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Quattro Jump

Type 9290AD

Portable Force Plate System

Leg performance is a determinant factor for success in most sports. A mixture of explosive force, endurance and coordination is trained and very carefully optimized for each particular sports type.

Quattro Jump provides an objective measurement of force, power and jump height. A special protocol developed by Prof. Carmelo Bosco allows the quantification of leg performance.

- Objective measurement of jump force, jump height and jump power
- Immediate feedback to optimize the training program
- Rugged and accurate Kistler force plate technology. Portable thanks to lightweight sandwich design

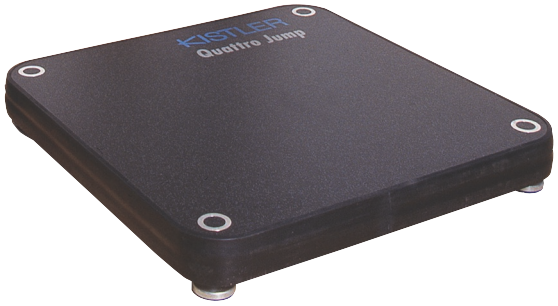

Fig. 1: Quattro Jump

Description

Quattro Jump consists of a portable Kistler force plate on which different jump types are performed. The force plate measures the vertical jump force which is analyzed with the computer connected to the system.

Kistler force plates are a worldwide standard in biomechanics and sports science since 25 years.

Requirements for the PC

- Operating System: Windows 98, NT4.0 (SP4), 2000, XP
- Pentium PC 500 MHz or higher
- Hard disc: 100 MB free space for data storage and software installation
- Memory: at least 64 MB RAM, (128 recommended)
- Super VGA monitor, screen resolution set to at least 800x600
- Serial interface RS-232C for communication or USB-RS-232C Adapter
- Microsoft compatible mouse
- CD-ROM drive
- A color printer is recommended for creating hard copies of graphs
- Acrobat Reader for reading the PDF Instruction Manual

Technical Data

Quattro Jump, Type 9290AD			
Dimensions of the force plate		mm	920x920x125
Range	Fz	kN	0 ... 10
Overload	Fz	kN	15
Linearity		%FSO	<±0,5
Hysteresis		%FSO	<1
Natural Frequency		Hz	≈150
Operating temperature range		° C	0 ... 50
Weight		kg	21,6
Sampling rate		Hz	500
Resolution			
Range 1		N/bit	1
Range 2		N/bit	0,2
Interface to the computer			RS-232C
Connector type			D-Sub 9f
Baudrate		kBaud	19,2 ... 115
Power supply			
Battery			12x1,5 V
External power supply			12 V
Connector type jack-socket			D5,5/2,1
Battery Lifetime (Alkaline)			≈15 hours

9290A_000-160e-12.05

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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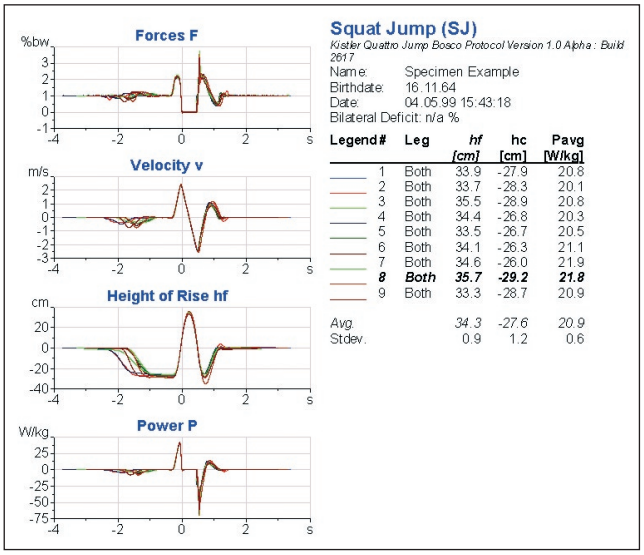
Quattro Jump Software

The Quattro Jump Software is dedicated for routine jump performance measurement. It is therefore very easy to use. After every jump the protocol on the right side of the screen is updated. The best jump is highlighted.
The control area on the left side of the screen allows the user to delete or temporarily hide jumps from the protocol.



Bosco Test

The Bosco Protocol evaluates different types of «Squat Jump», «Countermovement Jump» and «Continuous Jump»:

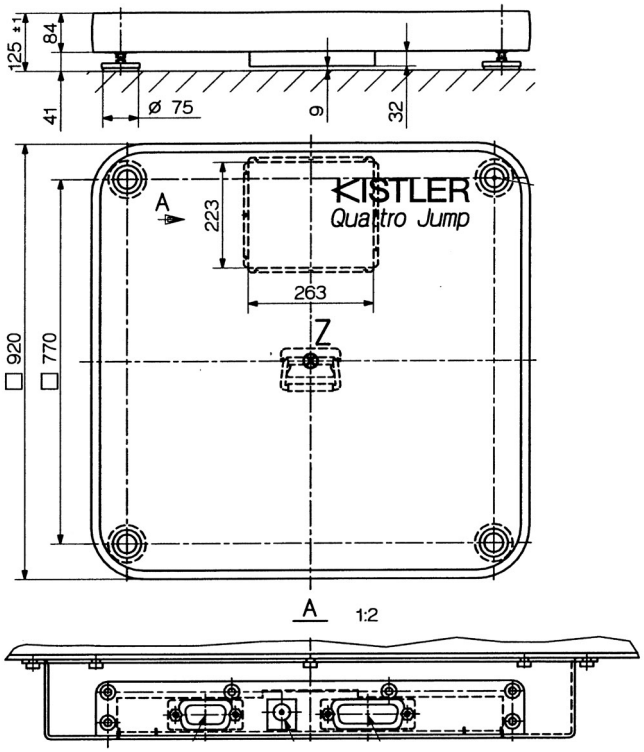
Des.	Type of jump	No.	Description
SJ	Squat Jump	3 *	Single jump starting from knees bent at 90 degrees
SJbw	Squat Jump + Body Weight	3 *	Squat jump with additional load of up to one body weight
CMJ	Counter-movement Jump	3 *	Single jump starting with straight legs with a natural flexion before takeoff
CJbref	Continuous Jump Bent Legs Ref.	5*	Series of jumps with bent knees, used as reference to compare with CJb (15 ... 60 s)
CJs	Cont. Jump straight leg	5*	Series of jumps with straight knees
CJb	Cont. Jump Bent Legs	15 ... 60 s	Series of 15 ... 60 s jumping with bent knees

* Recommended No. of jumps

Important Parameters

Force time curve	F(t)
Jump height (rise of center of gravity)	hf
Depth of countermovement	
Average Power	Pavg
% Fast Twitch Fibers (estimate)	%FT
Force at the transition from eccentric to concentric	Fi
Bosco Index	
Leg Equilibrium Index	
Speed/Endurance Index	
Effect of Prestretch	
Fatigue Parameters	
approximately 70 further Parameters	

Dimension



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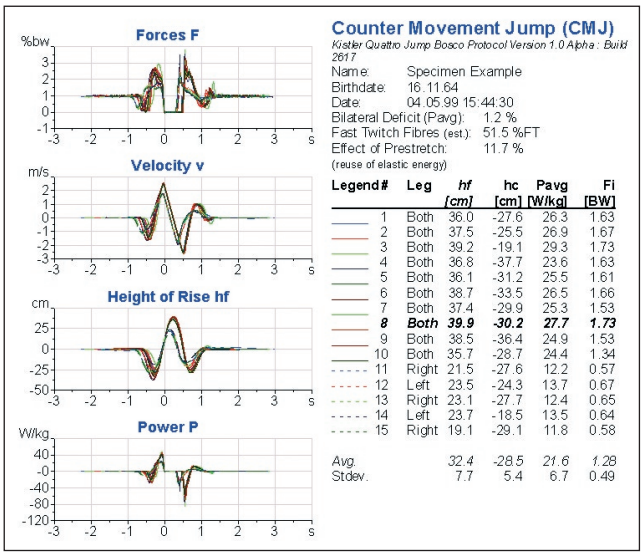
Jump Type Specific Bosco Protocols

For each jump type a variety of parameters is calculated and presented in a jump type specific protocol. This protocol can be customized by the user.

Examples:

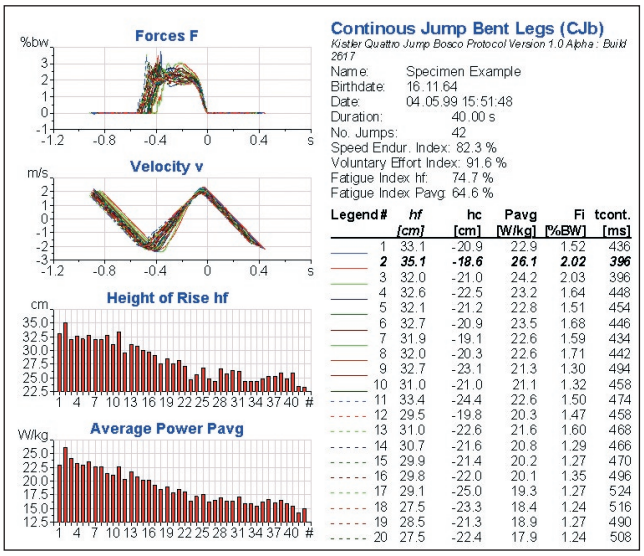


Counter Movement Jump (CMJ)

Kistler Quattro Jump Bosco Protocol Version 1.0 Alpha : Build 2617

Name: Specimen Example
Birthdate: 16.11.64
Date: 04.05.99 15:44:30
Bilateral Deficit (Pavg): 1.2 %
Fast Twitch Fibres (est.): 51.5 %FT
Effect of Prestretch: 11.7 %
(reuse of elastic energy)

Legend #	Leg	hf [cm]	hc [cm]	Pavg [W/kg]	Fi [BW]
1	Both	36.0	-27.6	26.3	1.63
2	Both	37.5	-25.5	26.9	1.67
3	Both	39.2	-19.1	29.3	1.73
4	Both	36.8	-37.7	23.6	1.63
5	Both	36.1	-31.2	25.5	1.61
6	Both	38.7	-33.5	26.5	1.66
7	Both	37.4	-29.9	25.3	1.53
8	***Both***	***39.9***	***-30.2***	***27.7***	***1.73***
9	Both	38.5	-36.4	24.9	1.53
10	Both	35.7	-28.7	24.4	1.34
11	Right	21.5	-27.6	12.2	0.57
12	Left	23.5	-24.3	13.7	0.67
13	Right	23.1	-27.7	12.4	0.65
14	Left	23.7	-18.5	13.5	0.64
15	Right	19.1	-29.1	11.8	0.58
Avg.		*32.4*	*-28.5*	*21.6*	*1.28*
Stdev.		7.7	5.4	6.7	0.49



Continous Jump Bent Legs (CJb)

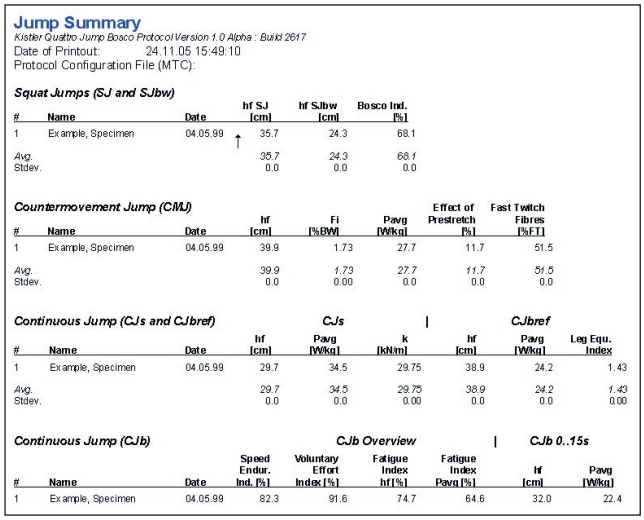
Kistler Quattro Jump Bosco Protocol Version 1.0 Alpha : Build 2617

Name: Specimen Example
Birthdate: 16.11.64
Date: 04.05.99 15:51:48
Duration: 40.00 s
No. Jumps: 42
Speed Endur. Index: 82.3 %
Voluntary Effort Index: 91.6 %
Fatigue Index hf: 74.7 %
Fatigue Index Pavg: 64.6 %

Legend #	hf [cm]	hc [cm]	Pavg [W/kg]	Fi [%BW]	tcont. [ms]
1	33.1	-20.9	22.9	1.52	436
2	***35.1***	***-18.6***	***26.1***	***2.02***	***396***
3	32.0	-21.0	24.2	2.03	396
4	32.6	-22.5	23.2	1.64	448
5	32.1	-21.2	22.8	1.51	454
6	32.7	-20.9	23.5	1.68	446
7	31.9	-19.1	22.6	1.59	434
8	32.0	-20.3	22.6	1.71	442
9	32.7	-23.1	21.3	1.30	494
10	31.0	-21.0	21.1	1.32	458
11	33.4	-24.4	22.6	1.50	474
12	29.5	-19.8	20.3	1.47	458
13	31.0	-22.6	21.6	1.60	468
14	30.7	-21.6	20.8	1.29	466
15	29.9	-21.4	20.2	1.27	470
16	29.8	-22.0	20.1	1.35	496
17	29.1	-25.0	19.3	1.27	524
18	27.5	-23.3	18.4	1.24	516
19	28.5	-21.3	18.9	1.27	490
20	27.5	-22.4	17.9	1.24	508

Summary Protocol

A summary protocol (also customizable) combines the most important parameters of an entire test. It also allows the comparison of different tests for instance within a team or over a certain time.



Jump Summary

Kistler Quattro Jump Bosco Protocol Version 1.0 Alpha : Build 2617
Date of Printout: 24.11.05 15:49:10
Protocol Configuration File (MTC):

Squat Jumps (SJ and SJbw)

#	Name	Date	hf SJ [cm]	hf SJbw [cm]	Bosco Ind. [%]
1	Example, Specimen	04.05.99	35.7	24.3	68.1
Avg.			35.7	24.3	68.1
Stdev.			0.0	0.0	0.0

Countermovement Jump (CMJ)

#	Name	Date	hf [cm]	Fi [%BW]	Pavg [W/kg]	Effect of Prestretch [%]	Fast Twitch Fibres [%FT]
1	Example, Specimen	04.05.99	39.9	1.73	27.7	11.7	51.5
Avg.			39.9	1.73	27.7	11.7	51.5
Stdev.			0.0	0.00	0.0	0.0	0.0

Continuous Jump (CJs and CJbref)

			CJs			CJbref		
#	Name	Date	hf [cm]	Pavg [W/kg]	k [kN/m]	hf [cm]	Pavg [W/kg]	Leg Equ. Index
1	Example, Specimen	04.05.99	29.7	34.5	29.75	38.9	24.2	1.43
Avg.			29.7	34.5	29.75	38.9	24.2	1.43
Stdev.			0.0	0.0	0.00	0.0	0.0	0.00

Continuous Jump (CJb)

			CJb Overview				CJb 0..15s	
#	Name	Date	Speed Endur. Ind. [%]	Voluntary Effort Index [%]	Fatigue Index hf [%]	Fatigue Index Pavg [%]	hf [cm]	Pavg [W/kg]
1	Example, Specimen	04.05.99	82.3	91.6	74.7	64.6	32.0	22.4

Included Accessories	Type/Art. No.
• Battery (12x)	5.310.002
• Quattro Jump Software	2822A-01-0
• RS-232C Interface cable	1200A27
• Power supply 90 ... 260 VAC/12 VDC	5.510.293

Optional Accessories

- none

Ordering Code	Type
• Quattro Jump Portable force plate system	**9290AD**

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