




# The only system that isolate single joints for functional diagnosis and exercise

## The CES Arm/Leg Machine

<p><b>The Ariel Computerized Exercise System</b></p> <p><b>CES 5000 Arm-Leg</b> <i>The only system that isolates single joints for functional diagnosis and exercise.</i></p> <ul style="list-style-type: none"><li><b>No other computerized system adjusts to the patient to ensure optimum programming and safety, instead of having the patient adjust to the system.</b></li><li><b>Interactive, Closed Loop Biofeedback</b> - Instant and continuously responds to patient performance up to 16,000 times per second to produce precise control of resistance and speed during performance of the chosen range of motion.</li><li><b>Bidirectional</b> - Exercise velocity and resistance in each direction are independently programmed and controlled. Allows training and comparison of antagonist vs. muscle groups. Combines both the neuromuscular and cardiovascular systems.</li><li><b>Hydraulic Resistance</b> - No mechanical system breakdown. Smooth, even movement throughout the range of motion.</li><li><b>Safe</b> - Equipment continually adjusts to patient for safe, complete rehabilitation. No emergency stop button.</li><li><b>Simple to Operate</b> - User friendly computer screen menu with functional exercise and program protocols or conventional programs. Help screen always available.</li><li><b>Versatile</b> - Can program an exercise separately or in any combination for hamstrings, latissimus, biceps or triceps; flexion, extension, abduction and adduction. Pre-programmed exercise programs are geared to the physical needs and requirements of the individual.</li><li><b>Multiple Capabilities</b> - Controls, records and evaluates movement, strength and endurance. Built-in motion, force and time recording interface for use with video, graphs, charts, and tables.</li></ul>  <p><b>Cost Effective</b> - Expands treatment capabilities, minimizes set-up time, and increases setting potential with minimal capital investment.</p> <p><b>Increased Productivity</b> - Interactive capability allows low patient repetition.</p> <p><b>User Files</b> - Patient protocols for testing and exercise are stored on a 120 MB hard disk and can be transferred to individual therapy stations. Large amount of data can be easily stored, retrieved or compared. Areal users may develop customized data base based on treatment data or data on a group population. Research files may be transferred between Areal users by modem.</p> <p><b>EMG Data Acquisition Package (optional)</b> - Simple, non-invasive procedure with pre-amplified surface electrodes. Helps identify malrecovery and substitute residual compensation data by engaging muscle activity with muscle function.</p> <p><b>The Ariel CES 5000 Arm-Leg is designed for isolated, single joint movements of the knee, elbow, shoulder and ankle. It can also be used for multi-joint exercises.</b></p> <p>It allows either unilateral or bilateral joint testing without repositioning the patient.</p> <p>The Arm-Leg has infinite seat adjustments for precise joint positioning. Attachments are available for versatile applications.</p> <p>An active extremity can control the movement of the contralateral extremity in a passive manner.</p> <p>A minimal equipment footprint reduces space requirements.</p>	<p><b>Code</b> adi-pub-01084</p> <p><b>Title</b> The only system that isolate single joints for functional diagnosis and exercise</p> <p><b>Subtitle</b> The CES Arm/Leg Machine</p> <p><b>Name</b> The Ariel Computerized Exercise System-Arm/Leg</p> <p><b>Author</b> Unknown</p> <p><b>Published on</b> Tuesday, January 1, 1980</p> <p><b>Subject</b> ACES; Analog; Brochures; EMG; Exercise Machine; Force Plate; Media; Science</p> <p><b>URL</b> <a href="https://arielweb.com/articles/show/adi-pub-01084">https://arielweb.com/articles/show/adi-pub-01084</a></p> <p><b>Date</b> 2013-01-16 15:40:45</p> <p><b>Label</b> Approved</p> <p><b>Privacy</b> Public</p>
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The article introduces the Ariel Computerized Exercise System (CES) 5000 Arm-Leg, a unique system that isolates single joints for functional diagnosis and exercise. The system uses interactive, closed-loop biofeedback to respond to patient performance, producing precise control of resistance and speed. It is bidirectional, allowing for independent programming and control of exercise velocity and resistance in each direction. The system is safe, easy to operate, versatile, and cost-effective. It also has multiple capabilities, including controlling, recording, and evaluating movement, strength, and endurance. The Ariel CES 5000 is controlled by an enhanced AST 386 computer with features such as 4X113 RAM, 120 MB Hard Disk, 3.5" 1.44 MB Disk Drive, 5.25" 1.2 MB Floppy Drive, 120 MB Back-up Tape Drive, Monochrome Display Monitor, High Resolution Color Display Monitor, Math Co-processor, Mouse, Multi-Channel Analog Board, and an optional Analog Module for EMG and/or Force Plate.

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Below find a reprint of the 2 relevant pages of the article "The only system that isolate single joints for functional diagnosis and exercise" in "The Ariel Computerized Exercise System-Arm/Leg":

# The Ariel Computerized Exercise System

## CES 5000 Arm-Leg

The only system that isolates single joints for functional diagnosis and exercise.

No other computerized system adjusts to the patient to ensure optimum programming and safety, instead of having the patient adjust to the system.

- Interactive, Closed Loop Biofeedback** - Senses and automatically responds to patient performance up to 16,000 times per second to produce precise control of resistance and speed during performance of the chosen range of motion.
- Bidirectional** - Exercise velocity and resistance in each direction are independently programmed and controlled. Allows training and comparison of antagonistic muscle groups. Conditions both the musculoskeletal and cardiovascular system.
- Hydraulic Resistance** - No mechanical system breakdown. Smooth, even movement throughout the range of motion.
- Safe** - Equipment continually adjusts to patient for safe, complete rehabilitation. No emergency stop control necessary.
- Simple to Operate** - User friendly computer screen menu with formatted exercise and test protocols or customized programs. Help screens always accessible.
- Versatile** - Can program an exercise separately or in any combination for isotonic, isokinetic, isometric or variable dynamic loads and speeds. Personalized exercise programs are geared to the physical needs and requirements of the individual.
- Multiple Capabilities** - Controls, records and evaluates movement, strength and endurance on a continuous basis while storing information on easy to read color graphs, charts, and tables.



- Cost Effective** - Expands treatment capabilities, minimizes set up time, and increases earning potential with minimal capital investment.
- Increased Productivity** - Interactive capability allows less patient supervision.
- User Files** - Patient protocols for testing and exercise are stored on a 120 MB hard disk and can be transferred to individual floppy diskettes. Large amounts of data can be easily stored, retrieved or compared. Ariel users may develop customized data bases based on normative data or their own patient population. Research files may be transferred between Ariel users by modem.
- EMG Data Acquisition Package** (optional) - Simple, non-invasive procedure with pre-amplified surface electrodes. Helps identify malingerers and substantiate workers' compensation claims by integrating muscle activity with muscle function.

The Ariel CES 5000 Arm-Leg is designed for isolated, single joint movements of the knee, elbow, shoulder and ankle. It can also be used for multi-joint exercises.

It allows either unilateral or bilateral joint testing without positioning the patient.

The Arm-Leg has infinite seat adjustments for precise joint positioning. Attachments are available for versatile applications.

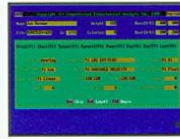
An active extremity can control the movement of the contralateral extremity in a passive manner.

A minimal equipment footprint reduces space requirement.

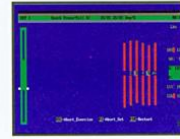
# The Ariel CES 5000 Operating System

The Ariel CES 5000 software displays functional information for rehabilitation and training which no other system can provide.

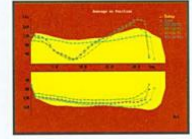
The Ariel CES 5000 uniquely controls, records, evaluates and modifies functional performance with programmed parameters that are user defined. The system can integrate and display numerous forms of information, such as range of motion, strength, velocity and endurance. The CES 5000 can be equipped with a color printer for obtaining a hard copy of all graphs for total performance evaluation. Reports may be customized for third party reimbursement.



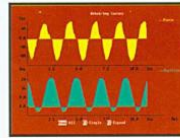
Exercise Parameter Screen displays exercise mode, velocity, resistance and repetition for each exercise parameter.



Bar Screen displays the average and maximum values of each repetition, force, velocity, work, fatigue, exercise time and protocol settings.



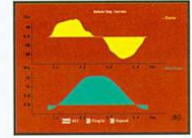
Average Force Curve combines all repetitions into an upstroke curve in the upper half of the screen and a downstroke curve in the lower half.



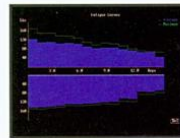
Repetition Display shows performance (upper curve) in conjunction with range of motion (lower curve).



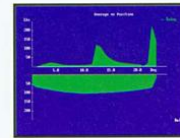
Data Display Table presents statistical information on velocity, resistance, and work load.



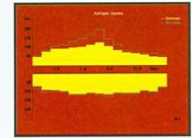
Curve Expansion identifies details of a repetition not otherwise easily distinguishable.



Fatigue Curve indicates endurance parameters for total performance analysis.



Isometric Stops can be positioned at any point for any length of time.



Pyramid Curve displays performance as a function of controlled changes in speed or resistance.

### The Ariel CES 5000 Hardware

(single computer may operate more than one station.)

The Ariel CES 5000 is controlled by an enhanced AST 386 computer with the following features:

- 4 MB RAM
- 120 MB Hard Disk
- 3.5" 1.44 MB Disk Drive
- 5.25" 1.2 MB Floppy Drive
- 120 MB Back-up Tape Drive

- Monochrome Display Monitor
- High Resolution Color Display Monitor
- Math Co-processor
- Mouse
- Multi-Channel Analog Board
- Analog Module for EMG and/or Force Plate (optional)

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