Fresenius Medical Care

2008K/K^2 Training Course Agenda (Level I)

Day 1

Start of Day

- Introduction to class
- Hemodialysis Review

Hydraulics

- Detailed description of the hydraulic system. All students are provided a flow diagram for personal use.
- Connection points for hydraulic calibrations.
- Discussion of the balancing chamber function and operation.
- Hydraulic and electronic interconnections.
- Accessing the electronics and machine modules.
- Demonstrate removal of the hydraulic assembly from the machine.

Machine operation

- Dialysis Mode
  1) Operator options
  2) Sodium Variation
  3) Test
  4) On-Line Clearance/Diasafe
  5) OLC "0" test
  6) Concentrate Select Menu
- Service Mode
  1) Options (Treatment and Hardware)
  2) Calibration menu
  3) Diagnostics
  4) Valve Test Program

Training Aids Utilized:

1) Overhead/Multimedia projector
2) TV/VCR
3) A complete hydraulic assembly
4) Individual hydraulic sub assemblies

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Day 2

Start of Day

- Written test on hydraulics
- Review and discuss test
- Review hydraulic flow path

Modules

1) Describe the calibration of level detector and venous pressure
2) Describe the function of the Blood pump and calibration of arterial pressure

Hydraulic Description

- Identification Lab Exercise

Electronics

1) Power Supply
2) Power control board
3) Power Logic board
4) Display boards
5) Function board
6) Actuator board
7) Test board
8) Sensor board
9) Mother board

Demonstrate all Calibrations

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Day 3

Start of Day

- Written test on calibrations
- Review and discuss test

Hydraulic Calibrations:

- Deareation (and Loading Pressure)
- Flow Pressure
- Balancing Chamber Volume
- Acid Pump Volume
- Bicarb Pump Volume
- UF Pump Volume

Calibrate Sensors:

- Arterial Pressure
- Venous Pressure
- Dialysate Pressure
- Temp Sensor
- Post Temp Sensor
- Temp Control
- Blood Leak Detector
- Cond Cells

Calibrate Monitor:

- Set Clock
- Voltage Detection
- Art Pump Rate
- Ven Pump Rate

When all calibrations are complete, a self-test is run on the machine. Any test that fails must be repaired or recalibrated so the machine passes all tests. The instructor using the debug screens also checks the machine.

Rebuilds and Repairs

1) Rebuild the acid and Bicarb pumps
2) Rebuild the Ultrafiltration pump
3) Replace brushes in the DC motors

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Day 4

Debug Screens

Each student will have a copy of the description of the debug screens to follow as all *screens* are described, and how they are used for troubleshooting and in the Preventative Maintenance Procedures.

Written Test

A test of 20 questions is given with a time limit of 1 hour. The test is marked and returned for review and a question and answer period.

Preventative Maintenance

The quarterly or 1000 hour and the annual or 4000 hour procedures are shown including the parts used for the procedure.

Certificate of completion

Certificates will be given to all students that pass the class.

Training material handed out in class:

1) 2008K Level I Training Manual, including Calibration procedures and P.M. procedures.
2) Hydraulic flow path diagrams (small and large)
3) Description of self test
4) Description of debug screens
5) NTC resistance chart
6) Service bulletins if applicable
7) Calibration resistors for temp sensor
8) Potentiometer adjusting tool

Students that successfully complete the class should have a thorough understanding of the hydraulic system and be able to troubleshoot minor problems, do all calibrations, and perform the quarterly and annual preventive maintenance procedures.