Rich Air Cooling Panel Flow Balancing and Adjustment

Abstract

The RICH air cooling valve panel is designed to supply two RICH detectors. Currently, the panel only supplies one RICH using both air panel supplies. This setup must change in order to supply two RICH detectors from the panel.

The RICH air cooling valve panel is also designed to supply sufficient air flow to remove the latent heat from the e-panel in the case of a compressor or power outage. The goal is to find the lowest pressure regulator setting in which proper cooling flow is obtained. This will maximize the cooling gas supply in the case of a compressor outage. This requires proper setup of the pressure regulators and flow rotameters. This procedure allows for these proper adjustments.

Air Flow Adjustment and Balancing Procedure

1) Turn on the air compressor and wait for the tank pressure to increase to normal and the compressor to cycle off

2) Rotate the pressure regulator handle on AC-PRESS1 counter clockwise to set the regulator pressure to zero

3) Close the rotameter valve on AC-RICH1

4) Open the isolation valve for RICH1, AC-OUT1

5) Adjust the pressure regulator, AC-PRESS1, to 25 psi

6) Slowly open the rotameter valve on AC-RICH1 and monitor the flow on both the rotameter, AC-RICH1, and the mass flow meter, AC-MFM1. Stop opening the valve at the point where the flow no longer increases. Note the flow rate achieved.

7) If the flow rate in step 6 is > 900 slm, go to step 7A. If the flow rate in step 6 is <900 slm, go to step 7B

7A) Decrease the flow to 900 slm by turning the flow rotameter valve clockwise. The adjustment is complete, go to step 13.

7B) Slowly increase the pressure regulator output to 30 psi and increase flow by slowly opening the rotameter valve on AC-RICH1 and monitor the flow on both

the rotameter, AC-RICH1, and the mass flow meter, AC-MFM1. Stop opening the valve at the point where the flow no longer increases. Note the flow rate achieved.

8) If the flow rate in step 7B is > 900 slm, go to step 7A. If the flow rate in step 7B is <900 slm, go to step 8A.

8A) Slowly increase the pressure regulator output to 35 psi and increase flow by slowly open the rotameter valve on AC-RICH1 and monitor the flow on both the rotameter, AC-RICH1, and the mass flow meter, AC-MFM1. Stop opening the valve at the point where the flow no longer increases. Note the flow rate achieved.

9) If the flow rate in step 8A is > 900 slm, go to step 7A. If the flow rate in step 8A is <900 slm, go to step 9A

9A) Slowly increase the pressure regulator output to 40 psi and increase flow by slowly open the rotameter valve on AC-RICH1 and monitor the flow on both the rotameter, AC-RICH1, and the mass flow meter, AC-MFM1. Stop opening the valve at the point where the flow no longer increases. Note the flow rate achieved.

10) If the flow rate in step 9A is > 900 slm, go to step 7A. If the flow rate in step 9A is <900 slm, go to step 10A

10A) Slowly increase the pressure regulator output to 45 psi and increase flow by slowly open the rotameter valve on AC-RICH1 and monitor the flow on both the rotameter, AC-RICH1, and the mass flow meter, AC-MFM1. Stop opening the valve at the point where the flow no longer increases. Note the flow rate achieved.

11) If the flow rate in step 10A is > 900 slm, go to step 7A. If the flow rate in step 10A is <900 slm, go to step 11A

11A) Slowly increase the pressure regulator output to 50 psi and increase flow by slowly open the rotameter valve on AC-RICH1 and monitor the flow on both the rotameter, AC-RICH1, and the mass flow meter, AC-MFM1. Stop opening the valve at the point where the flow no longer increases. Note the flow rate achieved.

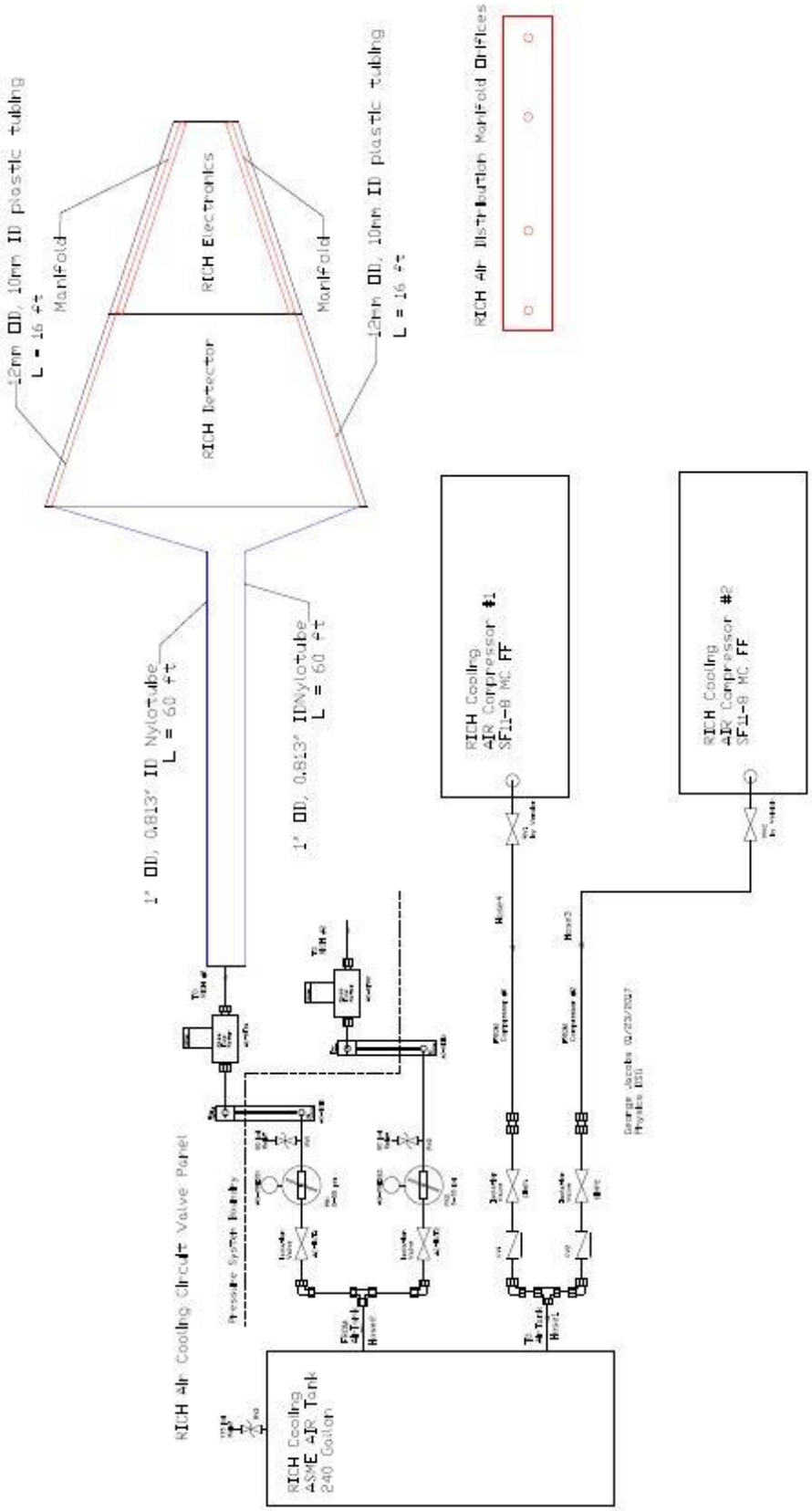
12) If the flow rate in step 11A is > 900 slm, go to step 7A. If the flow rate in step 11A is <900 slm, go to step 12A

12A) Slowly increase the pressure regulator output to 55 psi and increase flow by slowly open the rotameter valve on AC-RICH1 and monitor the flow on both the rotameter, AC-RICH1, and the mass flow meter, AC-MFM1. Stop opening the valve at the point where the flow no longer increases. Note the flow rate achieved.

12) If the flow rate in step 12A is > 900 slm, go to step 7A. If the flow rate in step 12A is <900 slm, notify the SME of the results

13) Repeat the above procedure for RICH air panel channel 2

14) Make a logbook entry describing the results of the above tests.


12mm OD, 10mm ID plastic tubing
L = 16 ft
Manifold
RICH Electronics
RICH Detector
Manifold
12mm OD, 10mm ID plastic tubing
L = 16 ft
RICH Air Distribution Manifold Orifices
1" OD, 0.813" ID Nylatube
L = 60 ft
1" OD, 0.813" IDNylatube
L = 60 ft
RICH Cooling
4IR Compressor #1
SF11-8 MC FF
RICH Cooling
4IR Compressor #2
SF11-8 MC FF
RICH Air Cooling Circuit Valve Panel
RICH Cooling
ASME 4IR Tank
240 Gallon