

Power Express In-Lab Training Manual Reference Key

Chapter 7

In-Lab Training Competency Exercise

The competency exercise should be completed by the end of the in-lab training session. All materials supplied with the Power Express or used during training may be used to complete this exercise. The exercise is a combination of performing learned skills and knowledge review.

System Overview

1. Place the letter of the Power Express Module in the column for its Description:

Module	
A	Dynamic Inlet
B	Error Lane
C	Decapper
D	Direct Track Sampling (DTS)
E	Rack Builder
F	Recapper
G	Storage
H	Outlet
I	Secondary Decapper

Description	
F	Contains two assemblies that place caps on sample tubes and secondary tubes before routing to the Storage Module
D	Connection that aspirates sample directly from a sample tube in a carrier on the track and dispenses it into the connected analyzer
B	Sample tubes with errors are routed here from the Inlet
E	Connection that transfers sample tubes from carriers into analyzer racks before they are processed on the analyzer
A	Transfers sample tubes from racks into sample tube carriers on the track
I	Removes caps from sample tubes retrieved from the Storage Module
C	Contains two assemblies for removing sample tube caps or stoppers from individual sample tubes
H	Sorts sample tubes into racks for removal for offline storage or additional processing
G	Provides long-term online storage of sample tubes that can be retrieved for additional processing

System Overview, continued

2. The following tube sizes are supported for processing on the Power Express:
(Circle all that apply)

- a. 13 x75 mm
- b. 13 x100 mm
- c. 16x75 mm
- d. 16x100 mm

3. Each module has a **control panel** that displays the module status and to enter commands.

What color is the display when the module is in Maintenance mode? **White**

4. Fill in the table below with the information about the Inlet racks:

Priority Order	Rack Color	Rack Usage
1	Red	Priority
2	Blue	Routine
3	White	Centrifuge Bypass
4	Yellow	Remap

5. On the Centrifuge Module, the **spin time** and **speed** can be adjusted.

6. Identify the analyzers that use the following Power Express modules in your lab:

- Direct Track Sampling (DTS)
Varies by lab: Dxl, AU680, IL Top, Centaur, Liason XL, Abbott i2000SR
- Rack Builder
Varies by lab: AU5800, DxC, DxH Workcell, Stago STA-R

Which of the above analyzers are Dynamic connections?

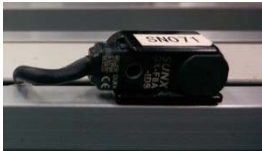


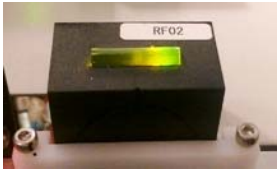
Reminder: **Dynamic analyzers update Cennexus when reagent status changes.**

AU680, AU5800, DxC, Dxl

System Overview, continued

7. After sample tubes are processed on connected analyzers, they are routed to the **Recapper** module before they are delivered to the Storage module for online storage.
8. Circle the statement that is false:
 - a. The system cannot retrieve sample tubes once they are sorted to the Outlet
 - b. Inlet and Outlet racks are keyed to fit in only one direction in the rack drawers
 - c. The Dynamic Inlet module can operate without racks in all 8 positions
 - d.** The Outlet module can operate without racks in all 8 positions
9. The following sensors/devices are located along the Power Express to detect and identify sample tubes and sample tube carriers.

Identify if the sensors/devices pictured below are used for the sample tube or carrier:

Sensor / Device	Tube or Carrier?	Sensor / Device	Tube or Carrier?
	Carrier		Tube
	Tube		Carrier

10. Identify the two software applications that are used with the Power Express:

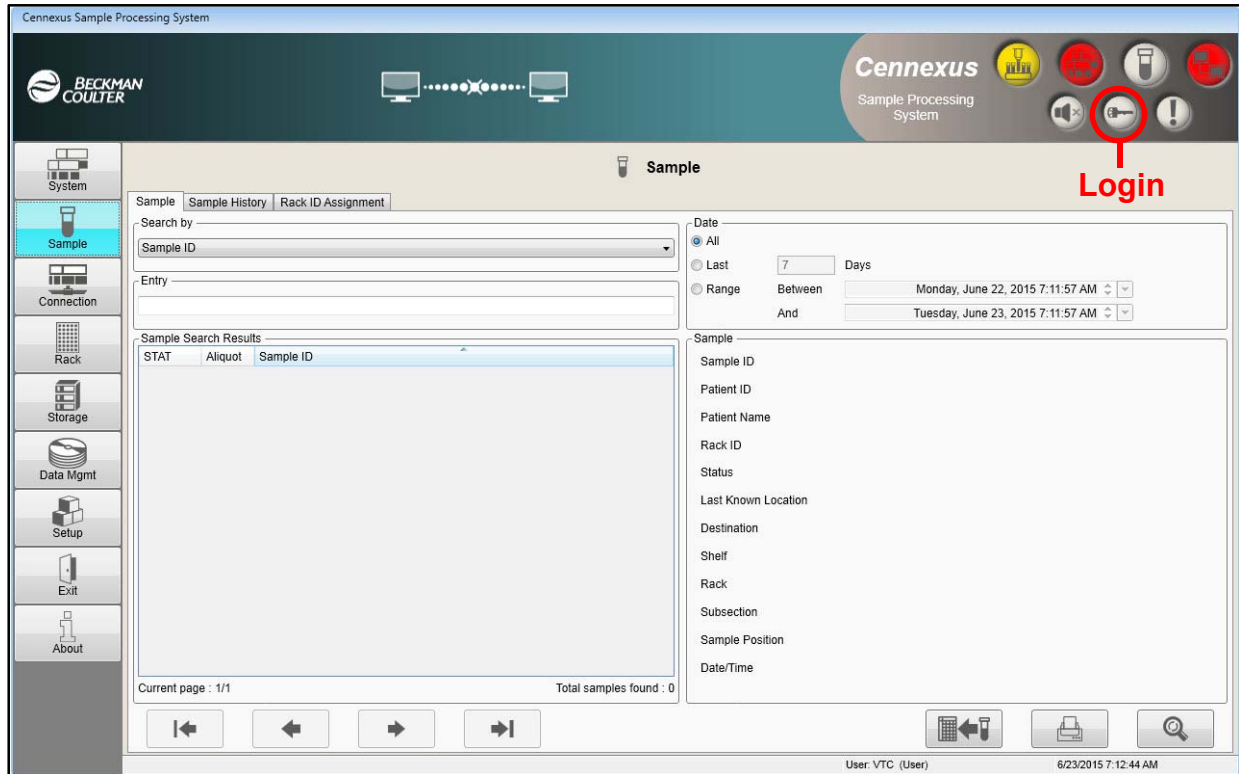
- **Cennexus**
- **Line Control**

11. Review the items that you have covered in the System Overview chapter. Place a check next to items you feel comfortable identifying. Meet with your instructor to review or answer any questions you may still have on unchecked items.

System Overview Review Checklist

- Identify Power Express Computer
 - Cennexus and Line Control
- Identify Track Components
 - T-Lanes
 - Through lanes (I-Lanes)
 - Conveyor belts
 - Sample tube carriers
 - Carrier sensors
 - Sample tube sensors (fiber optic)
 - Bar code readers
 - RFID sensors
 - Stoppers
 - Diverters
 - Lane changers
- Identify Common Module Components
 - Control panel
 - Stop button
 - Beacon
- Identify Power Express Modules
 - Dynamic Inlet
 - Error Lane
 - Centrifuge and D-Lane
 - Decapper
 - Aliquot (Level Detector, Labeler, Aliquotter)
 - Direct Track Sampling (DTS)
 - Rack Builder
 - Recapper
 - Storage
 - Outlet
 - Secondary Decapper
- Sample Tube Processing Overview

Software Overview



Refer to the Cennexus screen above to answer the following questions:

12. What is the system status of Cennexus? **Ready**

13. **True** or False? Loading is paused for at least one connected analyzer.

14. Which alert buttons require investigation? **System Alerts, Communication Alerts**

15. You want to identify the samples that have been sorted to the Outlet. Which Main Menu button should select? **Rack**

16. Hotline is asking for the software version of Cennexus. Where can you find this information? **About**

Identify the software version of Cennexus in your lab: **Varies by lab**

17. Where should you go to add a new test in Cennexus? **Setup**

Where should you go to perform a backup of the setup data? **Data Mgmt**

You need to log on with "Supervisor" access to perform a backup. Circle the button on the screen above that will open the Login dialog box.

Software Overview, continued

18. Check all the statements that apply to the Line Control screen below.

The screenshot shows the 'Laboratory Automation System' interface. Key elements include:

- System Status:** ON
- Cennexus:** ONLINE
- Primary Sample Log:** Host Download: 4, Received Samples: 4, No Data Rcvd Sample: 0
- Unit Status:** Enabled (blue), Disabled (black), Error (red), Not Connected (pink)
- T-Lanes:** 12 lanes shown, with Local IDs 1 through 12. Lane 3 is highlighted in blue, and Lane 4,5 is highlighted in blue.
- Modules:** Dynamic Inlet, Error Lane, Cent#1-C/O-100, Cent#2-C/O-100, Decapper#1 (red), Level Sense#1, Labeler#1, Aliquoter#1, Outlet1, Decapper#2, Centaur#1 (value 3), Centaur#2 (value 1), AU5820#1 (value 5), AU5820#2 (value 0), Recapper, StorageUnit1-R (value 2), StorageUnit2-R (value 2).
- Buttons:** Screen Refresh, StorageUnit Shelves, Outlet Statistics.
- Footer:** Beckman Coulter logo, Date: 07/19/2013, Time: 11:29 AM.

- The Line Control computer is communicating with Cennexus but not the track system
- Four samples have been downloaded from the host and received on the Power Express
- There is a communication error with a Decapper module
- This system has an Aliquot module
- There are four analyzers connected on the system
- There is one Centrifuge and two Storage modules on the system

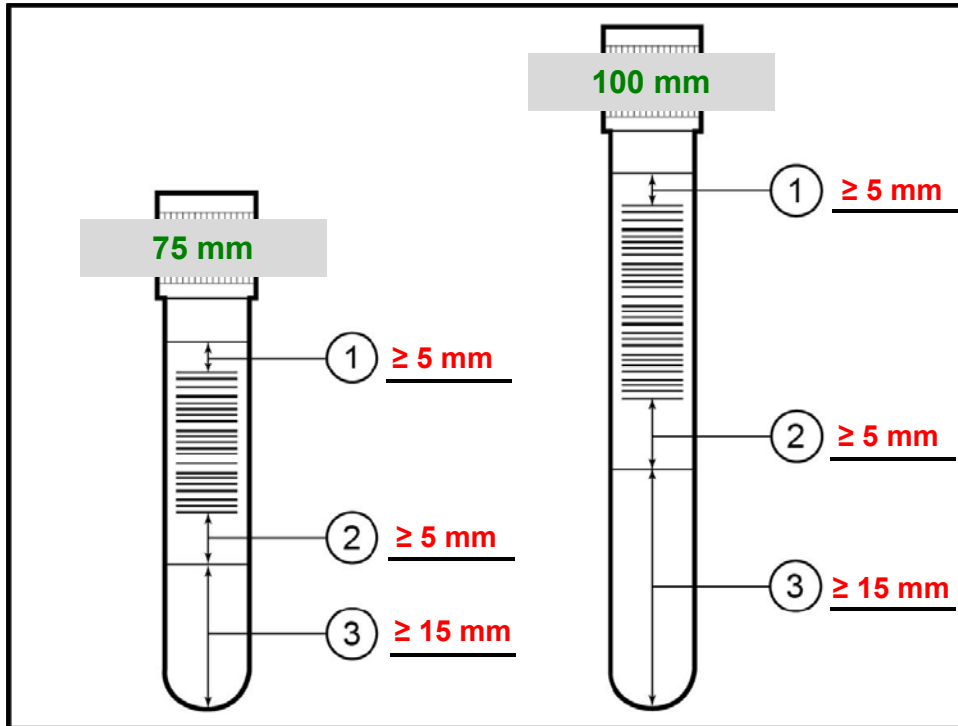
19. Review the items that you have covered in the Software Overview chapter. Place a check next to items you feel comfortable identifying. Meet with your instructor to review or answer any questions you may still have on unchecked items.

Software Overview Review Checklist

- Identify Cennexus Software
 - Dashboard
 - System Status (Startup, Ready, Running, Shutdown)
 - Loading Pause
 - Alert Buttons (System, Sample, Communication)
 - Audible On/Off
 - Login
 - View Event Log
 - Main Menu Buttons
 - System
 - Sample
 - Connection
 - Rack
 - Storage
 - Data Mgmt
 - Setup
 - Exit
 - About
 - Work space
 - Function buttons
 - Notification bar
- Switch between Cennexus and Line Control software
- Identify Line Control Software
 - Menu bar
 - System status
 - Cennexus status
 - Primary sample log
 - Unit status
 - Track diagram
 - Screen refresh
 - Storage unit shelves
 - Outlet statistics
 - Analyzer connection modules and Storage module number fields
- Identify Control Panel Buttons

System Operations

20. Identify the space requirements (labeled 1, 2, and 3 below) for bar code labels placed on sample tubes processed on the Power Express.



21. A sample tube with an unreadable bar code is loaded at the Inlet module. Which module will the sample tube be routed to? **Error Lane**

Identify the software buttons you would select on Cennexus to identify the reason the sample is at this module:

Sample Alerts button → **Error Lane tab**

22. Which modules require a **Rack Exchange** to be performed at the control panel when the racks or rack subsections are full?





- **Storage Module**
- **Outlet Module**

What can happen if a **Rack Exchange** is performed from the control panel but the tubes are not removed from all positions of the rack?

The system could place a tube on top of another tube since the Rack Exchange cleared out the position.

System Operations, continued


23. Refer to the following figure to identify the shelf and storage rack position (positions for each shelf: 1-4 from left to right) for the listed rack exchange status:

RACK CHANGE		Rack Exchange Status	Shelf / Rack Position
4F		Required	1F / 1
3F		In Progress	2F / 4
2F		Completed	3F / 2
1F			



24. Circle the six options that are available when searching for a sample tube at Cennexus:

- Sample ID
- Pending Rack Reason
- Tests
- Patient Name
- Rack ID
- Location
- Destination
- Patient ID
- Status

25. True or False?

You can select **Start Retrieving the Selected Sample Tubes**  from the Samples screen to retrieve a sample from the Storage module and have the track directly route it to an analyzer for additional testing.

26. Which button should be selected prior to performing maintenance on a connected analyzer to prevent samples from routing to the analyzer? Circle the correct answer.

-  **Loading Pause** at Cennexus
-  **Pause** at the control panel (Rack Builder or DTS module)
- Pause button on the analyzer software
- None. Power Express can identify when an analyzer is in Maintenance mode

System Operations – Daily Shutdown / Startup

27. Identify the correct order to perform the steps of the daily shutdown and startup of the Power Express. Place a number next to each step in the order they should be performed (1 = first, 2 = second, etc.).

Order	Step
8	Power ON Power Express line (green button at Inlet)
4	Power OFF the Power Express line (red button at Inlet)
9	Turn on the computer
3	Perform a system shutdown at Line Control
2	Perform a rack exchange on all Outlet positions
10	Startup the Cennexus software
1	Wait for samples to complete processing and route to the Storage or Outlet modules
7	Complete pre-startup checklist tasks
5	Exit the Line Control software
11	Perform a system startup at Line Control
6	Exit the Cennexus software and shutdown the computer

28. Review the items that you have covered in the Systems Operations chapter. Place a check next to items you feel comfortable performing. Meet with your instructor to review or answer any questions you may still have on unchecked items.

System Operations Review Checklist

- Attaching bar code labels on sample tubes
- Loading sample tubes into Inlet racks
- Perform a rack exchange at Inlet module
- Remove sample tubes from the Error Lane
- Perform a rack exchange at Outlet module
- Perform a rack exchange at Storage module
- Loading Pause at Cennexus
- Track the movement of a sample tube at Cennexus
- Generate statistics for the system at Cennexus
- Search for a sample tube at Cennexus
- Retrieve a sample tube from Storage at Cennexus

- Search for sample tube history at Cennexus
- Assign a rack ID at Cennexus
- Add/Modify a test at Cennexus
- Back up setup data at Cennexus
- Daily Shutdown
 - System shutdown at Line Control
 - Power OFF Power Express line
 - Exit Line Control software
 - Exit Cennexus software and shutdown computer
- Perform pre-startup checklist tasks
- Daily Startup
 - Power ON Power Express line
 - Turn on computer and startup Cennexus software
 - System startup at Line Control

29. Review the items that you have covered in the Maintenance chapter. Place a check next to items you feel comfortable performing. Meet with your instructor to review or answer any questions you may still have on unchecked items.

Maintenance Review Checklist

- Scheduled maintenance logs
- Daily maintenance
- Weekly maintenance
- Monthly maintenance

Error Recovery and Troubleshooting

30. For each error code listed in the tables in the following pages:

- Locate the error code in the Error Codes Table found in Chapter 4 Troubleshooting of each Module-Specific IFU
- Identify the Problem and the Solution for the error code
- Locate the component on the Sensor Diagrams found in Chapter 4 Troubleshooting of each Module-Specific IFU
- Locate the component on your Power Express System

Complete the tables for the modules on your Power Express.

HINT: The Module column will identify the control panel on which the “error” displays.

Module	Error Code	Problem	Solution
Dynamic Inlet	LS003 OFF	Inlet Rack #5 detection error. Inlet Rack #5 is not present or not being detected by the rack sensor.	Verify that the rack is present and set correctly in tray.
<p>How could a rack not be placed correctly?</p> <p>Rack is placed backwards. Rack is not seated flat.</p>			

Module	Error Code	Problem	Solution
Centrifuge	PM001 POS	Loading arm positioning error.	<ol style="list-style-type: none"> 1. Place the module in Manual mode. 2. Confirm that nothing interferes with the movement of the loading arm. 3. Place the module in Auto mode to resume operation.
<p>What is the definition of the PS code? Perform the steps in the solution at the control panel. What happens on the module when you switch from Manual to Auto?</p> <p>Pulse Motor. The transfer arm homes.</p>			

Module	Error Code	Problem	Solution
Decapper	PS012 ON	Unexpected sample tube at the decapping position.	<ol style="list-style-type: none"> 1. Select Clear on the control panel to release the sample tube carrier from the decapping position. 2. If the sample tube in the carrier is capped, remove the cap manually.
<p>Which Decapper is PS012 located at?</p> <p>Primary Decapper #1</p>			

Module	Error Code	Problem	Solution
Aliquot – Level Detector	AS018 OFF	Gripper error on the transfer arm.	<ol style="list-style-type: none"> 1. Confirm that a sample tube has not been dropped. 2. Confirm that the gripper is holding a sample tube correctly. If not, manually place a tube in the gripper. 3. Confirm the air compressor is on and the auto switch is working correctly. Confirm the compressed air supply is within the normal pressure range.
<p>Which transfer arm is causing the error?</p> <p>Transfer arm 4</p>			

Module	Error Code	Problem	Solution
Aliquot – Labeler	SN011 PAS	Labeler component is not set correctly	<ol style="list-style-type: none"> 1. Push back the labeler component until the bracket latches. 2. Confirm that SN011 turns on when the component is secured in position. 3. Reboot the module.
<p>What procedure might have been performed that could cause this error?</p> <p>Replace the label roll. Clean the print-head, label sensor, and roller.</p>			

Module	Error Code	Problem	Solution
Aliquot – Aliquotter	SN103 OFF	The sensor detected an impact while initializing aliquot arm B (Zaxis).	<ol style="list-style-type: none"> 1. Inspect and remove any obstructions. 2. Inspect that the sensor is working correctly.
<p>There are multiple sensor diagrams for the Aliquotter. Which diagram did you use to locate the SN103 component?</p> <p>Aliquotter Arm Sensor Diagram</p>			

Module	Error Code	Problem	Solution
Direct Track Sampling (DTS) T Lane	SN025 PAS	Passage sensor error. A passage sensor does not detect a carrier within a predetermined timeout period.	<ol style="list-style-type: none"> 1. Confirm that a carrier is not jammed or stuck and that the belt moves. 2. Select Restart on the control panel to resume operation. 3. If no sample tube carrier is there or stopped, the passage of the carrier did not trigger the sensor. Use a metal object to trigger the sensor manually. Press Restart.
<p>List some metal objects that might be available to you in the lab to manually trigger a passage sensor:</p> <p>Screwdriver, keys, scissors, etc.</p>			

Module	Error Code	Problem	Solution
Rack Builder – AU5800 Connection	PS123 ON	An instrument rack was found at PS123 (rack sending position) during initialization.	<ol style="list-style-type: none"> 1. Manually remove the rack. 2. Select Restart on the control panel to resume operation.

The Sensor Diagrams includes different types of sensors. What can help you identify a sensor on the diagram once you know the type of sensor (eg. PS) that generated the error?

Sensors are color-coded on the Sensor Diagrams.

Module	Error Code	Problem	Solution
Rack Builder – DxH Workcell Connection	PS331 PAS	Passage sensor error. A passage sensor does not detect an instrument rack within a predetermined timeout period.	<ol style="list-style-type: none"> 1. Confirm that an instrument rack is not jammed or stuck and that the belt moves. Check if the cassette is in position. 2. Select Restart on the control panel to resume operation.

Is the PS331 sensor a part of the rack loading or rack unloading area of the DxH Workcell Connection?

Rack unloading

Module	Error Code	Problem	Solution
Recapper	SL057 ON	<p>Lateral cap pusher at the capping position is not working correctly.</p> <p>ON error: The cylinder does not respond correctly to an ON signal from a PLC.</p> <p>OFF error: The cylinder does not respond correctly to an OFF signal from a PLC.</p>	<p>1. Confirm that a cap is not jammed or stuck.</p> <p>2. Confirm the air compressor is on and the auto switch is working correctly. Confirm the compressed air supply is within the normal pressure range.</p>
<p>Which Recapper is SL057 located at?</p> <p>Recapper #2</p>			

Module	Error Code	Problem	Solution
Storage	FS025 OFF	100mm tube detected without a cap.	<p>1. Make sure that cap is applied on the 100 mm tall tube arrived at loading position.</p> <p>2. Select Restart on the control panel to resume operation.</p> <p>3. If a number of samples are appearing at the Storage Module without caps, check and clean the Recapper module sensors FS003, FS005, FS033, and FS035.</p>
<p>Identify the FS sensor number that checks for the presence of caps on 75 mm tubes:</p> <p>HINT: The information is located in the same section of the IFU as FS025.</p> <p>FS023</p>			

Module	Error Code	Problem	Solution
Outlet	BUZZ01-0*	Line Control CPU Error, Bar code or RFID read error or Sample Positioning error	<p>1. Select Restart on the control panel and retry. Verify that the bar code or RFID reader reads the bar code/RFID tag correctly.</p> <p>2. If the error persists, select Clear on the control panel to release the carrier.</p>
<p>BUZZ errors can be associated with bar code readers or RFID sensors. Do you think this BUZZ error was the cause of a bar code reader or RFID sensor? Why?</p> <p>Bar code reader. There is no RFID sensor in the Outlet (only in Outlet T-Lane).</p>			

NOTE: When this error is displayed on a control panel, the asterisk () is replaced with one of the following numbers:

- -01 – Indicates the sample bar code label is unreadable
- -02 – Indicates the sample bar code label was read, but the ID should be somewhere else on the system
- -03 – Indicates the sample bar code label was read, but the ID indicates the tube should not be on the system

31. You have completed the competency check. Compare the answers of your completed competency check with the Reference Key provided by your trainer.

CONGRATULATIONS!

