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DAQ System with BioWare®

Type 5691A1

Data Acquisition and Analysis System for Biomechanics

Data acquisition system for connecting and controlling two multicomponent force plates with integral charge amplifiers. The system is connected to a USB 2.0 port of the PC and operated with the included software BioWare.

- Easy of installation with USB 2.0
- Remote control of integral charge amplifiers
- Powerful data acquisition and signal processing
- Versatile data analysis and filters
- Can be started with external trigger

Description

The DAQ system with BioWare consists of a data acquisition box for one or two Kistler multicomponent force plates and one integral 16-bit A/D converter to digitize the plates' analog output signals. The system is connected to a USB 2.0 port of the PC. The integral charge amplifiers of the connected Kistler force plates are supplied via the data acquisition box and controlled by means of the supplied software (measuring range and reset/operate).
The DAQ system Type 5691A... can also be controlled by 3rd party software that is utilizing the software interface (API) BioWare dataserver.dll. The software interface (API) BioWare dataserver.dll is available for download at the Kistler website.

Application

The Type 5691A1 with BioWare is designed specifically to fully exploit the capabilities of Kistler's piezoelectric force plates Type 9260AA, 9281EA, 9286BA and 9287CA in biomechanics applications. The 16-bit resolution of the measurement signals and high sampling rate of up to 17 kS/s in conjunction with Kistler force plates allow a very wide range of applications. The system as a whole is therefore equally ideal for measuring highly dynamic processes, very small measurands and slow phenomena. The additional options of acquiring any analog signals rather than just those from force plates, with external trigger or pre- and post-trigger capability, underscore the versatility of the system for use in basic research, sports science, gait analysis, neurology, ergonomics, etc., etc.

Technical Data

General Data		
Dimensions	mm	208x65x250
Total weight	kg	2,05
Operating temperature range	°C	0 ... 50

Power Supply Voltage		
Power supply	VDC	11 ... 15
Power consumption	VA	6

A/D-Converter			
Number of channels			16
Resolution (per channel)		Bit	16
Input voltage range (software selectable)		V	±1, ±2, ±5, ±10
Sampling rate (software selectable)		S/s	0,6 ... 50 000
	max. @ 2 channels	kS/s	50
1 Force plate	max. @ 8 channels	kS/s	17
2 Force plates	max. @ 16 channels	kS/s	9,5

Connections		
USB 2.0		
USB In (uplink, to the PC)		USB Type B, female
USB Out (downlink, free)		USB Type A, female

Force Plate 1/2		D-Sub37, male
Input voltage (max.)	V	±15

5691A_000-633e-05.12

This information corresponds to the current state of knowledge. Kistler reserves the right to make technical changes. Liability for consequential damage resulting from the use of Kistler products is excluded.

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External Trigger (trigger-in)			BNC neg.
Input voltage			
Pull-Up resistance 10 kΩ to ±5 V			
	max.	VDC	12
	high or input open	VDC	>3,6
	low	VDC	<0,6
Trigger mode	standard		rising edge
	software selectable		falling edge

Conforms to the CE safety standards (73/23/EG) for electrical equipment and systems:
EN 60601-1:2005, EN 61010-1:2001
and the EMC standards (89/336/EG):
EN 60601-1:2005 (EN 55022 Class B), EN 61000-6-3:2004
(EN 55022 Class B), EN 61000-6-4:2001 (EN 55011 Class B),
EN 60601-1:2005, EN 61000-6-1:2001, EN 61000-6-2:2005

Dimensions

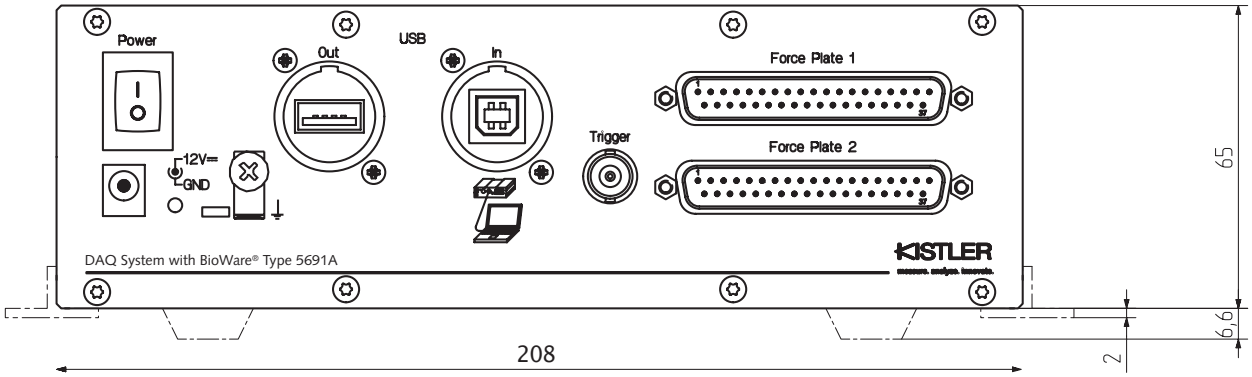
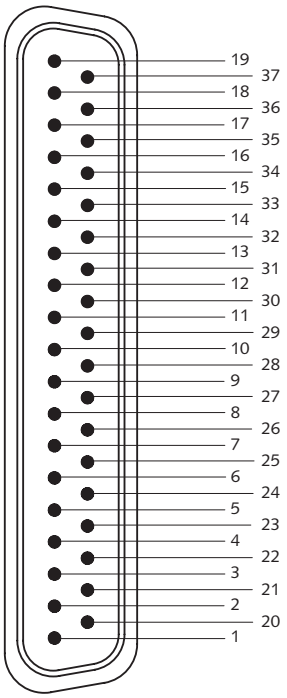


Fig. 1: DAQ system with BioWare Type 5691A1

Pin Allocation D-Sub37, male (Force Plate 1/2)

1	Exct. +12 VDC	20	Data IO5 (reserve)	
2	n.c.	21	Data IO6 (reserve)	
3	n.c.	22	B Range Select Group I	
4	A Range Select Group I	23	Operate/NotReset	
5	n.c.	24	Data IO7 (reserve)	
6	n.c.	25	n.c.	
7	Exct. GND	26	n.c.	
8	n.c.	27	B' Range Select Group II	
9	A' Range Select Group II	28	Control GND	
10	n.c.	29	Control GND	
11	Signal GND	–	**Force Plate 1**	**Force Plate 2**
12	Signal GND	30	CH8 (Fz4)	CH16 (Fz4)
13	Signal GND	31	CH7 (Fz3)	CH15 (Fz3)
14	Signal GND	32	CH6 (Fz2)	CH14 (Fz2)
15	Signal GND	33	CH5 (Fz1)	CH13 (Fz1)
16	Signal GND	34	CH4 (Fy23)	CH12 (Fy23)
17	Signal GND	35	CH3 (Fy14)	CH11 (Fy14)
18	Signal GND	36	CH2 (Fx34)	CH10 (Fx34)
19	Signal GND	37	CH1 (Fx12)	CH9 (Fx12)



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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

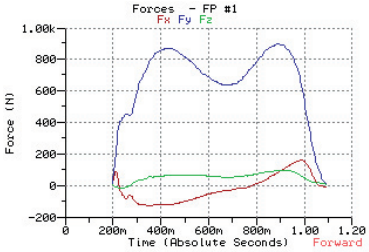

Fig. 2: Ground reaction forces (GRF)

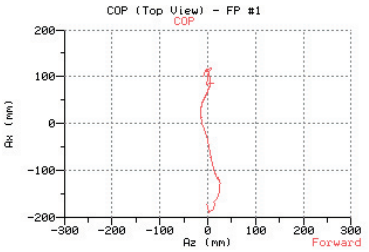

Fig. 3: Center of pressure (COP)

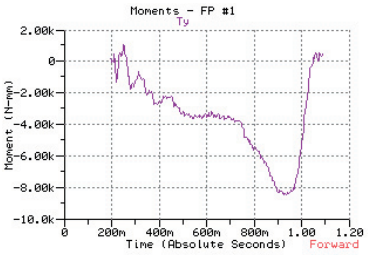

Fig. 4: Frictional torque T_z

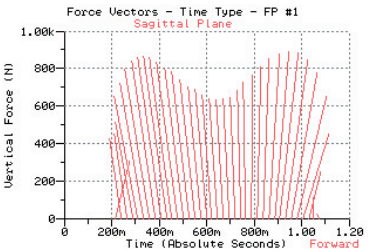

Fig. 5: Force vector

Other Functions

- Coefficient of friction (COF)
- Frequency analysis, statistics, digital filters
- Full Windows® functionality

BioWare provides several performance specific evaluations.

Parameters of Countermovement Jump CMJ

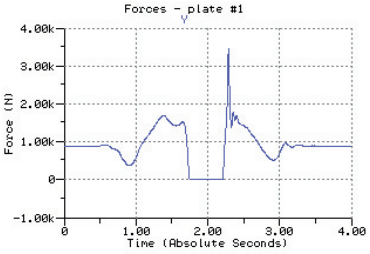

Fig. 6: Jump force

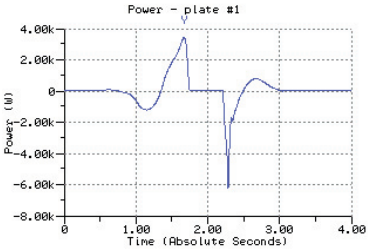

Fig. 7: Power

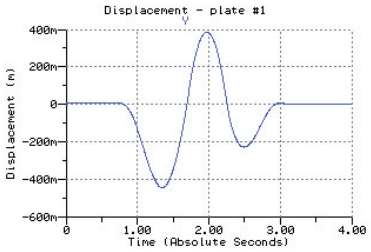

Fig. 8: Jump height (COM)

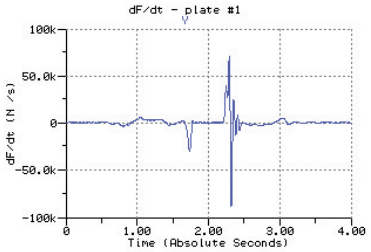

Fig. 9: Force gradient (Explosivity)

Other Parameters

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

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Typical Measuring Chain

			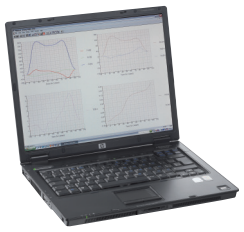
Force Plate with charge amplifier Type 9286BA	Connection cable Type 1758A...	DAQ system (USB 2.0) Type 5691A1	Laptop (provided by user) with BioWare

Fig. 10: Configuration of a typical measuring chain with Kistler DAQ system with BioWare®

DAQ-System with BioWare Version **Type 5691A1**
Data Acquisition and Analysis Tool for Biomechanics
USB 2.0, for max. 2 Force Plates
- USB 2.0 DAQ system with BioWare Type 5691A (16 channels, 16 bit)
- BioWare software
- BioWare Dataserver Interface Library

System Requirements
- Microsoft Windows® 7, Windows® XP or Windows® Vista operating system
- Intel Pentium 4 class processor (1 GHz or higher recommended)
- 2 GB of RAM
- Video Display set to at least 800x600, 256 colors, small fonts selected
- Min 125 MB of free disk space
- Microsoft compatible mouse
- Windows Installer Version 1.1 or later
- Adobe® Acrobat® Reader®
- 1 free USB 2.0 port

Included Accessories	**Type/Art. No.**
• USB 2.0 connecting cable, length 1,8 m	–
• Universal AC/DC adapter, 100 ... 240 V~ 12 VDC	5.510.276
• Self-adhesive base, black, 20,5x7,6 mm	5.211.368
• BioWare software CD-ROM	2812A-05-0
• Instruction manual	2812A_002-312

Optional Accessories	**Type/Art. No.**
• Connection cable for	
– Force platforms w/ integr. amplifier (straight connector)	1758A...
– Force platforms w/ integr. amplifier (angle connector)	1759A...
– Force plate Type 9260AA... with integr. charge amplifier (D-Sub 25)	1791A...
– External charge amplifier Type 9865E...	1769A1
– External control unit Type 5233A2	1500B5
– Analog signals (8x BNC pos.)	1500A67
• Mounting kit consisting of 2 brackets and 4 screws	7.511.339
• BioWare Dataserver Interface Library dataserver.dll: free download from Kistler website	2873A

Ordering Code
- DAQ system with BioWare **Type 5691A1**

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