Gait Real-time Analysis Interactive Lab

Commercial Technical Specifications

Subject	Specifications	Remarks
Manufacturer		
Manufacturer	Motek Medical	
Country of origin	The Netherlands	
Model		
Model	GRAIL	
Regulations		
FDA Listed	Yes	
Health Canada Listed	Yes	
CE Mark	Yes	
Medical device classification	Class I	
EN ISO 13485 certiifcation	Yes	
Technology		
Instrumented treadmill		
Degrees of Freedom	2 (Pitch and Sway)	
Pitch	±10º	
Sway	±5cm	
Number of belts	2	
Walking Surface length	2000 mm	
Walking Surface width	1000 mm (2x 500mm)	
Treadmill speed	18 km/h	(reverse is optional and limited to max -6 km/h)[1]
Treadmill speed stepping	0.01 km/h	
Treadmill acceleration	5 m/s^2	(up to 15 m/s^2 optional)[1]
Number of Forceplates	2	
Forceplate type	Fx, Fy, Fz, Mx, My, Mz	
Fx Load Capacity (sideways)	5000 N	
Fy Load Capacity (vertical)	5000 N	
Fz Load Capacity (running direction)	5000 N	
Center of Pressure Error	≤ 5 mm	
Weight	818 kg	
Power supply	3-phase 360-440 V, 50/60hz, 25A	

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[1] Not certified for medical use

Motion Capture

Vicon Vero	10x Vicon Vero v1.3 optical motion capture cameras

Projection 180 degrees

Screen	Circular screen 5m diameter, 180°, 2.9m height	Height can be limited as result of available height in room
Number of projectors	3	
Technology	single chip professional grade DLP projector	
Resolution	SXGA+ (1400 x 1050)	Can change as components become obsolete
Brightness	3300 lumens	
Aspect ratio	4:3	
Displayable colours	24-bit RGB	
Wide Angle	Throw ratio: 0.8 - 1	
Lamp life	Up to 2250 hours (Full power)	

Projection on belt

Projection surface	Width: 1m (same as belt), Length: 2.5m (from the screen up to the center of the treadmill belt)
Projector	Short-throw single chip DLP
Resolution	1280 x 800 (WXGA)
Brightness	2500 lumens

Audio

Power output	50W / Channel
Channels / Speakers	5
Subwoofer	1
Soundmode	Surround sound

Video

Number of video cameras	3: left , right and rear
Resolution	0.3MP
Framerate	50 fps
Lens	4.4-11mm
Type	Monochrome (for low light conditions)

Custom built Image generators (for up to 4 channels)

OS	≥ Windows 10 IoT Enterprise LTSB

	64-bit	
Processor	Dual Core Intel i3	
Mem	≥ 8GB	
HD	≥ 240GB SSD	
Graphics	≥ NVIDIA Quadro P4000	

Custom built Motion Capture Computer

OS	≥ Windows 10 IoT Enterprise LTSB 64-bit	
Processor	Quad Core Intel Xeon	
Mem	≥ 8GB	
HD	≥ 240GB SSD	
Graphics	≥ nVidia Quadro P620	May change due to motion capture supplier requirements

Custom built D-Flow Computer

OS	≥ Windows 10 IoT Enterprise LTSB 64-bit	
Processor	Quad Core Intel Xeon	
Mem	≥ 8GB	
HD	≥ 240GB SSD + ≥ 2000GB HDD	
Graphics	≥ GeForce GTX Series	
Sound	5.1 Dolby Digital	

Custom built Video Computer

OS	≥ Windows 10 IoT Enterprise LTSB 64-bit	
Processor	Dual Core Intel i3	
Mem	≥ 8GB	
HD	≥ 250GB SSD	
Graphics	≥ Onboard Intel graphics	

Server rack

General	37U server rack with lockable door with network switch and KVM for computers, motion capture and audio amplifier	
Power	3x 110V/20A – 230V/16A (peak)	Requires 3 dedicated electrical circuits

Truss	Free standing truss. 5x5x3.5m (WxDxH)	Height can be limited as result of available height in room

Wireless EMG (optional)

Type	Delsys Avanti 16-channel
Interface	USB

Body Weight Support Light (optional)

	Motor - spring system with remote control Adjustable force-range 0-1500N Lift from wheel chair possibility Rail length of 2.4 or 3 m	See separate spec sheet

Software

D-Flow	Full D-Flow software suite for application development and real-time hardware control.
Frontend	Clinical user interface and patient management system
Human Body Model	Real-time gait analysis software as a module in D-Flow, that allows for real-time calculation of gait parameters, i.e. spatio-temporal parameters, kinematics, kinetics to be used in real-time feedback applications.
Gait Offline Analysis Tool	Offline tool to synchronize video data (3x), 3D forces and gait parameters, to reprocess and interactively analyze multiple gait cycles, to export data and to generate a customized gait report.
Balance Suite	Set of applications for the assessment and training of balance.
Gait Suite	Set of applications for the assessment and training of gait
Dual-task Suite	Set of applications for cognitive- and motor dual-tasking.

Gait Off-line Analysis Tool	Off-line tool to process and analyze previously recorded data recorded during GRAIL sessions. The software allows the user to scroll through video streams, filter gait cycles, select and deselect gait cycles, calculate averages and standard deviations and create custom gait reports.

Safety

Access to system	Stairs; 50cm	
Fall protection patient	Handrails and harness for fall protection	
E-stops & suspends	On control cabinet and operator desk	

Warranty

Warranty on parts	1 year	Extended warranty available upon request