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Multicomponent Force Plate

Type 9285

with Glass Top Plate for Biomechanics, F_z 0 ... 5 kN

Multicomponent force plate with glass top plate for measuring ground reaction forces, moments and the center of pressure in biomechanics.

- Glass top plate allows recording of contact surface
- Wide measuring range
- Excellent measuring accuracy
- Excellent accuracy of center of pressure (COP)
- Threshold F_z <10 mN

Description

Multicomponent force plate Type 9285 consists of a base frame on which four piezoelectric 3-component force sensors under a high preload are mounted. A 600x400 mm triple-layer composite glass plate is mounted on these sensors. The very low crosstalk values of the sensors in conjunction with the special design principle ensure excellent accuracy of the center of pressure. The output signals are processed in an external charge amplifier for subsequent acquisition with any common motion analysis system.

Application

This force plate is designed for special gait and balance analysis applications. The glass plate allows simultaneous force measurement and photographic or cinematographic recording of the contact surface from below. Despite the wide measuring range (0 ... 5 kN), this force plate offers excellent accuracy and linearity across the entire spectrum of applications and guarantees overload protection up to 7,5 kN. A larger force plate with external dimensions of 900x600 mm is available on request. It can be equipped with an built-in charge amplifier.

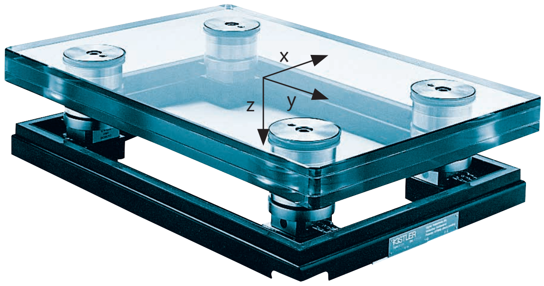

Fig. 1: Multicomponent Force Plate Type 9285

Technical Data

Dimensions		mm	600x400x150
Range	F_x, F_y	kN	–2,5 ... 2,5
	F_z	kN	0 ... 5
Overload	F_x, F_y	kN	–3,75/3,75
	F_z	kN	0/7,5
Linearity	%FSO		≤±0,5
Hysteresis	%FSO		<1
Crosstalk	F_x <–> F_y	%	<±2
	F_x, F_y –> F_z	%	<±2
	F_z –> F_x, F_y	%	<±1
Rigidity	x-axle ($a_y = 0$)	N/µm	≈120
	y-axle ($a_x = 0$)	N/µm	≈115
	z-axle ($a_y = a_y = 0$)	N/µm	≈25
Natural frequency	f_0 (x, y)	Hz	≈300
	f_0 (z)	Hz	≈500
Operating temperature range		°C	–20 ... 50
Weight		kg	45
Degree of protection	EN 60529:1992		IP65
Refractive index of glass top plate		n	≈1,52
Calibrated range	F_x, F_y	kN	–2,5 ... 2,5
	F_z	kN	0 ... 5
Calibrated partial range	F_x, F_y	kN	0 ... 0,25
	F_z	kN	0 ... 0,5
Threshold	F_x, F_y, F_z	mN	<10
Sensitivity	F_x, F_y	pC/N	–7,4[1)]
	F_z	pC/N	–3,8[1)]

[1)] nominal value

Conforms to the CE safety standards for electrical equipment and systems: EN 60601-1-1:92 + A1:96, IEC 60601-1-1:92 + A1:95 and the EMC standards: 60601-1-2:01 + A1:06 class B, EN 61000-3-2:06, EN 61000-3-3:95 + A1:01 + A2:05, EN 61000-6-2:05, EN 61000-6-3:01 + A11:04, IEC60601-1-2:01 + A1:04 class B, IEC61000-3-2:05, IEC 61000-3-3:94 + A1:01 + A2:05, IEC61000-6-2:05, IEC 61000-6-3:06

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BioWare®

BioWare software is the engine behind the force plate system. It collects data from the force plates, converts the trials into useful information and plots the results. The force plates and charge amplifiers are fully remote controlled by BioWare thus making the system extremely flexible and easy-to-use.

Parameters of Gait

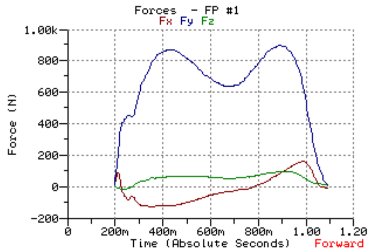

Fig. 2: Ground reaction forces (GRF)

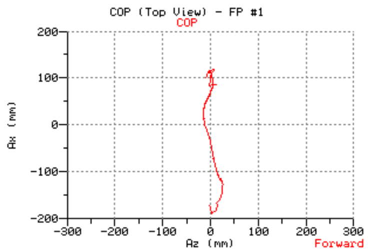

Fig. 3: Center of pressure (COP)

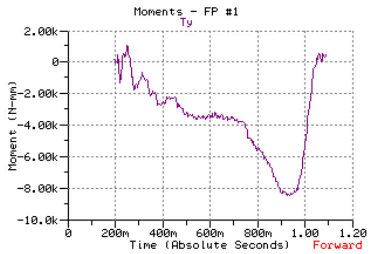

Fig. 4: Frictional torque T_z

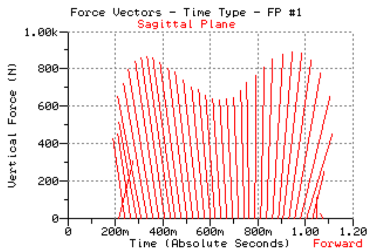

Fig. 5: Force vector

BioWare provides several performance specific evaluations.

Parameters of Countermovement Jump CMJ

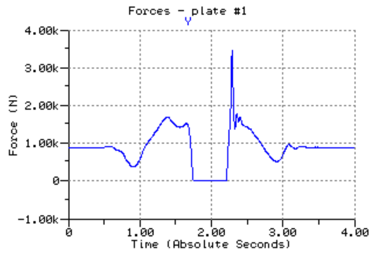

Fig. 6: Jump force

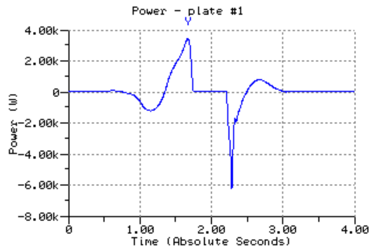

Fig. 7: Power

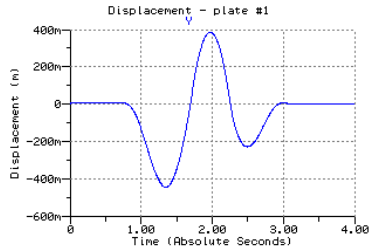

Fig. 8: Jump height (COM)

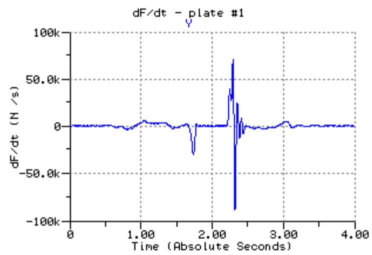

Fig. 9: Force gradient (Explosivity)

Other functions:

- Coefficient of friction (COF)
- 3-dimensional vector representation
- Real-time vectors and COP for biofeedback
- Frequency analysis, statistics, digital filters

Other parameters:

- Acceleration, velocity and displacement of the center of mass (COM)
- Work, energy, impulse
- Statistics, digital filters

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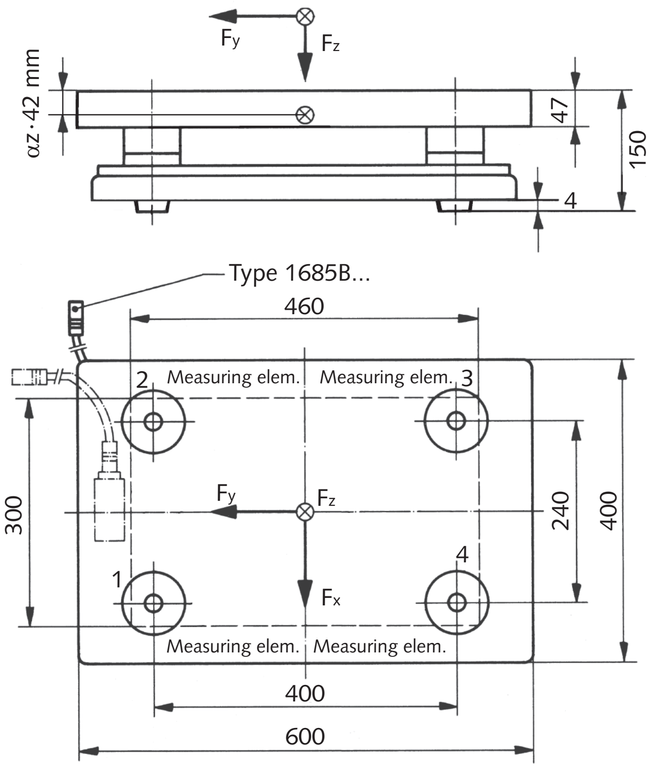

Fig. 10: Dimensions of multicomponent force plate Type 9285

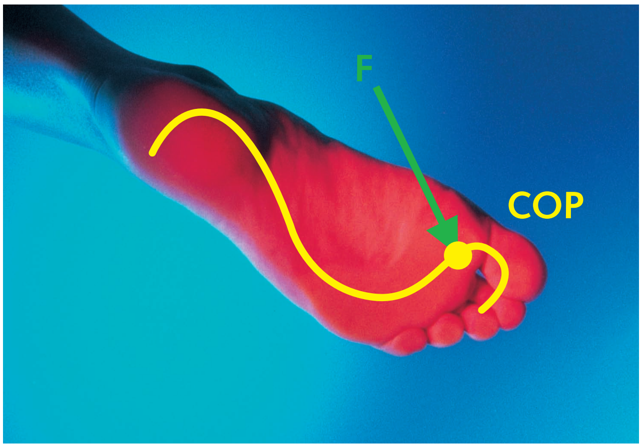

Fig. 11: This photograph taken through the glass plate from below shows the main part of the standing phase of a step.

Typical Measuring Chain

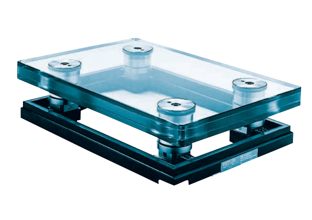			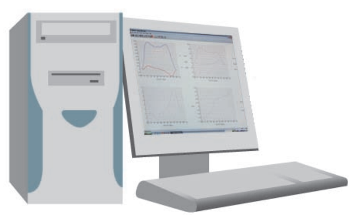
Multicomponent force plate Type 9285	Connection cable Type 1685B...	External charge amplifier Type 9865E...	PC (provided by customer) with BioWare system Type 2812A...

Fig. 12: Configuration of a typical measuring chain

Included Accessories	**Type/Art. No.**
• 1 Set shims	7.050.011
• 4 Eye bolts M6 with washer	6.170.007 6.220.040
• 4 Hexagon socket head cap screws M12x25	6.120.106
• 1 Hexagon socket wrench	1391
• 1 Voltage equalizing cable	5.590.175

Optional Accessories **For Type 9285**	**Type/Art. No.**
• External charge amplifier	9865E...
• Connection cable, straight plug	1685B...
• DAQ system BioWare® (PCI-Bus)	2812A...

Ordering Code

• Multicomponent force plate with charge output	**Type 9285**

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