. However, this does lead to a slow response-time, i.e. if a weight is changed, it takes a few seconds before the correct value is displayed. It is recommended that you use an <Average> value between 10 and 25 for taring.

If you cannot get a steady display in the 0.004 N measuring range, then you should cushion the measuring module against vibrations and shield it from drafts. Remember that industrial weighing devices with this resolution are always operated in enclosed housings. If you are not able to take these precautions, you should use the program F(t)_COM 1 (and/or F(t)_COM 2) to take the measurements. These programs record force in relation to time. Unstable force readings can be averaged and resolved with a cursor line which can be displayed in the graph.

Results

Figure 2 shows the digital display of the weight placed on the force meter.

Fig. 2

