

Rotamex-5

0254-2002L

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1 Introduction

1.1 Product Description

The Columbus Instruments Rotamex-5 System provides an automated approach to rotarod measurements. It can operate with rats or mice and up to 4 subjects. The main unit is equipped with four lanes and a control unit. The rotarod unit has individually divided areas on the rotarod spindle within which the subjects are contained. The rotational speed of rotarod spindle is controlled by system software. Infrared beams are used to detect when a subject has fallen from the rotarod. The sensors discriminate between the animal's tail and body thereby eliminating any erroneous indications of a subject fall that may be caused by the subject's tail. When the subject has fallen from the rotarod, the system logs this as the end of the experiment for that particular subject. Information such as the total time running on the rotarod (Time Running), and the Rotarod's current speed at the time of the subjects fall are recorded. All experiment setup parameters are also recorded. Rotamex-5 can be used as a stand alone device or it can be interfaced through an RS232 communication port to Windows compatible computer for storing data for later review or importation into a third party statistical analysis program.

1.2 Specifications

Number of Exercise Lanes:	4
Rotarod Spindle Speed Range:	0 - 99.9 RPM
Acceleration Increments:	0.1 RPM per second. to 20.0 RPM per second
Mouse Spindle Dimensions:	3.0 CM x 9.5 CM
Rat Spindle Dimensions:	7.0 CM x 9.5 CM
Fall height From Rod center:	44.5 CM
Unit Dimensions(LxWxH):	61cm X 56cm X 77cm

Weight:	27.5 kg
Data Recorded: fall	Running duration, Rotarod speed at time of fall
Animal Detection Method: monitor animals absence from rod	Scanning infrared beam(32) sensors assembly.
Power Connections: configurable.	100 Vac to 240 Vac @ 50-60 Hz Auto
Power Consumption:	70 Watts
Fuse size:	3 amp slow blow
Communication (optional): of 64 devices)	RS-232 to RS422(CIBUS) Multi drop. (Max
Shocker (optional) Shock Type:	Scrambled electric, constant current Maximum Shock Voltage 600V no load Shock Current Range 0 -1 MA Shock Current Regulation: 8% change per impedance.
50 kohm change in animal	

2 Installation

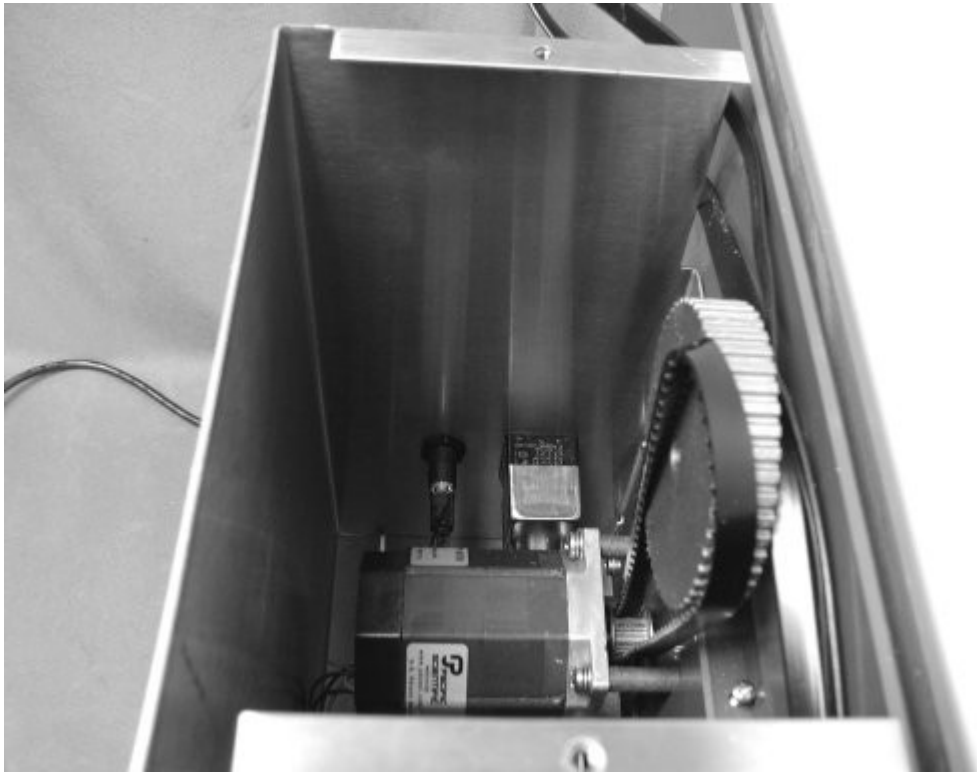
The Rotamex-5 comes pre assembled from the factory with either a standard mouse or rat rod assembly. There is no need for additional assembly. The instrument should be placed on a flat study surface. If the optional lid assembly was purchased ensure that there is enough room for the lid assembly to open to allow easy placement of animals on the units rod assembly.

2.1 Changing Rod Assembly

The Rotamex-5 can be used with either 3.0cm(mouse) or 7.0cm(rat) rod assembly. The rod assembly is designed to allow the end user to quickly and easily change from rod assemblies without the need for speed re-calibration. The procedure for changing the rod assembly can be found below.

1. First ensure that the power is turned off and the system is unplugged from the power source.
2. If the optional Lid assembly was purchased remove the lid assembly for lifting straight up the side walls.

- 3.** Remove the motor compartment lid assembly. This is accomplished by removing the two Phillips head screws.
- 4.** Remove the belt assembly from the top geared pulley. To easy removal of belt simply pull outward on the belt while the rod is slowly rotated by hand. This action is very similar to removing a chain on a bicycle. This should be preformed slowly to prevent fingers from getting pinched between the belt assembly and pulley.
- 5.** Once the belt is removed the complete rod assembly can be removed by lifting straight up on the side rod holders.
- 6.** Once the Rod assembly has been removed simply install the new rod assembly onto the Rotamex side panels.
- 7.** To install the belt assembly on the geared pulley, Simply slide the belt on the front of the pulley while rotating the rotarod assembly backwards. Once the belt is started continue rotating the Rod assembly backwards until the belt is fully seated. This action is very similar to installing a chain on a bicycle. This should be preformed slowly to prevent fingers from getting pinched between the belt assembly and pulley.
- 8.** Reinstall the motor compartment lid assembly and securing the two Phillips screws.
- 9.** If the option Lid assembly was purchased attach it to the top of the rod holder assemblies.
- 10.** Reconnect power to the system and turn the switch on.



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2.2 Mouse Rod Assembly

The Rotamex-5 can be configured with a smaller rod assembly that has a 3.0 cm rod diameter. This is the preferred rod when running smaller animals such as mice. The width of the running surface is approximately 9.5 cm. The rod surface is constructed from grey PVC with a knurled finished.



2.3 Rat Rod Assembly

The Rotamex-5 can be configured with a rod assembly that has a 7.0 cm rod diameter. This is the preferred rod when running larger animals such as rats. The width of the running surface is approximately 9.5 cm. The rod surface is constructed from grey PVC with a knurled finished.



2.4 Sensor Adjustment

The Rotamex-5 incorporates a 32 beam optical sensor mounter slightly over the rotarod assembly. This approach allows for more precise detection of when the animal leaves or falls from the rod assembly. This method also allows for detection of the animal gripping the rod assembly and rotating along with the rod as it spins. Since there are two different rod diameters the sensor beams will need to be adjusted for each.

Beam Adjustment for Mouse Rod assembly. When using the mouse rod assembly(3.0 cm) the sensors will need to be adjusted to the lowest position on the sensor bracket. When adjusting the sensors ensure that both emitter and detector are positioned on the same bracket position.



Beam adjustment for Rat Rod Assembly. When using the Rat Rod assembly(7.0 cm) the sensors will need to be adjusted to the highest position on the sensor bracket. When adjusting the sensors ensure that both emitter and detector are positioned on the same bracket position.



3 Controller

The Rotamex-5 was designed to operate in a standalone mode where a host computer is not needed for normal operation. The main controller is located on the front of the unit. It contains four buttons which are used to enable each lane as well as an "UP", "DOWN", "ENTER" and "CANCEL" buttons used to enter system parameters.



3.1 Controller Hardware Connections

The Rotamex-5 Controller controls monitors the animals presence on the rod through a two 16 beam optical sensors. It also controls the motor used to turn the rota-rod assembly. These hardware components are connected to the left side of the controller unit.



Motor Connector: The motor control lines are connected with a 7 pin "Din" type connector, it is connected to the port labeled "Motor".

Sensor Connector: The optical sensors are connected to the port labeled "Sensors". The sensor for Channels one and two are connected to the upper connector, while the sensor for channels three and four are connected to the bottom sensor connector.

Computer Connector. The Romatex-5 can be connected and controlled via a host computer. This connector is used to connect to the host computer through a "CIBUS" protocol. If this option is purchased a "CIBUS" converter will be supplied.

3.2 Controller Keypad

The Rotamex-5 was designed to operate in a standalone mode where a host computer is not needed for normal operation. The main controller is located on the front of the unit. It contains four buttons which are used to enable each lane as well as an "UP", "DOWN", "ENTER" and "CANCEL" buttons used to enter system parameters.



UP. The "UP" button is used to increment experiment set point values and to scroll upwards through the system menu.

Down. The "Down" button is used to decrement experiment set point values as well as to scroll downwards through the system menu.

Enter. The "Enter" button is used to store and edit experiment set point values as well as select system menu items.

Cancel. The "Cancel" button is used to abort set point value edits as well as returning to previous menus.

CH1 Start/Stop. This button is used to enable Channel 1 during an experiment.

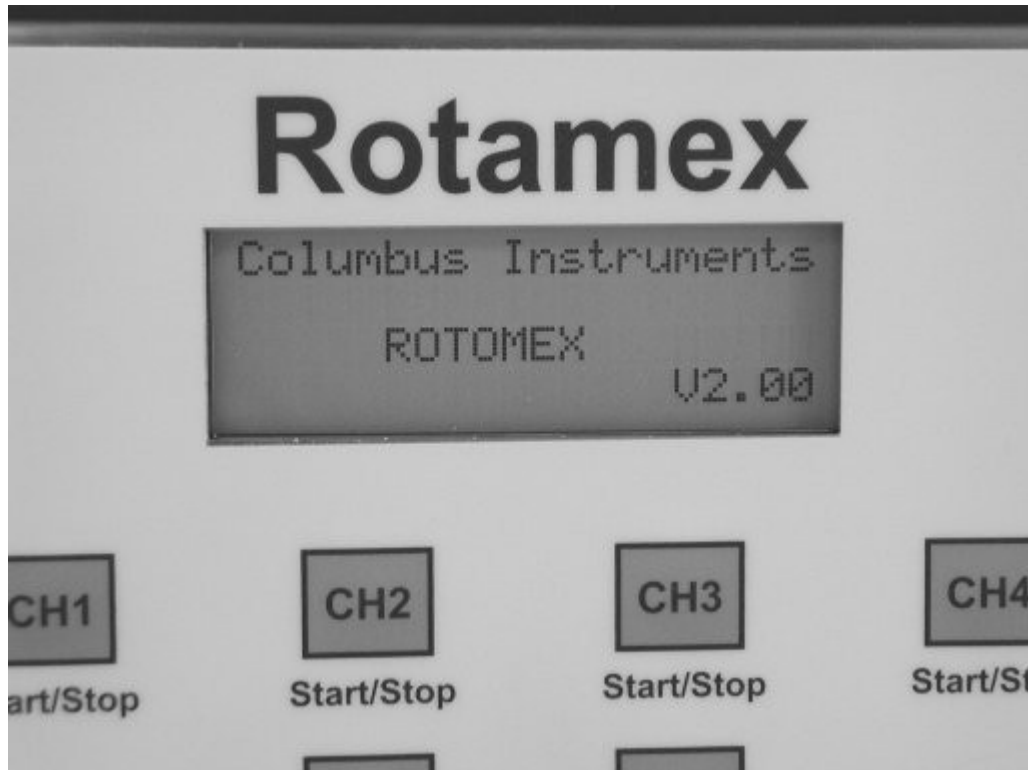
CH2 Start/Stop. This button is used to enable Channel 2 during an experiment.

CH3 Start/Stop. This button is used to enable Channel 3 during an experiment.

CH4 Start/Stop. This button is used to enable Channel 4 during an experiment.

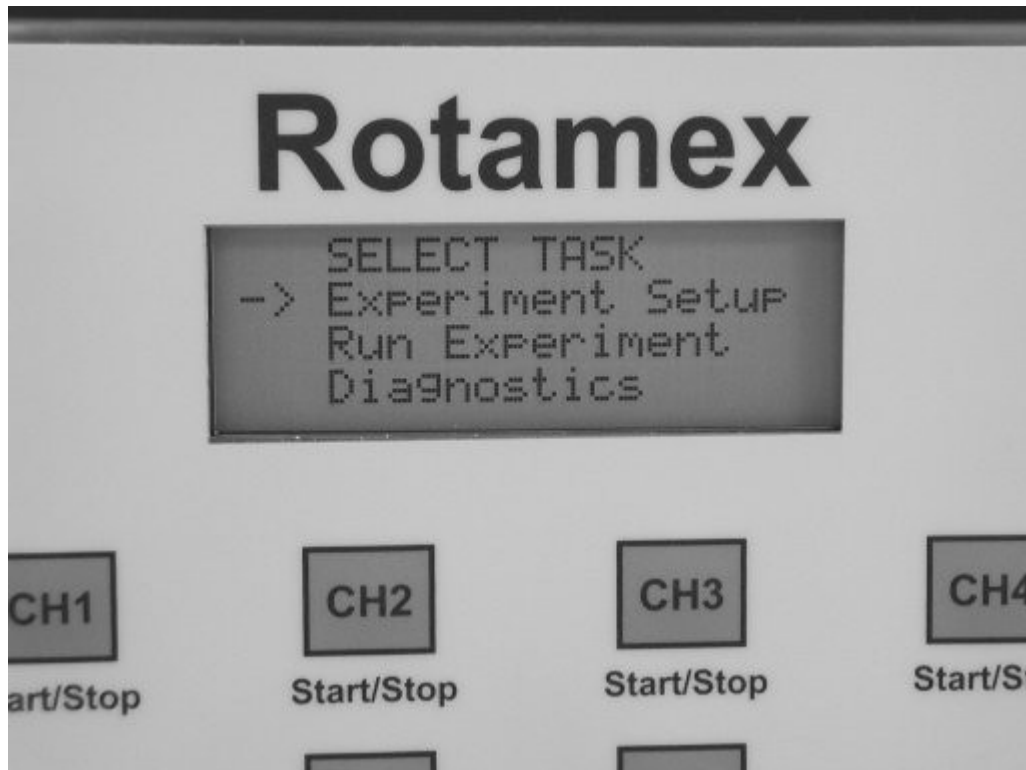
3.3 Startup Menu

The Startup Menu of the Rotamex-5 is displayed immediately after power up. On this menu the firmware version number can be found. By pressing any key the Main Menu will be displayed.



3.4 Main Menu

The Main Menu enables access to functions to edit experiment variables, run experiments, and diagnostics functions. The "Up" and "Down" buttons allows easy navigation through the menu, while the "Enter" and "Cancel" buttons are used to run and abort selected menu functions.



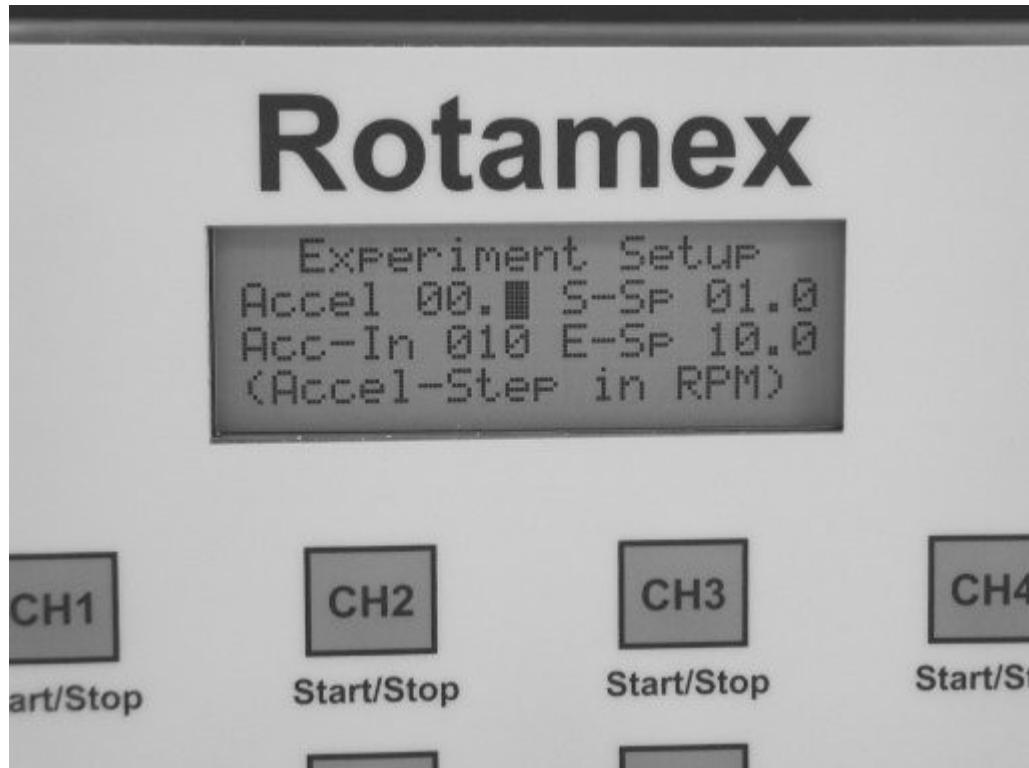
Experiment Setup Menu. This menu is used to setup rod Start Speed, End Speed, Acceleration Speed and Acceleration period.

Run Experiment Menu. This menu selections displays the experiment screen.

Diagnostics Menu. This menu selection allows the user to monitor in real time the optical sensors as well as control of the Rotamex motor.

3.5 Experiment Setup Menu

This menu is used to setup experiment parameters such as rota-rod Start Speed, End Speed, Acceleration Speed and Acceleration Period. The "Up", "Down" and "Enter" button are used to navigate through this menu. Once a value is selected to edit the "Up" button is used to increment the value while the "Down" button is used to decrement the value. Once the edit is complete the "Enter" button can be used to store the new value. The "Cancel" button exits out of this menu.



ACCEL. This variable is used to set the acceleration increment step. A value of 1.0 will allow the rotarod to have a step 1.0 RPM at the given time period defined by ACCEL-IN. If ACCEL-IN is set to 10 and ACCEL is set to 1.0 then the rotarod will increase in rotational speed 1.0 RPM every 10 seconds.

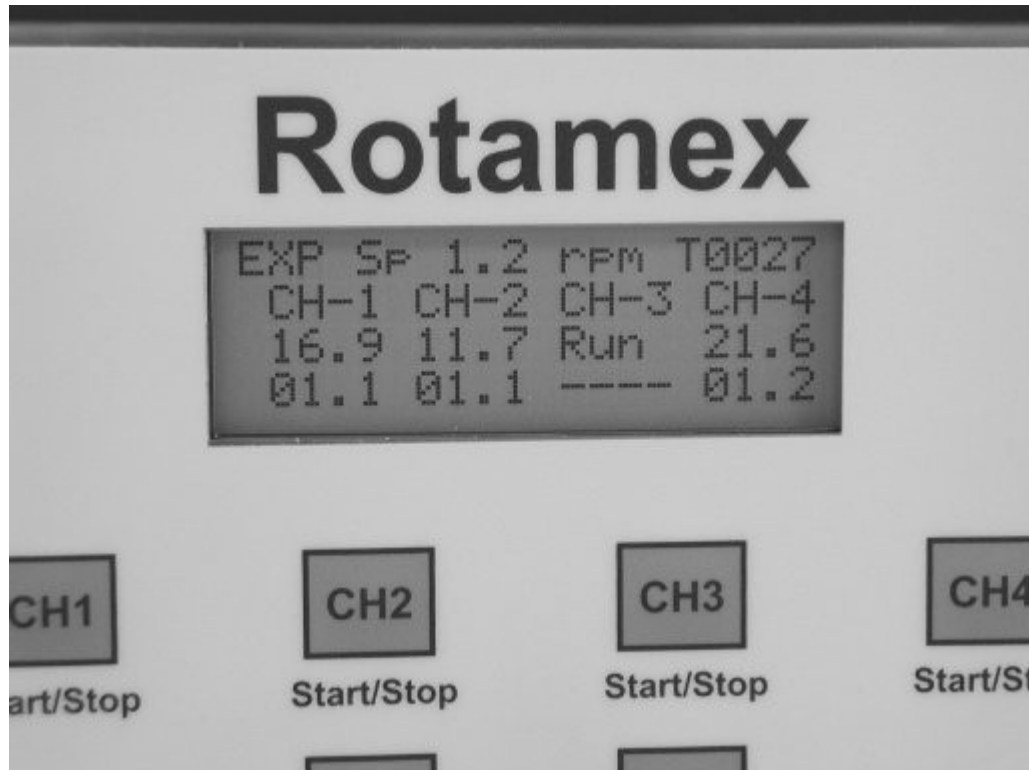
ACCEL-IN. This variable is used to set the time period in seconds of each acceleration step. If ACCEL-IN is set to 10 and ACCEL is set to 1.0 then the rotarod will increase in rotational speed 1.0 RPM every 10 seconds.

S-SP. This variable is used to set the initial start speed(RPM) of the rota-rod. A value of 1.0 will allow the rotarod to start rotating at 1.0 RPM when the experiment begins.

E-SP. This variable is used to set the Ending Speed(RPM) of the Rota-rod. A value of 20.0 will allow the rota-rod to start at the preset S-SP and accelerate to 20.0 at the preset Acceleration step and period.

3.6 Run Experiment

The Run Experiment Menu allows experiments to be run. From this menu the user can enable channels and start / stop experiments. When the experiment is running the current speed of the rota-rod assembly is displayed, channels running as well as the amount of elapsed time since the experiment has started. Once an animal falls from the rotarod, the rotational speed of the rota-rod at the time of the fall is displayed along with the amount of time the subject was present on the rod.

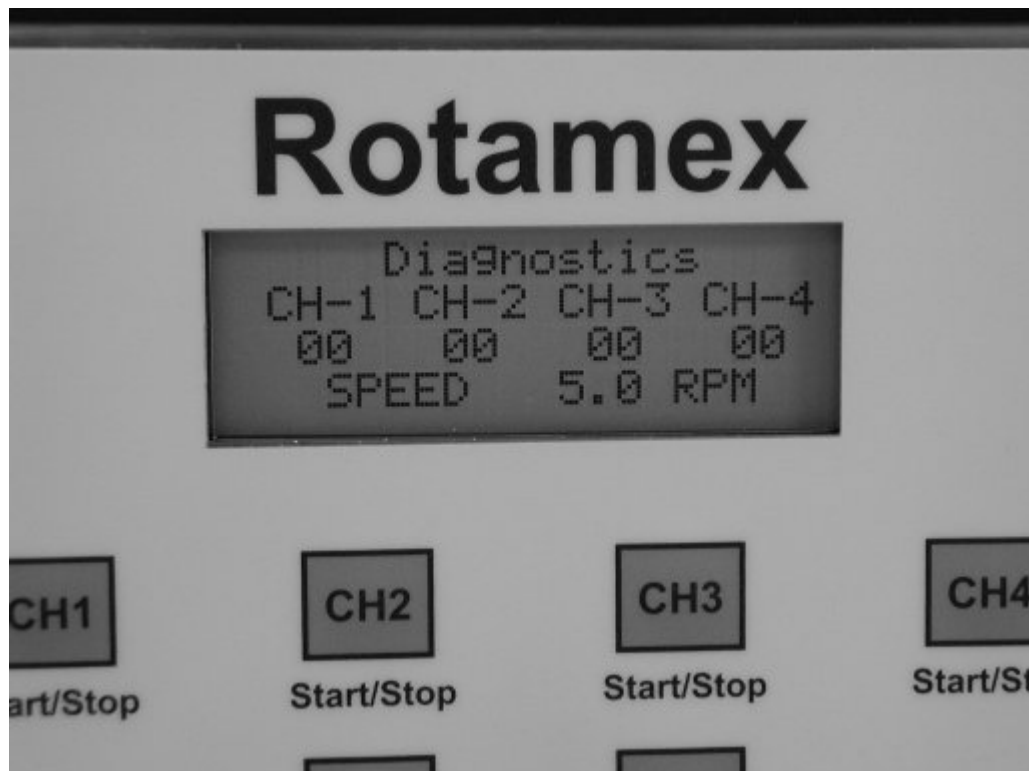


Interpetting Data. The above picture illustrates a running experiment in which all four channels were enabled. The animal in Channel 1 ran on the rod for 16.9 seconds and the rod speed was 1.1 RPM. The Channel 2 animal ran for 11.7 seconds and the rod speed was 1.1 RPM. The Channel 3 animal has not fallen off the rod and his session is still active. The animal in channel 4 ran for 21.6 seconds with a rod speed of 1.2 RPM. The top line indicates that 27 seconds have elapsed since the beginning of the experiment and the current rod speed is 1.2 RPM

Starting an experiment. To start an experiment, first enable the desired channels. This is done by pressing the Start/Stop button for the respective channel. When the channel is enabled its status will change from "IDLE" to "Run". Once all the channels have been enabled, next load each animal into the enabled lane. The experiment is started once all the animals are loaded, and the "ENTER" button has been pressed. As the experiment runs the elapsed time since the beginning of the experiment is displayed as well as the current rod speed in RPM.

3.7 Diagnostics

The Diagnostics allows the user to monitor the optical sensors as well control the rota-rod's motor. The motor speed(RPM) can be increased and decreased by pressing the "UP" and "Down" button. In the sensor portion of the diagnostics each beam position that is broken is displayed as its binary beam position. If there are no beams broken then the display should read 00 00 00 00.



4 Software

4.1 Installation

The software to operate the Rotamex-5 is supplied on a CD-ROM. The software is installed by using the Add/Remove Programs facility in the Windows Control Panel. Once the software has been installed a new program group named "Rotamex" will be added to the Programs Menu.

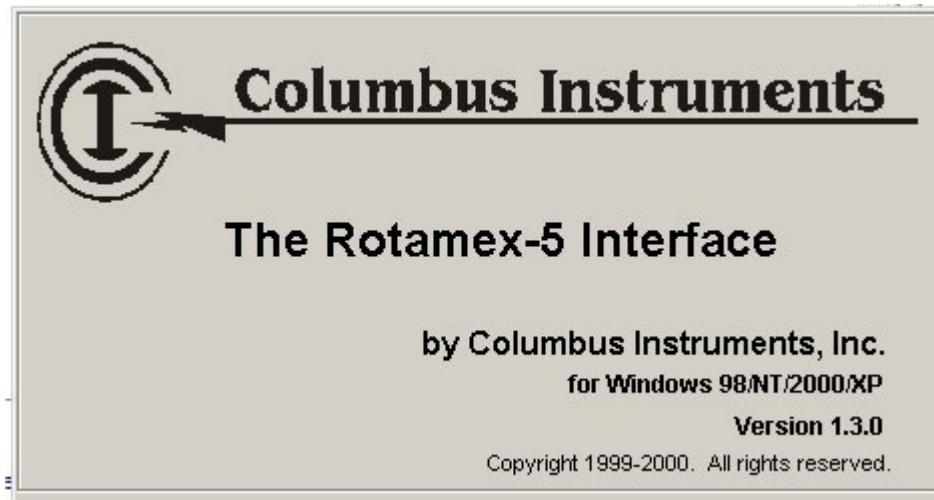
4.2 Connecting Interface Box

The Rotamex-5 connects to the host computer through a CI-Bus adapter. This adapted connects to a standard RS232 communications port located on the computer. To connect the CI-Bus box take the supplied 9 pin cable and attach one end to the CCI-bus port labeled computer, and the other end of the computer to the computers RS232 port. The CI-Bus ports labeled to Controller connects to the Rotamex-5 controller. If there are additional Rotamex-5 controllers it will connect to the extra port located on the first Rotamex-5 controller. There can be a total of 32 Rotamex-5 controllers connected to the Host computer through the CI-Bus adapter.



4.3 Running the Software

The Rotamex-5 Interface software can be run clicking on the Rotamex-5 Interface folder located in the Programs Menu. The Rotamex-5 Interface splash screen will be shown.



Communication Port Setup

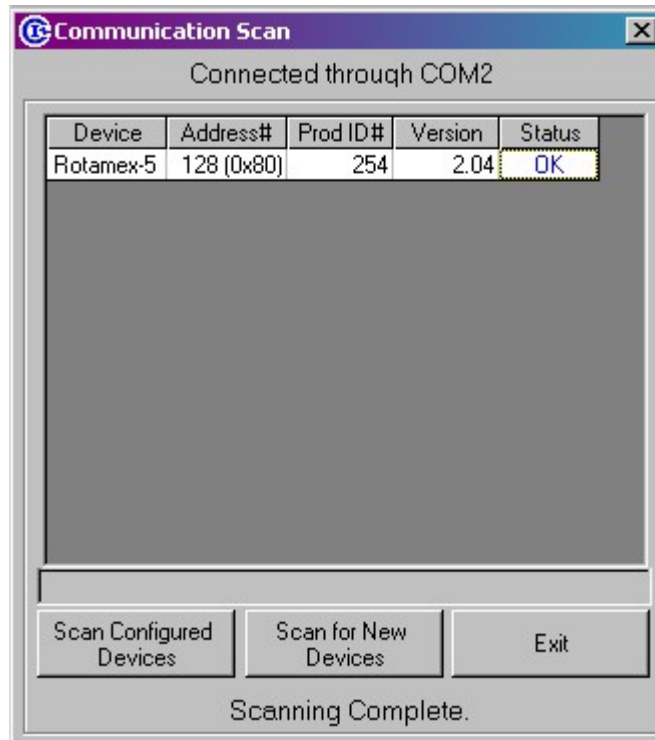
The Rotamex-5 Software is designed to automatically check the available RS-232 Communication ports for connected hardware. When the program first begins you will see the following window as it scans the ports for devices.



If no devices are found on the communication ports the user will have to manually select a device to search the communication ports for. If the system is configured with one Rotamex-5 then the starting address of 128 is used. If there are additional Rotamex-5 present with the system then their addresses will follow 128. Normally the devices that are connected to the instrument are listed in the hardware configuration file supplied with the system. In instances where there is not a hardware configuration available the user will need to manually search the communication ports.

Scanning for Configured Devices

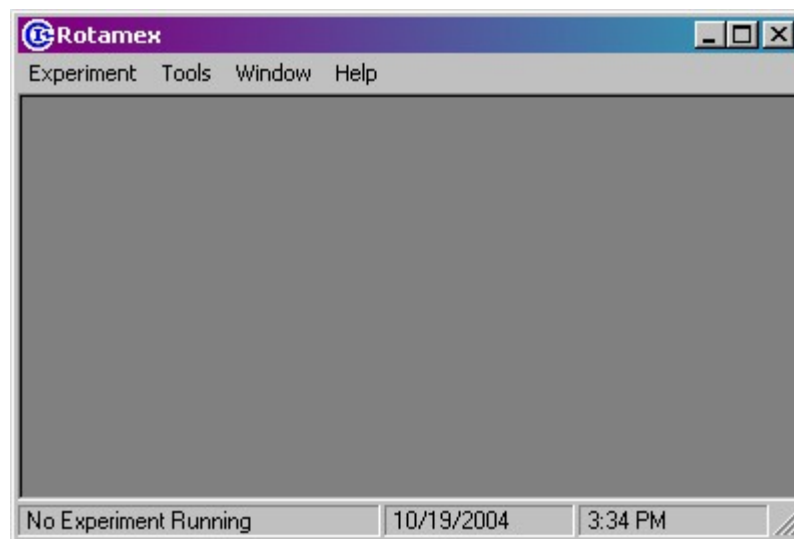
Once the communication port that connects to the hardware devices is determined, all the devices that are listed in the hardware configuration are scanned automatically. Each device will respond to the device scan by sending its identification string. If the device's identification information matches the hardware setup the device is listed as **OK**. If the device fails to respond to the device scan the device is marked as **No-Response**. If there is a mismatch of device hardware then the device will be marked as **Mismatch**. The most common error reported during the device scan is a No-Response. This is normally caused by the device's power not being turned on during the device scan. If this is the case check the power and then rerun the device scan.



After all the configured devices are scanned the Device Scanning Utility window will automatically unload and the system will await the user. If there are errors during the device scan or the user wants to add new hardware the Device Scanning Utility can be accessed under the Setup Menu found in the Tools Section.

4.4 Menus

The Rotamex-5 software contains many utilities to run experiments, as well as test and troubleshoot the hardware devices configured to the system. The Utilities can be access from the main menu.



Experiment Menu. The Experiment Menu contains utilities to create new experiments and run protocols from previously preformed experiments.

Tools Menu. The Tools Menu contains a utility to scan the available communication ports for connected rotamex devices as well as a complete set of diagnostics which can test sensor alignment and motor speed.

Windows Menu. The Window Menu contains tool to arrange child windows opened in the main Rotamex Interface window.

4.4.1 Experiment Menu

When setting up a new experiment the software uploads the current experiment setup information stored on the Rotamex-5's controller. The start, stop acceleration and acceleration time interval is uploaded. The Wheel type and mode of speed display is uploaded as well.

Experiment for Device 1 at address 128

Duration: 55 seconds Start Speed: 1.1 RPM Max Speed: 10.0 RPM Acc Int: 10.0 seconds Acc Step: 1.0 RPM Rot Delay: 5.0 seconds

Speed in RPM Rat Wheel Rotate CCW
 Speed in cm/s Mouse Wheel

Time: 0.0 RPM: 00.0

Subject ID		Subject ID		Subject ID		Subject ID		
Normal	Passive	Normal	Passive	Normal	Passive	Normal	Passive	
Time	Idle	0.0	Time	Idle	0.0	Time	Idle	0.0
RPM	0.0	0.0	RPM	0.0	0.0	RPM	0.0	0.0
Sub ID			Sub ID			Sub ID		
Beams			Beams			Beams		

Subject ID	CH #	Start Time	Run Time (sec)	Speed (RPM)	P_R Time (sec)	P_R Speed (RPM)	Total Run Time (sec)

Load Template Start Experiment Stop Experiment Quit

Experiment Setup

In the top of the Experiment menu the Device number and device address is displayed. You will have one experiment menu for each Rotamex-5 controller. The device number and device address is used to determine which Rotamex-5 that menu is controlling.

Start Speed. This variable is used to set the initial start speed(RPM or cm/s) of the rota-rod. A value or 1.0 will allow the rotarod to start rotating at 1.0 (RPM or cm/s) when the experiment begins.

End -Speed. This variable is used to set the Ending Speed(RPM or cm/s) of the Rota-rod. A value of 20.0 will allow the rota-rod to start at the preset S-SP and accelerate to 20.0 at the preset Acceleration step and period.

Accel Step. This variable is used to set the acceleration increment step. A value of 1.0 will allow the rotarod to have a step 1.0 (RPM or cm/s) at the given time period defined by ACCEL-IN. If ACCEL-IN is set to 10 and ACCEL is set to 1.0 then the rotarod will increase in rotational speed 1.0 (RPM or cm/s) every 10 seconds.

Accel-Int. This variable is used to set the time period in seconds of each acceleration step. If ACCEL-IN is set to 10 and ACCEL is set to 1.0 then the rotarod will increase in rotational speed 1.0 (RPM or cm/s) every 10 seconds.

Duration. This variable is used to set a period of time in seconds where the instrument will run. Once the time has elapsed the Rod rotation will be stopped. To disable this feature set the value to 0.0.

Speed Display Mode. This button allows the used to select what units the rod speed is displayed in(RPM or cm/s). This option is only available in firmware versions later than 2.04

Wheel Size. These buttons are used to determine which wheel the Rotamex is configured with. This setting must be set correctly when operating in Linear speed mode(cm/s).

Wheel Rotation Direction. This buttons is used to select which direction the Rod assembly will rotate.

Time. The time window displays the amount of time that has passed since the beginning of the experiment.

Speed. The speed window displays the current speed of the rod assembly.

Channel Time. This window displays the amount of time the animal stayed on the rod assembly before falling.

Channel Speed. This window displays the rod speed at the time the animal falls from the rod.

Passive Rotation Time. This window displays the amount of time the animal has remained on the rod assembly in the passive rotation mode. The passive rotation mode is defined as the part of the session where the animal has been absent from the sensor beams for less then the Rotation Delay setting.

Passive Rotation Speed. This window displays the speed in which the animal falls from the rota-rod assembly while in the passive rotation mode.

Total Session Time. This window displays the total amount of time the animal remained on the rotarod assembly during the session. This is the normal running time plus the passive rotation time minues the rotation delay time.

Subject ID. This window displays an 8 character ID text string. These ID's are also saved in the experiment data file.

Data Grid. This grid displays the experiment information for a given channel. The Subject ID, time, time on the rod, rod speed, passive rotation time, passive rotation speed and Total Session time is displayed in this window. This information is also saved in a CSV type file.

Subject ID Button. This button can be used to label the subject running in the given lane. To Start the experiment the user can use the buttons located on the front of the Rotamex-5 Controller.

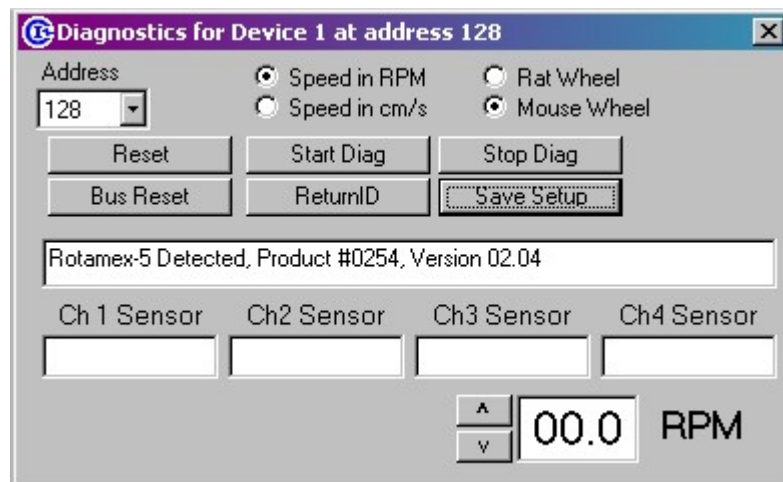
Load Template. This button can be used to load parameters from past experiments.

Start Experiment. This button is used to start an experiment on the Rotamex. If you select a previously run experiment the used will be prompted to append unto the file.

Stop Experiment. This button is used to terminate an experiment.

4.4.2 Diagnostic Menu

The Diagnostic menu allows the user to test beam status and operate the rota-rod's motor manually. This menu is very helpful in diagnosing problems or checking system calibration.



Address Box. This box is used to select which Rotamex to preform diagnostics on. The first Rotamex in the system is addressed as device 128. If there is an additional rotamex installed its address will be device 129.

Reset Button. This button is used to reset the the device whoses address is listed in the address box.

Bus Reset. This button is used to reset all the rotamex devices regardless of their address.

Return ID. This button is used to query the selected device to get the firmware version number. The selected device is defined by the address in the address box.

Start Diag. This button is used to begin diagnostics.

Stop Diag. This button is used to end diagnostics.

Speed units. These buttons allows the user to switch between RPM and cm/s speed mode. When the instrument is in CM/S speed mode the rod type must also be defined.

Rod type. This button allows the user to define which type of ROD is present.

Save Setup. This button is used to store the speed and wheel information on the rotamex.

Speed Increase "^". This button is used to increase the speed of the rotarod. The minimum speed increase is 1 unit either RPM or CM/S.

Speed decrease "V". This button is used to decrease the speed of the rotarod. The minumum speed decrease is 0.1 unit either RPM or CM/S

4.5 Running Experiment

The software can be used to monitor and record the data generated from the animals session. The data collected is stored in a standard CSV file which can be easily loaded into a speed sheet type program such as EXCEL.

Open Experiment Window. To start the experiment the user will first need to open the Experiment menu. When this menu opens the Experiment setup data is uploaded from the remote Rotamex and displayed in the Experiment Variable section of the screen.

Load Experiment Template. This button is used to load experiment parameters from past experiments.

Setup Experiment Variables. Next the experiment variables should be set to the reflect the current testing protocol for the experiment.

Select Filename for Save Data. To select the data filename the user can press the Start button to Start the experiment and select a data filename.

Input Subject ID(Optional). If the user wishes he can click the Subject ID button to label each animal in the given lane. If there is no subject ID information entered The software automatically lables them according to their channel number.(ie. Channel 1)

Load Animals. Next the user will load the animals onto the lanes. As the animals are loaded the user must press the Start/Enable button on the lane in which the animal was loaded. This button is located on the front of the Rotamex Controller.

Start Experiment. Once all the animals are loaded the user can press the Enter button to start the experiment. The Enter Button is located on the front of the Rotamex Controller. As each animal falls from the rod, the speed of the rod at time of fall is recorded as well as the amount of time the animal stayed on the Rod. The Rod will continue to rotate until the last animal has fallen from the rod assembly.

Experiment for Device 1 at address 128

Duration: 55 seconds Start Speed: 1.1 RPM Max Speed: 10.0 RPM Acc Int: 10.0 seconds Acc Step: 1.0 RPM Rot Delay: 5.0 seconds

Speed in RPM Rat Wheel Rotate CCW Time: 0.0 RPM: 00.0
 Speed in cm/s Mouse Wheel

Subject ID		Subject ID		Subject ID		Subject ID		
Normal	Passive	Normal	Passive	Normal	Passive	Normal	Passive	
Time	Idle	0.0	Time	Idle	0.0	Time	Idle	0.0
RPM	0.0	0.0	RPM	0.0	0.0	RPM	0.0	0.0
Sub ID			Sub ID			Sub ID		
Beams			Beams			Beams		

Subject ID	CH #	Start Time	Run Time (sec)	Speed (RPM)	P_R Time (sec)	P_R Speed (RPM)	Total Run Time (sec)

Experiment Setup

Rotamex Controller: The Rotamex Controller is used to Enable each channel as the animal is loaded. Once all the animals are loaded press the Enter button to start the experiment.



4.6 Experiment Data

The Experiment Data is displayed as the animal has fallen from the rota rod. As each animal falls the start time, channel number, subject id, current rod speed and amount of time the animal stayed on the rod without leaving the beams.

Experiment for Device 1 at address 128

Duration: 0 seconds Start Speed: 0.0 RPM Max Speed: 10.0 RPM Acc Int: 10.0 seconds Acc Step: 1.0 RPM Rot Delay: 5.0 seconds

Speed in RPM Rat Wheel Rotate CCW
 Speed in cm/s Mouse Wheel

Time: 43.3 RPM: 04.0

Subject ID	Normal	Passive	Subject ID	Normal	Passive	Subject ID	Normal	Passive	Subject ID	Normal	Passive
Time	25.1	5.9	Time	40.0	9.4	Time	24.8	0.0	Time	21.9	0.0
RPM	2.0	4.0	RPM	4.0	4.0	RPM	3.0	3.0	RPM	2.0	2.0
Sub ID			Sub ID			Sub ID			Sub ID		
Beams	●●●●●○		Beams	●●●●●○		Beams	●●●●●○		Beams	●●●●●○	

Subject ID	CH #	Start Time	Run Time (sec)	Speed (RPM)	P_R Time (sec)	P_R Speed (RPM)	Total Run Time (sec)
Channel 2	2	09/22/05	86.1	8.0	0.0	9.0	86.1
Channel 4	4	09/22/05	112.8	10.0	22.8	10.0	135.6
Channel 1	1	09/22/05	144.3	10.0	0.0	10.0	144.3
Channel 3	3	09/22/05	132.4	10.0	42.4	10.0	174.8
Channel 4	4	09/22/05	21.9	2.0	0.0	2.0	21.9
Channel 3	3	09/22/05	24.8	3.0	0.0	3.0	24.8
Channel 1	1	09/22/05	25.1	2.0	5.9	4.0	31.0
Channel 2	2	09/22/05	40.0	4.0	9.4	4.0	49.4

G:\Rotamex-5\Data\demo experiment.csv READ successful

4.6.1 Passive Rotation Mode

Passive Rotation Option. On units that have firmware later than version 2.11 Additional data is provided along with the normal session data. A passive rotation event is defined as the amount of time the animal remained on the rod after it has left the beam for a brief period of time. The absence from the beam could be from the animal's rotation around the rod or a partial fall where the animal only holds onto the rod via his front legs and then crawls back onto the rod. The amount of time the

animal can be absent from the beams is defined in the experiment setup under passive rotation delay. In a normal experiment the user still gets the data consisting of the rod speed at time of fall and the amount of time the animal remained on the rod. Once the animal is absent from the beams a countdown timer is set equal to the Passive Rotation Delay. If the animal returns to the sensor beam plane the countdown timer is reset and session will continue until the animal is again absent from the beam plane for longer then the Passive Rotation Delay time. At this time the unit will record the amount of time the animal remained on the rod during the passive rotation mode, the speed in which he finally fell from the rod assembly and finally the total time the animal was on the rod assembly. This is the total time in the normal mode and the passive rotation time minus the passive rotation delay.

Experiment for Device 1 at address 128

Duration: 0 seconds | Start Speed: 0.0 RPM | Max Speed: 10.0 RPM | Acc Int: 10.0 seconds | Acc Step: 1.0 RPM | Rot Delay: 5.0 seconds

Speed in RPM
 Rat Wheel
 Rotate CCW
 Time: 43.3
 RPM: 04.0
 Speed in cm/s
 Mouse Wheel

Subject ID	Normal	Passive	Subject ID	Normal	Passive	Subject ID	Normal	Passive	Subject ID	Normal	Passive
Time	25.1	5.9	Time	40.0	9.4	Time	24.8	0.0	Time	21.9	0.0
RPM	2.0	4.0	RPM	4.0	4.0	RPM	3.0	3.0	RPM	2.0	2.0
Sub ID			Sub ID			Sub ID			Sub ID		
Beams	●●●●●●○		Beams	●●●●●●○		Beams	●●●●●●○		Beams	●●●●●●○	

Subject ID	CH #	Start Time	Run Time (sec)	Speed (RPM)	P_R Time (sec)	P_R Speed (RPM)	Total Run Time (sec)
Channel 2	2	09/22/05	86.1	8.0	0.0	9.0	86.1
Channel 4	4	09/22/05	112.8	10.0	22.8	10.0	135.6
Channel 1	1	09/22/05	144.3	10.0	0.0	10.0	144.3
Channel 3	3	09/22/05	132.4	10.0	42.4	10.0	174.8
Channel 4	4	09/22/05	21.9	2.0	0.0	2.0	21.9
Channel 3	3	09/22/05	24.8	3.0	0.0	3.0	24.8
Channel 1	1	09/22/05	25.1	2.0	5.9	4.0	31.0
Channel 2	2	09/22/05	40.0	4.0	9.4	4.0	49.4

G:\Rotamex-5\Data\demo experiment.csv READ successful

4.6.2 Data File Format

The Experiment files are saved as a common CSV file format. CSV stands for common separated values. This is easy imported into any type of spread sheet type application.

The raw file format is displayed below in notepad form.

```
Columbus Instruments Rotamex-5 1.3
Rotamex-5 number 1 at address 128
Started On:.,09/22/05 08:20:41
Experiment Filename:.,G:\Rotamex-5\Data\demo experiment.csv
```

```
[Experiment Setup Info]
Start Speed:.,0.0
End Speed:.,10.0
Acceleration Interval:.,10.0
Acceleration Step Speed:.,1.0
Session Duration:.,0.0
Passive Rotation Delay:.,5.0
Speed Units:.,RPM
Wheel Type:.,Mouse Wheel
Wheel Rotation:.,CCW
```

```
[Experiment Data]
Subject ID,CH #,Start Time,Run Time (sec),Speed (RPM),P_R Time (sec),P_R Speed (RPM),Total
Run Time (sec),
Channel 2,2,09/22/05 08:20:48,86.1,8.0,0.0,9.0,86.1,
Channel 4,4,09/22/05 08:20:48,112.8,10.0,22.8,10.0,135.6,
Channel 1,1,09/22/05 08:20:48,144.3,10.0,0.0,10.0,144.3,
Channel 3,3,09/22/05 08:20:48,132.4,10.0,42.4,10.0,174.8,
Channel 4,4,09/22/05 08:20:48,21.9,2.0,0.0,2.0,21.9,
Channel 3,3,09/22/05 08:20:48,24.8,3.0,0.0,3.0,24.8,
Channel 1,1,09/22/05 08:20:48,25.1,2.0,5.9,4.0,31.0,
Channel 2,2,09/22/05 08:20:48,40.0,4.0,9.4,4.0,49.4,
```

Display of file in spread sheet Type format.

Columbus Instruments Rotamex-5 1.3								
Rotamex-5 number 1 at address 128								
Started On:	9/22/2005 8:20							
Experiment Filename:	G:\Rotamex-5\Data\demo experiment.raw							
[Experiment Setup Info]								
Start Speed:	0							
End Speed:	10							
Acceleration Interval:	10							
Acceleration Step Speed:	1							
Session Duration:	0							
Passive Rotation Delay:	5							
Speed Units:	RPM							
Wheel Type:	Mouse Wheel							
Wheel Rotation:	CCW							
[Experiment Data]								
Subject ID	CH #	Start Time	Run Time (sec)	Speed (RPM)	P_R Time (sec)	P_R Speed (RPM)	Total Run Time (sec)	
Channel 2	2	9/22/2005 8:20	86.1	8	0	9	86.1	
Channel 4	4	9/22/2005 8:20	112.8	10	22.8	10	135.6	
Channel 1	1	9/22/2005 8:20	144.3	10	0	10	144.3	
Channel 3	3	9/22/2005 8:20	132.4	10	42.4	10	174.8	
Channel 4	4	9/22/2005 8:20	21.9	2	0	2	21.9	
Channel 3	3	9/22/2005 8:20	24.8	3	0	3	24.8	
Channel 1	1	9/22/2005 8:20	25.1	2	5.9	4	31	
Channel 2	2	9/22/2005 8:20	40	4	9.4	4	49.4	

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