INSTRUMENT AIR K2A/K2B AND SERVICE AIR K3A/K3B COMPRESSOR RUN-IN OPERATING INSTRUCTIONS

RECORD

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BY: _____ DATE: _____

1.0 PURPOSE

The purpose of this instruction is to:

1.1 Provide guidance for compressor run-in following ring replacement.

1.2 Provide a means for obtaining after run-in data to be placed in machinery history.

1.3 The procedure for K2A and K2B (Section 5.0) is derived from Joy technical manual, TFI 5.11.2, Control No. 01193, Section 4, Page 6.

1.4 The procedure for K3A (Section 7.0) is derived from Joy technical manual, TFI 5.11.1, Control No. 000388, Section 4, Page 7.

1.5 The procedure for K3B (Section 7.0) is derived from Joy technical manual, TFI 5.11.1, Control No. 000406, Section 4, Page 7.

2.0 REFERENCES

IR 96-006, NRC Inspection Report, NRC Commitment for Operations procedures PMT/QC reviews.

3.0 PRECAUTIONS AND LIMITATIONS

3.1 While running in a compressor, pressure is adjusted by throttling the 1½" aftercooler air side vent.

3.2 Manual operation of the Total Closure valves and installed jumpers that provide manual load and unload control defeat the agastat for compressor loading delay. Ensure the compressor is started unloaded and remains unloaded for the first seven seconds to allow speed and oil pressure to build.

3.3 It is good practice to secure a compressor when it is unloaded because of the reduced load on breaker contacts.

3.4 When shifting a compressor's mode of operation, pause approximately five seconds prior to selecting the alternate mode. This allows the compressor Total Closure Butterfly valves and/or unloader valves time to reposition, interstage pressure and the motor EMF to decay prior to restart of the motor.

3.5 If at any time there is evidence of ring seizure, the compressor should be run at a lower pressure and consequently a lower temperature level until free. Then proceed to a higher pressure level.

3.6 The only overpressure protection available for the compressor during operation with the compressor discharge valve shut is the compressor relief valve.

4.0 INITIAL CONDITIONS FOR INSTRUMENT AIR COMPRESSOR RUN-IN

One instrument air compressor in operation supplying instrument air loads with the other compressor isolated following maintenance and requiring a run-in.

5.0 PROCEDURE FOR K2A AND K2B

5.1 Check for proper oil level.

5.2 Check shut the discharge valve for the compressor to be run in (IA-1 for K2A or IA-2 for K2B).

5.3 Open the 1½" aftercooler air side vent (IA-228 for K2A or IA-231 for K2B).

NOTE: ***The air receiver pressure indicator on the compressor gauge board will be isolated when the total closure valve operating air supply isolation valve is shut.***

5.4 Shut the total closure valve operating air supply isolation valve for the compressor to be run-in (IA-206 for K2A or IA-215 for K2B). Uncap and open the total closure valve operating air supply line vents (IA-218 and IA-219 for K2A or IA-220 and IA-221 for K2B).

NOTE: ***The total closure valve may now be manually operated via wrench flats machined on the actuator shaft extension protruding from the side of the actuator.***

NOTE: ***Normal oil pressure is 30-40 psig.***

5.5 Unload the compressor by manually fully closing total closure valve. Start the compressor and run unloaded for a minimum of 30 minutes.

5.6 With the aftercooler air side vent valve full open, load the compressor by manually fully opening the total closure valve. Adjust the aftercooler air side vent valve for a compressor discharge pressure of 30 psig. Run for one hour.

5.7 Adjust the aftercooler air side vent valve for a compressor discharge pressure of 50 psig. Run for one hour.

NOTE: ***Ring seizure tendency will be checked by noting abnormal coastdown behavior such as abnormal knocking noise, vibration, or rate of speed decrease. Normal coastdown time is about 5 to 6 seconds. Ring seizure may be noted by operation temperatures in excess of normal values.***

5.8 Unload the compressor by manually fully shutting the total closure valve. Shut down the compressor by placing its control switch to off and check for signs of ring seizure tendency (see Precautions and Limitations 3.5).

5.9 If the pistons are free, restart the compressor. After the compressor is up to speed, load the compressor by manually fully opening the total closure valve.

5.10 Compressor run-in should continue according to the following substeps. Run-in should be done at discharge pressure plateaus of 70 psig, 80 psig, 90 psig and 100 psig.

5.10.1 Adjust the aftercooler air side vent valve for the desired discharge pressure plateau and run the compressor for one hour.

5.10.2 Unload the compressor by manually fully shutting the total closure valve. Immediately shut down the compressor and check for signs of ring seizure tendency during coastdown (see Precautions and Limitations 3.5).

5.10.3 If the pistons are free, restart the compressor. After the compressor is up to speed, load the compressor by manually fully opening the total closure valve. Repeat Steps 5.10.1, 5.10.2 and 5.10.3 for each of the pressure plateaus in Step 5.10.

5.11 Upon completion of the one hour run at 100 psig, unload the compressor by manually fully shutting the total closure valve. Immediately shut down the compressor and check for signs of ring seizure tendency during coastdown (see Precautions and Limitations 3.5).

5.12 If the pistons are free, restart the compressor. After the compressor is up to speed, load the compressor by fully opening the total closure valve. Run the compressor for an additional 3 to 4 hours at a discharge pressure of 100 psig. Ensure compressor operating conditions normal:

5.12.1 Oil pressure 30-40 psig.

5.12.2 Inter cooler pressure (loaded) 20-26 psig.

5.12.3 Inter cooler pressure (unloaded) 23-27 "HG Vac"

5.12.4 Discharge air temperature <325°F

5.12.5 After cooler air outlet temperature <90°F

5.12.6 Compressor SW return temperature 95-105°F

5.13 Unload the compressor by manually fully shutting the total closure valve. Immediately shut down the compressor and check for signs of ring seizure tendency during coastdown (see Precautions and Limitations 3.5).

5.14 If pistons are free, compressor run-in is complete. Shut and cap the total closure valve operating air supply line vents (IA-218 and IA-219 for K2A or IA-220 and IA-221 for K2B). Open the total closure valve operating air supply isolation valve (IA-206 for K2A or IA-215 for K2B) and verify that air receiver pressure indicated on the compressor gauge board is normal.

5.15 Shut the 1½" aftercooler air side vent valve.

NOTE: ***Make a copy of the attached instrument air compressor data sheet prior to recording data.***

5.16 With the discharge valve still shut on the newly run-in compressor, record data for the on-line compressor on the instrument air compressor data sheet.

5.17 Open the discharge valve for the newly run-in compressor and record data for the on-line compressor to estimate any back leakage through the newly run-in compressor. Load times should not differ by more than 25% between the newly run-in compressor and the on-line compressor.

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5.18 Start the newly run-in compressor in constant and observe the compressor for proper operation.

5.19 If compressor performance is satisfactory as determined by freedom of piston movement during run-in and normal operating conditions as noted in Step 5.12, then secure the previously running compressor by placing it's control switch to off and shutting it's discharge valve.

5.20 Record data for newly run-in compressor.

5.21 Open the compressor discharge valve on the stopped compressor. Record data for newly run-in compressor to determine amount of back leakage through the off line compressor.

5.22 Align compressors as follows to provide for more even run time or as directed by the DSS.

ODD MONTH	EVEN MONTH
K2A CONSTANT	K2A AUTO
K2B AUTO	K2B CONSTANT

5.23 Attach completed instrument air compressor data sheet to Maintenance work control document.

6.0 INITIAL CONDITIONS FOR SERVICE AIR COMPRESSOR RUN-IN

One service air compressor in operation supplying service air loads with the other compressor isolated following maintenance and requiring a run-in.

7.0 PROCEDURE FOR K3A AND K3B

7.1 Check for proper oil level.

7.2 Check shut the discharge valve for the compressor to be run-in, (SA-2 for K3A or SA-3 for K3B).

7.3 Open the 1½" aftercooler air side vent. (SA-33 for K3A; SA-57 for K3B.)

7.4 Shut the unloader outlet isolation valve (SA-23 for K3A, SA-24 for K3B). Remove the Swagelok cap at the outlet of SA-23 or SA-24 and install P-tubing jumper between this sensing line and IA-39 at PI-3005 on the instrument air compressor gaugeboard (refer to Figure 1).

NOTE: Normal oil press is 30-40 psig.

7.5 Unload the compressor by closing vent valve IA-40 and opening IA-39 (see Precaution 3.2). Start the compressor and run unloaded for a minimum of 30 minutes.

7.6 With the aftercooler air side vent valve full open, load the compressor by shutting IA-39 and opening vent valve IA-40. Adjust the aftercooler air side vent valve for a compressor discharge pressure of 30 psig. Run for one hour.

7.7 Adjust the aftercooler air side vent valve for a compressor discharge pressure of 50 psig and run for one hour.

*NOTE: **Ring seizure tendency will be checked by noting abnormal coastdown behavior such as abnormal knocking noise, vibration, or rate of speed decrease. Normal coastdown time:***

For K3A = 17 to 21 sec

For K3B = 7 to 11 sec

Ring seizure may be noted by operating temperature in excess of normal value.

7.8 Unload the compressor by shutting vent valve IA-40 and opening IA-39. Immediately shut down the compressor. Check for ring seizure tendency during coastdown (See Precautions and Limitations 3.5).

7.9 If the piston is free, restart the compressor. After the compressor is up to speed, load the compressor by shutting IA-39 and opening vent valve IA-40.

7.10 Compressor run-in should continue according to the following steps. It should be done at discharge pressure plateaus of 70 psig, 80 psig, 90 psig and 100 psig.

7.10.1 Adjust the aftercooler air side vent valve for the desired discharge pressure plateau and run the compressor for ONE hour.

7.10.2 Unload the compressor by shutting vent valve IA-40 and opening IA-39. Immediately shut down the compressor. Check for ring seizure tendency during coastdown (See Precautions and Limitations 3.5).

7.10.3 If the piston is free, restart the compressor. After the compressor is up to speed, load the compressor by shutting IA-39 and opening vent valve IA-40. Repeat Steps 7.10.1, 7.10.2 and 7.10.3 for each of the pressure plateaus in Step 7.10.

7.11 Upon completion of the one hour run at 100 psig, unload the compressor by shutting vent valve IA-40 and opening IA-39. Immediately shut down the compressor. Check for ring seizure tendency during coastdown (See Precautions and Limitations 3.5).

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7.12 If the piston is free, restart the compressor. After the compressor is up to speed, load the compressor by shutting IA-39 and opening vent valve IA-40. Run the compressor for an additional 3 to 4 hours at a discharge pressure of 100 psig. Ensure compressor operating conditions normal:

7.12.1 Oil pressure 30-40 psig.

7.12.2 Inter cooler pressure (loaded) 20-26 psig

7.12.3 Compressor SW return temperature <105°F

7.13 Unload the compressor by shutting vent valve IA-40 and opening IA-39. Immediately shut down the compressor. Check for ring seizure tendency during coastdown (See Precautions and Limitations 3.5).

7.14 If compressor performance is satisfactory as determined by freedom of piston movement during run-in and normal conditions per Step 7.12, shut IA-39 and open IA-40. Remove the P-tubing jumper and install Swagelok caps at the compressor and IA-39. Shut IA-40. Open the unloader outlet isolation valve SA-23 for K3A or SA-24 for K3B. Shut the aftercooler air side vent valve.

*NOTE: **Attempt to perform the following steps during a period of low S.A. air usage.***

*NOTE: **Make a copy of the service air compressor data sheet prior to recording data.***

7.15 Establish a S. A. header bleed in the air compressor room at the N. E. Hose Station SA-98 (1 turn open).

7.16 With the discharge valve still shut on the newly run-in compressor record data for the on-line compressor on the service air compressor data sheet.

7.17 Open the discharge valve for the newly run-in compressor and record data for the online compressor to estimate any back leakage through the newly run-in compressor.

7.18 Start the newly run-in compressor.

7.19 Secure the previously running compressor by placing its control switch to off and shutting its discharge valve.

7.20 Record data for newly run-in compressor.

7.21 Open the compressor discharge valve on the stopped compressor and record data for the newly run-in compressor to estimate any back leakage through the stopped compressor.

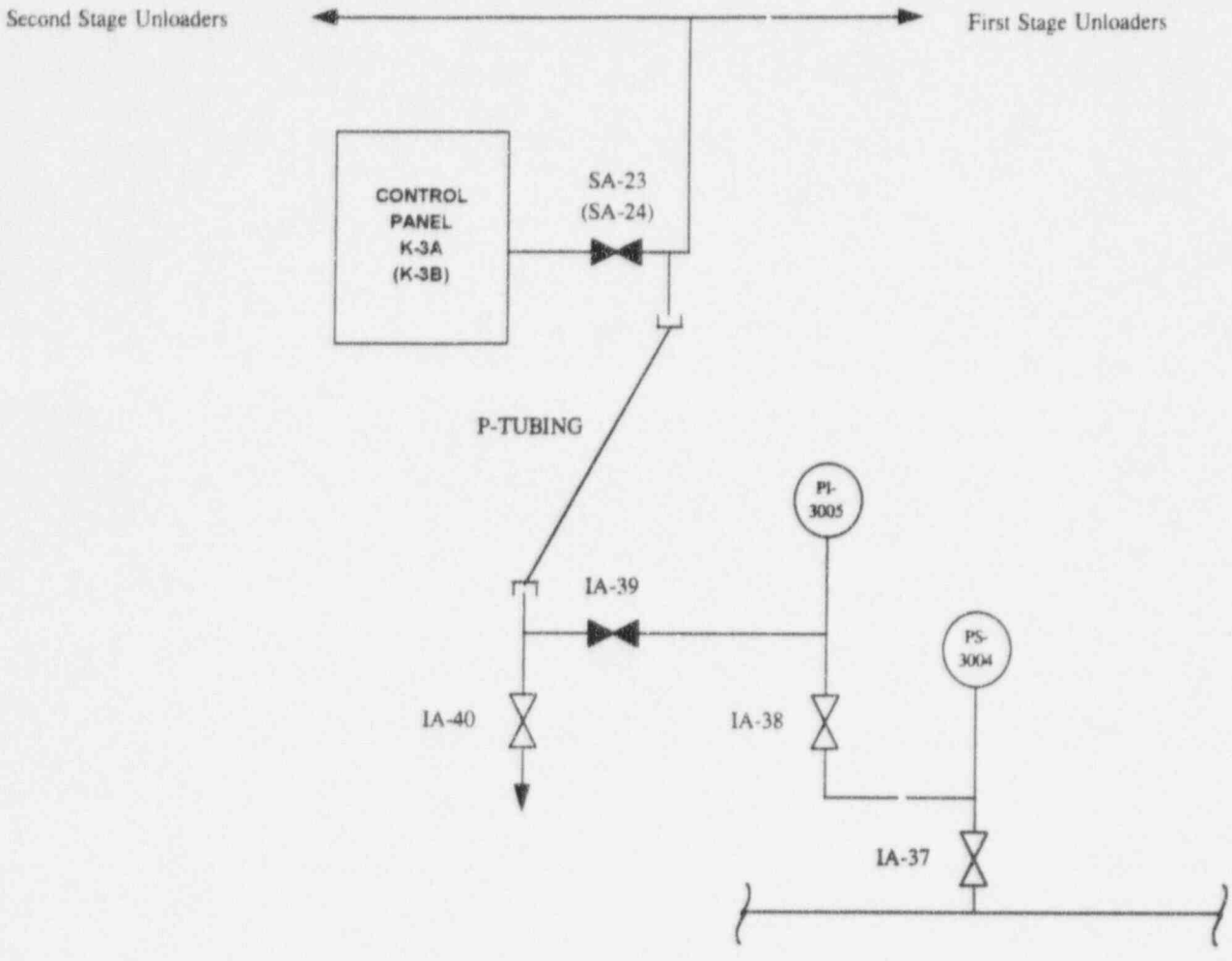
7.22 Secure service air header bleed by shutting SA-98.

7.23 Align compressors as follows to provide for more even run time or as directed by the DSS.

ODD MONTH	EVEN MONTH
K3A CONSTANT	K3A AUTO
K3B AUTO	K3B CONSTANT

7.24 Attach completed service air compressor data sheet to Maintenance work control document.

FIGURE 1


Second Stage Unloaders
First Stage Unloaders
CONTROL PANEL K-3A (K-3B)
SA-23 (SA-24)
P-TUBING
PI-3005
IA-39
PS-3004
IA-40
IA-38
IA-37

INSTRUMENT AIR COMPRESSOR MAINTENANCE HISTORY DATA SHEET FOR BOTH INSTRUMENT AIR COMPRESSORS FOLLOWING OVERHAUL AND BREAK-IN OF EITHER AIR COMPRESSOR

Step-5.16

Running Compressor	K2	_____
Time Loaded		_____ Min _____ Sec
Time Unloaded		_____ Min _____ Sec
Header Air Flow (FI-3081) @ 105 psig on PI-3005		_____ scfm
Header Air Flow (FI-3082) @ 105 psig on PI-6320		_____ scfm

Step-5.17

Running Compressor	K2	_____
Time Loaded		_____ Min _____ Sec
Time Unloaded		_____ Min _____ Sec
Header Air Flow (FI-3081) @ 105 psig on PI-3005		_____ scfm
Header Air Flow (FI-3082) @ 105 psig on PI-6320		_____ scfm

Step-5.20

Running Compressor	K2	_____
Time Loaded		_____ Min _____ Sec
Time Unloaded		_____ Min _____ Sec
Header Air Flow (FI-3081) @ 105 psig on PI-3005		_____ scfm
Header Air Flow (FI-3082) @ 105 psig on PI-6320		_____ scfm

Step-5.21

Running Compressor	K2	_____
Time Loaded		_____ Min _____ Sec
Time Unloaded		_____ Min _____ Sec
Header Air Flow (FI-3081) @ 105 psig on PI-3005		_____ scfm
Header Air Flow (FI-3082) @ 105 psig on PI-6320		_____ scfm

Initials _____

Date _____

Time _____

Work Control Document No. _____

Maintenance Review By _____

Disposition: Work Control Document

SERVICE AIR COMPRESSOR MAINTENANCE HISTORY DATA SHEET FOR BOTH SERVICE INSTRUMENT AIR COMPRESSORS FOLLOWING OVERHAUL AND BREAK-IN OF EITHER AIR COMPRESSOR

Step-7.16

Running Compressor	K3	_____
Time Loaded		_____ Min _____ Sec
Time Unloaded		_____ Min _____ Sec

Step-7.17

Running Compressor	K3	_____
Time Loaded		_____ Min _____ Sec
Time Unloaded		_____ Min _____ Sec

Step-7.20

Running Compressor	K3	_____
Time Loaded		_____ Min _____ Sec
Time Unloaded		_____ Min _____ Sec

Step-7.21

Running Compressor	K3	_____
Time Loaded		_____ Min _____ Sec
Time Unloaded		_____ Min _____ Sec

Initials _____

Date _____

Time _____

Work Control Document No. _____

Maintenance Review By _____

Disposition: Work Control Document