iQ200 System Maintenance Procedures Technical Procedure 3342
Beckman Coulter, IRIS Diagnostics Division, Arkray Factory Inc., manufacturer

Principle

Intended Use

The iQ®200 Sprint Automated Urinalysis System (iQ System) is an in-vitro diagnostic system. The iQ®200 SPRINT™ system is composed of the automated AUTION MAX™ AX-4280 Urine Chemistry Analyzer and the iQ200™ Automated Urine Microscopy Analyzer, results/analysis processor (PC), computer monitor, mouse and key- board. The iQ200 Sprint System provides a fully integrated, automated or semi-automated chemical and microscopic analysis of urine. Recommended maintenance is performed to assure that the instrument is functioning optimally.

Maintenance Procedures

AX-4280 Daily Maintenance

Clean All Instrument Surfaces

Materials required:
Iris System Cleanser, supplied as Iris System Cleanser Pack P/N: 800-3203
Distilled or deionized water
Gauze or Paper towels

1. Dilute Iris System Cleanser 1:10 with distilled or deionized water.
2. Clean the instrument surfaces using gauze or a paper towel moistened with the diluted Iris System Cleanser.
3. Using another gauze or paper towel, wipe the surfaces with distilled or deionized water.
4. Dry the surfaces with a clean, dry gauze or paper towel.
5. Record that the procedure was completed on the iQ200 system maintenance sheet.

Empty the Liquid Waste Bottle

Note: If the iQ200 System is connected to a drain, the following procedure is not necessary.

1. Make sure both instruments are not processing samples before continuing.
2. Remove the drain bottle cap from the drain bottle.
3. Discard the liquid waste by pouring it down the drain.
4. Clean the bottle by washing it with warm water and a mild detergent. Rinse the bottle with water.
5. Replace the drain bottle cap.
6. Record that the procedure was completed on the iQ200 system maintenance sheet.

Empty the Strip Waste Box

1. Locate the strip waste box on the lower left side of the AX-4280.
2. Pull open the cover and remove the strip waste box.
3. Discard the strips in the waste box, placing them in biohazard trash.
4. If needed, rinse out the strip waste box with warm water and mild soap. The waste box must be completely dried before continuing.
5. Line the bottom of the waste box with clean tissue, paper towel or gauze.
6. Return the strip waste box to its original position and replace the cover.

Record that the procedure was completed on the iQ200 system maintenance sheet.

Check the Wash Solution

Materials required:
AX-4280 Wash Solution Concentrate, P/N: 475-3503
Distilled or deionized water
Note: Perform weekly or after 1000 samples have been run or when bottle is empty or almost empty.

1. Place the instrument in "STANDBY" by pressing the "STOP" button.
2. Remove the bottle cap from the Wash Solution bottle.
3. Discard the remaining Wash Solution by pouring it down the drain.
4. Rinse the bottle and fill with 1800 mL of deionized or distilled water.
5. Add 200 mL AX-4280 Wash Solution Concentrate to the distilled water.
6. Mix the solution and replace the Wash Solution bottle cap.
7. Document lot number of Wash Concentrate on reagent log.
8. Fill out a wash solution preparation label and attach to wash solution bottle.
9. Record that the procedure was completed on the iQ200 system maintenance sheet.

Perform Shift QC

This procedure is to be performed at the beginning of every shift.
Materials Required:
MAS Liquid UA Normal (P/N 024227) and Abnormal (P/N 024225) Controls, 60 mL bottles
Sample Rack
Two 16 X 100 glass specimen tubes

1. MAS UA Controls are stored at 2° – 8°C. Once a bottle is opened, the expiration date changes to 30 days, from the date the bottle was first opened.
2. Before the first use, mark the outside of the box with the open date. Mark the outside of the control bottles that are being opened with the open date and/or expiration date.
3. Pour 2 ml of each well-mixed, room temperature control into a 16 X 100 glass tube properly identified with a QC barcode label.
4. Recap and return control bottles back to the refrigerator as soon as possible.
5. Place the barcoded controls in a sample rack and place the rack on the AX-4280 load station: If the instrument is in "STANDBY", press the "START" button. The instrument will automatically process the rack.

iQ200 Daily Maintenance

Perform the iQ200 System Start Up (Daily QC)

Materials required:
Iris System Cleanser, supplied as Iris System Cleanser Pack P/N: 800-3203
Iris Diluent, supplied as Iris Diluent Pack P/N: 800-3202
iQ Control/Focus Set, P/N: 800-3104
iQ Control Rack, P/N: 700-3007
Six 16 X 100 glass specimen tubes

1. This procedure is to be performed daily on dayshift or as needed.
2. The Iris System Cleanser and Iris Diluent are stored at room temperature and do not require preparation or special handling.

3. The iQ Focus, iQ Positive Control, and iQ Negative Control are packaged as the iQ® Control/Focus Set. These products are stored at 2 - 8° C and expire 30 days after being opened.
4. Before the first use, mark the cap of each bottle to indicate on which bottle it goes. For example, F for Focus, P for Positive and N for Negative. Also mark the date opened and/or expiration date on each bottle.
5. Prepare the iQ200 Control Rack as follows:

Position	Marker Color	Content	Volume	Barcode Label
1	No Color	IRIS System Cleanser	3 mL	No
2	Gray	IRIS Diluent	3 mL	No
3	Gray	IRIS Diluent	3 mL	No
4	No Color	Empty		
5	Dark Blue	iQ Focus	6 mL	Yes
6	Orange	iQ Positive Control (Primary)	3 mL	Yes
7	Light Blue	iQ Negative Control (Primary)	3 mL	Yes
8	Orange	iQ Positive Control (Secondary, optional)	3 mL	Yes
9	Light Blue	iQ Negative Control Secondary, optional)	3 mL	Yes
10	Gray	Empty		

6. The iQ Focus and the iQ Controls each have bar codes that are specific to the product. Place these bar code labels on the appropriate tubes. Use the barcode labels from the current box and be sure to use the correct barcode label for each product
7. Before each use, shake the iQ Focus and iQ Positive Control by holding each bottle upside down. Give each bottle five hard, sharp shakes followed by five gentle inversions. **Do not shake the iQ Negative Control**.

NOTE: It is very important that you follow the mixing instructions exactly. The cells must be resuspended from where they settle on the bottom of the bottle and then the suspension must be mixed to insure uniformity. At the same time, the shaking cannot be too vigorous (as in vortexing or “cocktail” type shaking) because the cells will become disrupted before the end of the valid shelf life.

8. After shaking, let the bottles sit undisturbed until the air bubbles are gone before pouring.
9. Load the rack onto the right side of the iQ Series Sampler.
10. Check to insure that the instrument is on line. Press the start button. The instrument will automatically process the rack.
11. When the instrument is finished processing the rack, review the results in QC Review.

Note: If there is an error in barcode label placement or if an iQ Focus or iQ Control fails, the instrument will post a “failed” message, eject the rack and go off line. The tubes in front of the failed tube may be removed for the repeat, unless the failed tube was the iQ Negative Control. In that case, both the positive and negative controls must be run.

12. If the iQ Focus or iQ Controls are not within acceptable limits, repeat using fresh aliquots.

13. If results are still not within acceptable limits, open fresh bottles.
14. If results are still not within acceptable limits, contact a key operator or Iris Service.
15. Record that the procedure was completed on the iQ200 System maintenance sheet.

Perform a Wash Cycle
Use as necessary

Materials required:
Iris System Cleanser, supplied as Iris System Cleanser Pack P/N: 800-3203
Iris Diluent, supplied as Iris Diluent Pack P/N: 800-3202
Three 16 X 100 glass specimen tubes

Note 1: This procedure is part of the daily System Start Up and will not need to be done separately if the full iQ QC rack is run.

Note 2: If repeated flow errors occur during use, perform a wash cycle as the first line of troubleshooting.

1. Prepare the color coded control rack as follows:

Position	Marker Color	Content	Volume	Barcode Label
1	No Color	IRIS System Cleanser	3 mL	No
2	Gray	IRIS Diluent	3 mL	No
3	Gray	IRIS Diluent	3 mL	No

2. Load the rack onto the right side of the Sampler of the iQ200 module.
3. Press the start button. The instrument will automatically process the rack, clean the lines, clean the flow cell, rinse and prime the system. This is done to prevent accumulation of residue in the fluidic system.

AX-4280 Weekly Maintenance

Clean the Test Strip Feeder and Test Strip Tray
Materials required:
Canned Air or Blower brush (in Accessory Kit)
Gauze, Clean tissues or paper towels

1. Place the instrument in "STANDBY" by pressing the "STOP" button.
2. Open the test strip feeder.
3. Remove the test strips from the feeder and wrap them in tissue paper or place them in an empty test strip vial to prevent contamination. Do not touch the reagent pads on the test strips.
4. Using the blower brush, clean the inside of the test strip feeder thoroughly including the groove.
5. Replace the strips in the test strip feeder or, if performing Calibration Check, leave them out until the calibration steps are completed. Close and lock the feeder.
6. Next, open the maintenance cover. This is located on the front of the AX-4280 just below the strip feeder lock. It opens from the left to the right.
7. Raise the feeder cover. This is located on the top and can only be opened after the maintenance cover is open. Unscrew the two screws, that are exposed when the maintenance cover is open, only enough to be able to lift the front of the cover up.

8. Open the side cover. This is located on the right side and can only be opened after the maintenance cover and feeder cover are opened. In effect you have just opened three sides of a box.
9. Tilt the test strip feeder on its side.
10. Expose the rollers under the hopper by opening the hinged door.
11. Using the blower brush, clean the rollers.
12. Close the hinged door, being certain that it snaps fully closed.
13. Pull out the test strip tray to remove it. Be careful not to pull the wire belt above the test strip tray.
14. Clean the tray with mild detergent and water. Do not use hot water, organic solvents, or ultrasonic cleaners.
15. Rinse with tap water and dry thoroughly.
16. Reinstall the tray. Be certain to push the tray in until it clicks into place. Do not catch the wire belt.
17. Put the test strip feeder back into its original position.
18. Close the side door, the feeder cover, tighten the two screws, and close the maintenance cover.
19. Record that the procedure was completed on the iQ200 system maintenance sheet.

Calibration Verification (AX-4280)

Materials required:
AX-4280 Cal Check Strips (in Accessory Kit or P/N: 800-3511)

Note: The ideal time to perform calibration verification is just after cleaning the test strip feeder, when the strips are already out of the feeder.

1. Place the instrument in "STANDBY" by pressing the "STOP" button.
2. If there are strips in the hopper, open the test strip feeder and remove the test strips. Wrap them in tissue paper or place them in an empty test strip vial to prevent contamination. Do not touch the reagent pads on the test strips.
3. Clean the test strip feeder, test strip tray and waste box following the maintenance procedures as listed above.
4. Line the cleaned waste box with clean paper towels to protect the check strips and return the waste box to the instrument.
5. Remove one white strip from the Check Strip tube. **CAUTION**: Do not touch the surface of the check strip. The check strips are contained in a tube in the accessory case. Two sets of strips are provided.
6. Open the test strip feeder.
7. Press the "CHECK" button on the Operator keypad. The "*SET CHECK STRIPS*" screen is displayed.
8. Place the strip in the provided groove within the test strip feeder. The printed side must be facing down and the black tab must be positioned towards the back of the instrument.
9. Press the "START" button. After the strip is read, the check measurement standby screen is restored and the results will print.
10. Remove one gray strip from the Check Strip tube. **CAUTION**: Do not touch the surface of the Check Strip.
11. Repeat steps 7 through 10 using the gray strip.
12. Record the printed calibration check results on the Weekly AX 9EB Strip Calibration Verification Results log sheet and compare the results with the acceptable ranges on the log sheet.

13. Remove the Check Strips from the waste box, place them in the tube and return the tube to the accessory case.
14. Reload the test strips.
15. Close and lock the test strip feeder.
16. Record that the procedures were completed on the iQ200 system maintenance sheet.
17. Results of the Calibration Verification:

Results	Action
Check measurement results are within range	The analyzer is performing correctly
Check measurement results are out of range	Repeat the calibration check
Check measurement results are still out of range	Repeat the calibration check with the unused set of check strips * If results are in range, the first set of check are defective. Discard them. * If results are still out of range, call Iris Service
Drift is printed	Light fluctuation occurred during testing Repeat the test
Strip Deviate is printed	Test strip was loaded incorrectly Reload and repeat the test

Clean the SG Cell

Materials required:
Iris System Cleanser, supplied as Iris System Cleanser Pack P/N: 800-3203
One 16 X 100 glass specimen tube

1. Place the instrument in "STANDBY" by pressing the "STOP" button.
2. Pour at least 2.0 ml of Iris System Cleanser into a sample tube.
3. Place the tube in the STAT holder.
4. Push the STAT holder forward until it locks. If the STAT holder is not locked in place correctly, an alarm will sound. Re-set the STAT holder.
5. Press the "WASH" button on the Operator keypad. The washing screen is displayed.
6. Press "START". The instrument will aspirate the cleanser.
7. Cleaning takes 5 minutes. The time is counted down on the instrument screen.
8. When the cleaning is completed the standby screen will be displayed.
9. Push the STAT holder forward to unlock and then pull back toward the front of the instrument.
10. Remove the tube and discard any remaining solution.
11. Record that the procedure was completed on the iQ200 System maintenance sheet.

AX-4280 Monthly Maintenance

SG Calibration – Perform after cleaning SG well

Materials required:

SG Low Calibrator – ARKRAY, Inc. recommends using deionized water as the low calibrator solution.

SG High Calibrator P/N: 100672 – No preparation required. Bottles should be stored at 2-8°C. Allow the bottle to adjust to ambient temperature (15-30°C) and invert/mix the bottle at least 10 times before opening. Any product remaining after initial use must be discarded.

Two 16 X 100 glass specimen tubes

1. Place the instrument in "STANDBY" by pressing the "STOP" button.
2. Pour a minimum of 2.0 ml of deionized water into a sample tube.
3. Place the tube in position "1" in a routine patient rack.
4. Transfer the entire solution from the bottle of SG High Calibrator into a sample tube.
5. Place the tube in position "2" in the same rack.
6. Place the rack on the AX-4280.
7. Press the "SG CAL" button on the keypad.
8. Press "ENTER". The low SG value is displayed. This value should be 1.000.
9. If the displayed value is different, enter 1.000.
10. Press "ENTER". The high SG value is displayed.
11. If the value displayed is different from the value stated in the package insert, enter the SG value stated in the package insert.
12. Press "ENTER". The SG cal start screen is displayed.
13. Press "START". The specific gravity calibration will begin.
14. The calibrator values entered are displayed. If the wrong value is entered press the CE key to clear the entry.
15. To cancel the procedure, press the "STOP" button.
16. When the SG calibration is completed, "*SG CAL OK*" is printed and the instrument returns to the standby screen.
17. Record that the procedure was completed on the iQ200 system maintenance sheet and on the AX SG Cal sheet results. Discard any remaining calibrator.

Results	**Action**
SG CAL OK	SG calibration was successfully completed
EO50: SG CAL MISS	SG calibration failed Repeat the procedure - If the same message appears, use fresh calibrators and repeat the procedure If the calibration fails again, call Iris Service

Clean the Drain Filters

Materials required:
Gauze or Paper towels
Tweezers

1. Place the instrument in "STANDBY" by pressing the "STOP" button, then turn off the power by pressing the GREEN standby button located on the bottom right front side of the instrument.
2. Lock the test strip feeder.
3. Open the maintenance cover, the feeder cover, and the side cover.
4. Loosen the thumbscrew holding the filter box. The filter box is a grey box located inside the right side of the instrument towards the bottom. There are two drain filters located in the filter box, which are labeled **L** and **R**.
5. Place paper towels under the filter box. Liquid remaining in the pump may leak after loosening the filter holders.
6. Remove the tubing marked "L" and "R" from the filter box by unscrewing the tube connectors. ONLY REMOVE ONE TUBE AT A TIME TO AVOID SWITCHING THEM WEN RECONNECTING.
7. Using tweezers, remove the drain filters. They are very small, gray plastic filters.
8. Use water to clean the drain filters. If a heavy debris build up is present, replace the filters with new ones. If replacing the filters, also replace the o-ring. Replacement filters and o-rings are in the accessory case.
9. Dry the drain filters and return them to the instrument.
10. Reconnect the tubes marked "L" and "R" matching the marks on the tubes and the filter box.
    Note: To avoid crimping the tubing by twisting it, twist the tubing counterclockwise two turns before beginning to screw the tube connectors into the filter box.
11. Put the filter box back into its position and tighten the thumbscrew.
12. Close the side cover, the feeder cover, and the maintenance cover.
13. Turn on the power.
14. Record that the procedure was completed on the iQ200 System maintenance sheet.

Clean the Washing Bath

Materials required:
Cotton Swabs
Distilled or deionized water

1. Place the instrument in "STANDBY" by pressing the "STOP" button.
2. Press the "MENU" button on the keypad, twice. Menu 2/5 is displayed.
3. Press "2". The sample probe will move back inside the analyzer.
4. Open the sample probe cover located in the front center of the instrument.
5. Using a cotton swab dipped in deionized water, remove any salt deposits from the outer portion of the washing bath and the washing tube. Refer to page 8-15 in the *AX-4280 Operators Manual* for a picture of this area. **DO NOT** insert the swab into the washing tube.
6. Close the sample probe cover.
7. Press "STOP". The sample probe will move towards the front of the instrument and the mechanical functions will initialize. When complete, the menu 2/5 is displayed.
8. Press "ESC" to return to the standby screen.

9. Record that the procedure was completed on the iQ200 system maintenance sheet.

iQ200 Monthly Maintenance

Running Calibration

Materials required:

iQ® Calibrator P/N: 800-3103

iQ® Focus, packaged in set P/N: 800-3104 (iQ® Control/Focus Set)

Fourteen 16 X 100 glass specimen tubes

Run a Focus

1. Place provided barcode label on a sample tube. Fill the tube with 6 mL of iQ Focus material and place in position 5 of the Control rack.
2. Iris Diagnostics recommends to run Iris System Cleanser in position 1, Iris Diluent in position 2 and 3 before running the Focus. (See section under daily – Perform a Wash Cycle.)
3. Load the Control rack onto the right side of the iQ Series sampler.
4. Press "START". The rack will be processed.

Run a Calibration

1. Transfer at least 4 mL iQ Calibrator into each of10 round-bottom 16 x 100 mm glass test tubes.
2. Place **one** provided barcode label on the tube that will be placed in the first position, and then load the rest of the unlabelled tubes into the Calibration rack.
3. Load the Calibration rack onto the right side of the iQ Series sampler.
4. Press Start. The rack will be processed and all calculations performed automatically.
5. When the calibration is successful, the date/time and new REF value will be displayed in the Last Calibration field on the instrument screen.

AX-4280 QUARTERLY MAINTENANCE

Replace the Wash Solution Filter

Materials required:

Tweezers

Filter and O-ring (in Accessory Kit P/N: 615-3500)

1. Place the instrument in "STANDBY" by pressing the "STOP" button, then turn off the power by pressing the **GREEN** button located on the right front side of the chemistry module.
2. On the wash bottle, unscrew the grey filter holder connected to the clear tubing.
3. Use tweezers to remove the wash solution filter.
4. Install a new filter and o-ring. Handle the filter carefully because it is delicate.
5. Reassemble the filter holder.
6. Turn on the power. Look for fluid leaking from the filter holder. If a leak is seen, tighten the filter holder.
7. Record that the procedure was completed on the iQ200 system maintenance sheet.

AX-4280 As Needed Maintenance

Clean the Trap Bottle

1. Place the instrument in "STANDBY" by pressing the "STOP" button.
2. Remove the trap bottle from the bottle stand. The trap bottle and stand are located on the right at the rear of the instrument.
3. Unscrew the cap and discard any fluid. Do not disconnect the attached tubing.
4. Clean the trap bottle with mild detergent and water.
5. Rinse with tap water.
6. Replace the cap tightly and put the trap bottle on the stand.
7. Record that the procedure was completed on the iQ200 system maintenance sheet.

iQ200 As Needed Maintenance

Clean the Rinse/Waste Bath

Materials required:
Cotton swabs
Distilled or deionized water
Iris Diluent, supplied as Iris Diluent Pack P/N: 800-3202

1. Make sure the instrument is turned off before performing this procedure.
2. Open the front cover of the iQ Series to access the Rinse/Waste bath.
3. Using a cotton swab dipped in distilled or deionized water, remove any salt deposits from the outer portion of the washing bath and the washing tube. Refer to page 8-10 in the iQ200 System *Operators Manual* for a pic- ture of this area. **DO NOT** insert the swab into the washing tube.
4. Using a cotton swab moistened with Iris Diluent clean the inside walls of the plastic overflow square enclosing the Rinse/Waste bath.
5. Close the front door.
6. Turn the power to the analysis processor back on. Once the instrument screen is displayed, turn on the power to the microscopy module.
7. Record that the procedure was completed on the iQ200 system maintenance sheet.

Replace iQ® Lamina Supply

Materials required:
iQ® Lamina™ P/N: 475-0047, supplied as iQ Lamina Case P/N: 800-3102
When changing filter:
Filter from case
Fresh gloves

Note: iQ Lamina can be changed at any time. Wait until the "***iQ Lamina Low***" message appears to change the bottle. Changing the bottle does not require that the instrument be stopped nor does it require any special priming steps.

When the iQ Lamina Low message appears:

1. Remove the caps from the old and new containers.
2. There is a filter in each case of Lamina. Replace the Lamina filter when loading the first bottle from a new case.
   a. The green Lamina filter is located at the end of the tubing in the container.
   b. Wear fresh gloves to prevent the introduction of excessive particles and/or bacteria.
   c. Remove the old filter by holding the tube and pulling the old filter straight off.
   d. Insert the new filter by pushing straight onto the tube. The filter only fits one way, with the smaller end inside the tube.
3. Place tube and filter into the new lamina container and tighten the cap.
4. Dispose of the old container. **Do not mix Lamina from different bottles**.
5. Record that the procedure was completed and the filter changed, on the iQ200 system maintenance sheet and document lot number on iQ200 system reagent log.

Clean the Barcode Reader Window

Materials required:
Cotton Swabs
Distilled or deionized water

NOTE: Only perform cleaning if the barcode reader is missing reads. Contact IRIS Service before cleaning the window.

1. Make sure power to the instrument is off before performing this procedure.
2. Open the front cover of the iQ Series to access the barcode reader.
3. Moisten a cotton swab with distilled or deionized water and gently wipe the barcode reader window.
4. Dry using a clean tissue.
5. Close the front door.
6. Record that the procedure was completed on the iQ200 system maintenance sheet.

Clean the Sample Tube Detector

Materials required:
Cotton swabs
Distilled or deionized water

NOTE: Only perform cleaning if the tube detector is missing tubes.

1. Make sure the instrument is in the standby mode before performing this procedure.
2. Use a cotton swab moistened with distilled or deionized water. Snap the swab off to about 1 ½" and use to clean the sample tube detector window.
3. Dry using a clean cotton swab. Refer to page 8-9 of the iQ200 System *Operators Manual* for illustrations.
4. Record that the procedure was completed on the iQ200 system maintenance sheet.

Clean the Optical Sensors on the Sampler:

Materials required:
Iris Diluent, supplied as Iris Diluent Pack P/N: 800-3202
Cotton swabs

1. Make sure the instrument is in standby mode before performing this procedure.
2. Using a cotton swab moistened with Iris Diluent, wipe the optical sensors located on the front right and back left corners of the sampler. Refer to page 8-11 of the iQ200 System *Operators Manual* for illustrations.
3. Dry the sensors with a clean dry cotton swab.
4. Record that the procedure was completed on the iQ200 system maintenance sheet.

Other Maintenance

Refer to the AX-4280 *Operators Manual* and the iQ200 System *Operators Manual* - Chapter 8 in both manuals.

Additional Information

For more detailed information on the AX-4280 Urine Analyzer and the iQ200 System, refer to the AUTION MAX AX-4280 Urine Analyzer *Operators Manual* and the iQ200 System *Operators Manual*.

References

1. IRIS iQ Series Automated Urinalysis System Maintenance – v5. Compiled by Iris Diagnostics, Chatsworth, CA 91311 USA. 300-9360 Rev. A. Aug. 2006.

2. IRIS AX-4280 Operators Manual, Rev D 7/2003, Iris Diagnostics, Chatsworth, CA 91311 USA.

3. Iris iQ200 Operators Manual, Rev B 11/2003, Iris Diagnostics, Chatsworth, CA 91311 USA

Prepared By	Date Adopted	Supersedes Procedure #
Michael Inn	07/09/2008	New

Revision Date	Type of Revision	Revised by	Review/Annual Review Date	Reviewed By
			07/09/2008	G. Kost
			09/15/2009	G. Kost
			10/12/2010	G. Kost
			11/16/2011	G. Kost
			11/20/2013	G. Kost
03/21/2015	Change to MAS UA Control	kdagang	04/15/2015	J. Gregg