NCAR Airborne Oxygen Instrument (AO2) Checklist

Flight Date (YYMMDD) 09/10/20 Flight (e.g. RF01) TF01

I. Preflight

A. Day(s) before flight

1) Prepare trap with clean glass beads filled to 1 inch from bottom
2) Install trap in dewar
3) Record cylinder pressures (or copy from prev. postflight)
   LS 18.10  HS 18.90
   LT 185.0  WT 217.0
4) Turn on instrument, record pressures (or copy from prev. postflight)
   PaWT ___  PaSP ___  PLi840 ___
   UTC = ___ : ___

B. 2-hours before take-off

0) Rack power switch on
1) O2 box Power breaker on
2) Laptop power on
3) Load dry-ice in dewar to within 0.5 inches of lid
4) Record hi-side cylinder pressures for overnight leak check (P / Δ)
   LS 18.10 / 12.4  HS 18.90 / 12.4
   LT 280 / 14.2  WT 290 / 9.3
5) Open green knobs four ¼ turns and re-record pressures and any changes
   LS 18.10 / 12.4  HS 18.90 / 12.4
   LT 280 / 14.2  WT 293 / 9.3
6) Close cylinder box lid
7) Open terminal on laptop and vnc ("vncviewer ao2-daq") into AO2
8) Start AO2 program by clicking play in higold.vdp
9) Ensure that no USB errors are present in boxes at bottom of screen
10) Check that NTP time sync is working
11) AO2 PC Time 6:25:45, Rack laptop time 6:30:45
12) Log each hi-side cylinder pressure in software
13) Cylinder box Power breaker on
14) Record instrument pressures for overnight leak checks (P / Δ)
   PaWT ___ / ___  PaSP ___ / ___  PLi840 ___ / ___
15) Pump box Pump 2 breaker on
16) Manual VAC valve open
17) Check that PaCO2 = 330 torr (± 5) and PaO2 = 90 torr (± 1). If not, adjust.
   PaCO2 ___  PaO2 ___
18) Click Initialize Cal Flow button
19) Ensure that WT flow starts through both lines (110 ± 10)
   FIWT ___  FISP ___
20) If necessary, adjust HA-3 to match bypass and cell flow on WT ±2 scem
21) Check / adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr
22) Return to WT selected when done checking regulators
23) Check that PdWT (±0.1), PdSP (±0.1), and PdO2 (±0.01) are controlling
24) Light lamp and ensure that it comes on
25) ≥ 10 min. after lamp on, record values in first row of table below
26) Once outside and fueling finished, click Initialize Sample Flow button
27) Pump box Pump 1 breaker on
28) Ensure that Fridge P stabilizes near 805 (±10) torr after 2 min.
   Fridge P     SA Purge Flow
   ~ UTC = 18:54
29) Snoop trap fittings
30) Enable change-over valve
31) ≥ 10 min. after change-over enable, record values in table below

<table>
<thead>
<tr>
<th>UTC</th>
<th>Gas</th>
<th>O2d</th>
<th>CO2n</th>
<th>O2n</th>
<th>SPm</th>
<th>WTm</th>
<th>Totm</th>
<th>mA</th>
<th>PdO2n</th>
<th>PdSPn</th>
<th>PdWTn</th>
</tr>
</thead>
<tbody>
<tr>
<td>18:52:40</td>
<td>WT</td>
<td>0.5</td>
<td></td>
<td></td>
<td></td>
<td>NA</td>
<td>NA</td>
<td></td>
<td>2.3</td>
<td>6.0</td>
<td>5.2</td>
</tr>
<tr>
<td>19:00:00</td>
<td>WT</td>
<td>4.6</td>
<td>0.5</td>
<td>8.2</td>
<td>12.4</td>
<td>12</td>
<td>11</td>
<td>2.2</td>
<td>5.6</td>
<td>4.6</td>
<td></td>
</tr>
<tr>
<td>19:31:54</td>
<td></td>
<td>5.9</td>
<td>9.0</td>
<td>7.5</td>
<td>1.5</td>
<td>16</td>
<td>1.4</td>
<td>4.2</td>
<td>4.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19:33:38</td>
<td></td>
<td>10.0</td>
<td>7.1</td>
<td>7.1</td>
<td>1.3</td>
<td>2.8</td>
<td>5.4</td>
<td>3.7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C. 20-min before take-off
1) Adjust / record program parameters (nominally set to a, 40, 2.7, 3, 4)
   Flag 30 Cal Interval 30 Cal Period 3:0 LTF 2 WtF 3
2) Click Start button on main screen
3) Click Proceed button on control screen
4) Minimize “Verify Run Plan” window
5) Note time of wheels up

UTC = 19:39:08

II. During Flight

Keep VNC off as much as possible, only connecting when necessary to adjust cals.
Record flight notes in text file YYMDD_RF##_Notes.txt

III. Postflight

1) Note time of wheels down
2) Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)
3) Click Stop button
4) Turn off lamp
5) Close SA, WT, SP, and O2 248 valves in software
6) Select None in cylinder box control section and uncheck any purges
7) Close manual VAC valve
8) Pump box Pump 1 breaker off
9) Note cryo temperature
10) Cylinder box Power breaker off
11) Pump box Pump 2 breaker off
12) Pump box Power breaker off

UTC = 22:50:10

Cryo = -70.6

A01 CO2  A02 CO2  A03 CO2  A04 CO2
297  136  695  639
297  198  643  700
13) Record pressures for a leak check
   PaWT 83.4 PaSP 80.1 PLi840 12.7
   UTC = 27:55

14) Open cylinder box lid and **close green valves**

15) Record cylinder pressures for a leak check
   LS 72/3.4 HS 93/3.5
   LT 410/4.4 WT 710/3.9
   UTC = 27:59

16) Close cylinder box lid

17) Log each hi-side cylinder pressure in software

18) Close program and Visual Basic

19) Send data to laptop and copy to pen drive - rt click, send to ao2, *mr, *hr, *txt

20) Shut down AO2 PC

21) Shut down laptop

22) After green “SP to Cell” light has gone out, O2 box Power breaker off

23) Rack power switch off

24) Pull trap and replace with stopper. Open trap and remove glass beads
NCAR Airborne Oxygen Instrument (AO2) Checklist

Flight Date (YYMMDD) **091022** Flight (e.g. RF01) **TF02**

I. Preflight

A. Day(s) before flight

1) Prepare trap with clean glass beads filled to 1 inch from bottom
2) Install trap in dewar
3) Record cylinder pressures (or copy from prev. postflight)
   - LS **880/3.3** HS **1700/3.7**
   - LT **40/3.9** WT **1800/3.9**
4) Turn on instrument, record pressures (or copy from prev. postflight)
   - PaWT **840** PaSP **858** PLi840 **14.8**

B. 2-hours before take-off

0) Rack power switch on
1) O2 box Power breaker on
2) Laptop power on
3) Load dry-ice in dewar to within 0.5 inches of lid
4) Record hi-side cylinder pressures for overnight leak check (P / Δ)
   - LS **880/3.3** HS **1700/3.7**
   - LT **240/3.9** WT **1800/3.9**
5) Open green knobs four ¼ turns and re-record pressures and any changes
   - LS **1280/3.9** HS **1912/3.7**
   - LT **240/3.9** WT **1900/9.4**
6) Close cylinder box lid
7) Open terminal on laptop and vnc (“vncviewer ao2-daq”) into AO2
8) Start AO2 program by clicking play in higold.vdp
9) Ensure that no USB errors are present in boxes at bottom of screen
10) Check that NTP time sync is working
   - AO2 PC Time 4:03:50, Rack laptop time 4:02:50
11) Log each hi-side cylinder pressure in software
12) Pump box Power breaker on
13) Cylinder box Power breaker on
14) Record instrument pressures for overnight leak checks (P / Δ)
   - PaWT **840** PaSP **766** PLi840 **12.85**
15) Pump box Pump 2 breaker on
16) Manual VAC valve open
17) Check that PaCO2 = 330 torr (± 5) and PaO2 = 90 torr (± 1). If not, adjust.
18) Click Initialize Cal Flow button
19) Ensure that WT flow starts through both lines (110 ± 10)
   - FIWT **112** FISP **112**
20) If necessary, adjust HA-3 to match bypass and cell flow on WT ±2 seem
21) Check / adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr
C. 20-min before take-off

1) Adjust / record program parameters (nominally set to 0, 40, 2.7, 3, 4)
   Flag 40 Cal Interval 40 Cal Period 2.7 LTF 3 WTo 4

2) Click Start button on main screen

3) Click Proceed button on control screen

4) Minimize “Verify Run Plan” window

5) Note time of wheels up

UTC = 16:47:00

II. During Flight

Keep VNC off as much as possible, only connecting when necessary to adjust cals.
Record flight notes in text file YYMMDD_RF##_Notes.txt

III. Postflight

1) Note time of wheels down

2) Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)

3) Click Stop button

4) Turn off lamp

5) Close SA, WT, SP, and O2 248 valves in software

6) Select None in cylinder box control section and uncheck any purges

7) Close manual VAC valve

8) Pump box Pump 1 breaker off

9) Note cryo temperature

10) Cylinder box Power breaker off

11) Pump box Pump 2 breaker off

12) Pump box Power breaker off

UTC = 21:47
13) Record pressures for a leak check
   PaWT 849  PaSP 157 PLi840 12.03  UTC = 21:52

14) Open cylinder box lid and close green valves

15) Record cylinder pressures for a leak check
   LS 870  HS 870  LT 273  WT 473

16) Close cylinder box lid

17) Log each hi-side cylinder pressure in software

18) Close program and Visual Basic

19) Scp data to laptop and copy to pen drive - rt-click, send to ao2, *.mr, *.hr, *.txt

20) Shut down AO2 PC

21) Shut down laptop

22) After green “SP to Cell” light has gone out, O2 box Power breaker off

23) Rack power switch off

24) Pull trap and replace with stopper. Open trap and remove glass beads
NCAR Airborne Oxygen Instrument (AO2) Checklist  V. 09.01.21

Flight Date (YYMMDD) 10031  Flight (e.g. RF01)

I. Preflight

A. Day(s) before flight
   ✓ 1) Prepare trap with clean glass beads filled to 1 inch from bottom
   ✓ 2) Install trap in dewar
   ✗ 3) Record cylinder pressures (or copy from prev. postflight)
      LS  _  HS  _
      LT  _  WT  _
   ✓ 4) Turn on instrument, record pressures (or copy from prev. postflight)
      PaWT  _  PaSP  _  PLi840  _

   Date = 10/3

   UTC = __ : __

B. 2-hours before take-off

   ✓ 0) Rack power switch on
   ✓ 1) O2 box Power breaker on
   ✓ 2) Laptop power on
   ✓ 3) Load dry-ice in dewar to within 0.5 inches of lid

   UTC = 13:40

   LS  1810/  LS  1830/  __
   LT  230/  WT  1710/  __
   __  __  __  __

   5) Open green knobs four 1/4 turns and re-record pressures and any changes

   LS  1860/  +50  HS  1800/  +50  (have been closed for ~ 1 week)
   LT  230/  WT  1710/  __

   ✓ 6) Close cylinder box lid

   ✓ 7) Open terminal on laptop and vnc (“remoteview-a02-12”) into AO2

   ✓ 8) Start AO2 program by clicking play in higold.vdp

   ✓ 9) Ensure that no USB errors are present in boxes at bottom of screen

   ✓ 10) Check that NTP time sync is working

   AO2 PC Time 13:03  Rack laptop time 13:03

   ✓ 11) Log each hi-side cylinder pressure in software

   ✓ 12) Pump box Power breaker on

   ✓ 13) Cylinder box Power breaker on

   ✗ 14) Record instrument pressures for overnight leak checks (P / Δ)

   PaWT  820/  PaSP  693/  PLi840  2085/  __

   ✓ 15) Pump box Pump 2 breaker on

   ✗ 16) Manual VAC valve open

   ✓ 17) Check that PaCO2 = 330 torr (± 5) and PaO2 = 90 torr (± 1). If not, adjust.

   PaCO2  332  PaO2  90

   ✓ 18) Click Initialize Cal Flow button

   ✗ 19) Ensure that WT flow starts through both lines (110 ± 10)

   FIWT  _  FISP  _

   ✗ 20) If necessary, adjust HA-3 to match bypass and cell flow on WT ±2 sccm

   ⇓ 21) Check / adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr

   i: 890  389 / 1.1
22) Return to WT selected when done checking regulators
23) Check that PdWT (±0.1), PdSP (±0.1), and PdO2 (±0.01) are controlling
24) Light lamp and ensure that it comes on UTC = 14:36
25) >= 10 min. after lamp on, record values in first row of table below
26) Once outside and fueling finished, click Initialize Sample Flow button
27) Pump box Pump 1 breaker on
28) Ensure that Fridge P stabilizes near 805 (±10) torr after 2 min.
   Fridge P: 998.5 SA Purge Flow 12
29) Snoop trap fittings
30) Enable change-over valve UTC = 14:50
31) >= 10 min. after change-over enable, record values in table below

<table>
<thead>
<tr>
<th>UTC</th>
<th>Gas</th>
<th>O2d</th>
<th>CO2n</th>
<th>O2n</th>
<th>SPm</th>
<th>WTm</th>
<th>Totm</th>
<th>mA</th>
<th>PdO2n</th>
<th>PdSPn</th>
<th>PdWTn</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:47:45W</td>
<td>NA</td>
<td>0.6</td>
<td>2.7</td>
<td>NA</td>
<td>NA</td>
<td>12</td>
<td>NA</td>
<td>0.3</td>
<td>4.9</td>
<td>4.3</td>
<td>5.0</td>
</tr>
<tr>
<td>15:01:30W</td>
<td>163</td>
<td>0.6</td>
<td>7.9</td>
<td>15-3</td>
<td>7.5</td>
<td>18</td>
<td>0.3</td>
<td>4.0</td>
<td>4.2</td>
<td>5.0</td>
<td>5.0</td>
</tr>
</tbody>
</table>

C. 20-min before take-off

1) Adjust / record program parameters (nominally set to a, 3, 2, 3, 4, 3, 2, 4)
   Flag a Cal Interval 40 Cal Period 2.5 LTF 3 WTf 4
2) Click Start button on main screen
3) Click Proceed button on control screen UTC = 15:30:40
4) Minimize "Verify Run Plan" window
5) Note time of wheels up UTC = 15:30:50

II. During Flight

Keep VNC off as much as possible, only connecting when necessary to adjust calcs.
Record flight notes in text file YYMMDD_RF##_Notes.txt

III. Postflight

1) Note time of wheels down UTC = 22:36
2) Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)
3) Click Stop button
4) Turn off lamp
5) Close SA, WT, SP, and O2 248 valves in software
6) Select None in cylinder box control section and uncheck any purges
7) Close manual VAC valve
8) Pump box Pump 1 breaker off
9) Note cryo temperature
10) Cylinder box Power breaker off
11) Pump box Pump 2 breaker off
12) Pump box Power breaker off
13) Record pressures for a leak check
   PaWT 976  PaSP 974  PLi840 12.03
   UTC = 20:41

14) Open cylinder box lid and **close green valves**

15) Record cylinder pressures for a leak check
   LS 1780  HS 1820
   LT 220  WT 1940
   UTC = 22:42

16) Close cylinder box lid

17) Log each hi-side cylinder pressure in software

18) Close program and Visual Basic

19) Sep data to laptop and copy to pen drive - rt-click, send to ao2, *.mr, *.hr, *.txt

20) Shut down AO2 PC

21) Shut down laptop

22) After green “SP to Cell” light has gone out, O2 box Power breaker off

23) Rack power switch off

24) Pull trap and replace with stopper. Open trap and remove glass beads
NCAR Airborne Oxygen Instrument (AO2) Checklist  V. 09.01.21

Flight Date (YYMMDD) 091102  Flight (e.g. RF01) RF02

I. Preflight

A. Day(s) before flight
   ✔ 1) Prepare trap with clean glass beads filled to 1 inch from bottom
   ✔ 2) Install trap in dewar
   ✔ 3) Record cylinder pressures (or copy from prev. postflight)
      
      | LS | HS | UTC |
      |----|----|-----|
      | 1860 | 320 | 00h |
      | 190 | 190 | 00h |

   ✔ 4) Turn on instrument, record pressures (or copy from prev. postflight)
      
      | PaWT | PaSP | PLi840 |
      | ---- | ---- | ------ |
      | 976  | 94  | 1203   |

   ✔ 2-hours before take-off
   ✔ 0) Rack power switch on
   ✔ 1) O2 box Power breaker on
   ✔ 2) Laptop power on
   ✔ 3) Load dry-ice in dewar to within 0.5 inches of lid

   ✔ 4) Record hi-side cylinder pressures for overnight leak check (P / Δ)
      
      | LS | HS | UTC |
      |----|----|-----|
      | 140 | 30 | 00h |
      | 20 | 20 | 00h |

   ✔ 5) Open green knobs four ¼ turns and re-record pressures and any changes
      
      | LS | HS | UTC |
      |----|----|-----|
      | 10 | 10 | 00h |
      | 10 | 10 | 00h |

   ✔ 6) Close cylinder box lid
   ✔ 7) Open terminal on laptop and vnc ("vncviewer ao2-daq") into AO2
   ✔ 8) Start AO2 program by clicking play in higold.vdp
   ✔ 9) Ensure that no USB errors are present in boxes at bottom of screen

   ✔ 10) Check that NTP time sync is working

   ✔ 11) Log each hi-side cylinder pressure in software
   ✔ 12) Pump box Power breaker on
   ✔ 13) Cylinder box Power breaker on
   ✔ 14) Record instrument pressures for overnight leak checks (P / Δ)
      
      | PaWT | PaSP | PLi840 |
      | ---- | ---- | ------ |
      | 94  | 94  | 1203   |

   ✔ 15) Pump box Pump 2 breaker on
   ✔ 16) Manual VAC valve open
   ✔ 17) Check that PaCO2 = 330 torr (± 5) and PaO2 = 98 torr (± 1). If not, adjust.
      
      | PaCO2 | PaO2 |
      | ----- |----- |
      | 320  | 94  |

   ✔ 18) Click Initialize Cal Flow button
   ✔ 19) Ensure that WT flow starts through both lines (110 ± 10)
      
      | FIWT | FISP |
      | ---- | ---- |
      | 103 | 101 |

   ✔ 20) If necessary, adjust HA-3 to match bypass and cell flow on WT ±2 sccm
   ✔ 21) Check / adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr

   ✔ 22) Check sea level calibration
   ✔ 23) Check PasP gauge zero? X agree w/ WT
22) Return to WT selected when done checking regulators
23) Check that PdWT (±0.1), PdSP (±0.1), and PdO2 (±0.01) are controlling
24) Light lamp and ensure that it comes on
25) >= 10 min. after lamp on, record values in first row of table below
26) Once outside and fueling finished, click Initialize Sample Flow button
27) Pump box Pump 1 breaker on
28) Ensure that Fridge P stabilizes near 805 (±10) torr after 2 min.
   Fridge P 800 SA Purge Flow 15
29) Snoop trap fittings
30) Enable change-over valve
31) >= 10 min. after change-over enable, record values in table below

<table>
<thead>
<tr>
<th>UTC</th>
<th>Gas</th>
<th>O2d</th>
<th>CO2n</th>
<th>O2n</th>
<th>SPm</th>
<th>WTm</th>
<th>Tötn</th>
<th>mA</th>
<th>PdO2n</th>
<th>PdSPn</th>
<th>PdWTn</th>
</tr>
</thead>
<tbody>
<tr>
<td>17:22:30</td>
<td>WT</td>
<td>NA</td>
<td>0.7</td>
<td>4.5</td>
<td>NA</td>
<td>NA</td>
<td>156</td>
<td>NA</td>
<td>0.6</td>
<td>3.7</td>
<td>8.0</td>
</tr>
</tbody>
</table>

C. 20-min before take-off
1) Adjust / record program parameters (nominally set to a, 40, 257, 3, 4)
   Flag a Cal Interval 50 Cal Period 3.5 Lf 3 Wtf 4
2) Click Start button on main screen
3) Click Proceed button on control screen
4) Minimize “Verify Run Plan” window
5) Note time of wheels up
6) Note time of wheels down
7) UTC = 18:20:55
8) UTC = 18:34:50

II. During Flight

Keep VNC off as much as possible, only connecting when necessary to adjust cals.
Record flight notes in text file YYMMDD_RF##_Notes.txt

III. Postflight
1) Note time of wheels down
2) Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)
3) Click Stop button
4) Turn off lamp
5) Close SA, WT, SP, and O2 248 valves in software
6) Select None in cylinder box control section and uncheck any purges
7) Close manual VAC valve
8) Pump box Pump 1 breaker off
9) Note cryo temperature
10) Cylinder box Power breaker off
11) Pump box Pump 2 breaker off
12) Pump box Power breaker off

Cryo = 65.5
13) Record pressures for a leak check
   PaWT 849  PaSP 759  PLi840 12.05
   UTC = 2:02

14) Open cylinder box lid and **close green valves**

15) Record cylinder pressures for a leak check
   LS 1250  HS 1740
   LT 193  WT 1720
   UTC = 2:05

16) Close cylinder box lid

17) Log each hi-side cylinder pressure in software

18) Close program and Visual Basic

19) Scr data to laptop and copy to pen drive - rt-click, send to ao2, *.mr, *.hr, *.txt

20) Shut down AO2 PC

21) Shut down laptop

22) After green “SP to Cell” light has gone out, O2 box Power breaker off

23) Rack power switch off

24) Pull trap and replace with stopper. **Open trap and remove glass beads**
NCAR Airborne Oxygen Instrument (AO2) Checklist

V. 09.11.03

Date 09/11/09

Campaign APO2
Flight A-193 From ANC To KBA HKO

I. Preflight

A. Day(s) before flight

1) Prepare trap with clean glass beads filled to 1 inch from bottom
2) Install trap in dewar
3) Record cylinder pressures (or copy from prev. postflight)

<table>
<thead>
<tr>
<th>LS</th>
<th>HS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1760</td>
<td>1790</td>
</tr>
</tbody>
</table>

UTC = 1:06

4) Turn on instrument, record pressures (or copy from prev. postflight)

| PaWT | PaSP | PLi840 |

UTC = __:__

B. 2-hours before take-off

Instrument Operator BBS

1) Rack power switch on
2) O₂ box Power breaker on
3) Laptop power on
4) Load dry-ice in dewar to within 0.5 inches of lid
5) Record hi-side cylinder pressures and changes overnight (P / Δ)

<table>
<thead>
<tr>
<th>LS</th>
<th>HS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1770 / 1760</td>
<td>1790 / -10</td>
</tr>
</tbody>
</table>

UTC = 17:05

6) Open green knobs four ¼ turns and re-record pressures and any changes

<table>
<thead>
<tr>
<th>LS</th>
<th>HS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1700 / 1700</td>
<td>1780 / 1700</td>
</tr>
</tbody>
</table>

7) Close cylinder box lid
8) Vnc into into AO2 (192.168.84.138)
9) Start AO2 program by clicking play in higold.vdp
10) Ensure that no USB errors are present in boxes at bottom of screen
11) Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times

AO2 PC Time 5:12:14, Rack laptop time 5:12:15

12) Log each hi-side cylinder pressure in software
13) Pump box Power breaker on
14) Cylinder box Power breaker on
15) Record instrument pressures and changes overnight (P / Δ)

<table>
<thead>
<tr>
<th>PaWT</th>
<th>PaSP</th>
<th>PLi840</th>
</tr>
</thead>
</table>

UTC = __:__

16) Pump box Pump 2 breaker on
17) Manual VAC valve open
18) Check that PaCO₂ = 330 torr (± 5) and PaO₂ = 92 torr (± 1). If not, adjust.

PaCO₂ 331 PaO₂ 92

19) Click Initialize Cal Flow button
20) Ensure that flow starts through both lines (110 ± 10)
21) Toggle changeover to check flows

WT to Cell: FIWT 105 FISP 103

same page
WT to Bypass: FIWT 106 FISP 102

22) If necessary, adjust HA-3 to match bypass and cell flow on WT ±2 sccm
23) Check / adjust regulator pressures for all 4 gases to PaSP of 785 ±/ 5 torr
24) Return to WT selected when done checking regulators
25) Check that PdWT (±0.1), PdSP (±0.1), and PdO2 (±0.01) are controlling
26) Light lamp and ensure that it comes on
27) If necessary, adjust PaO2 to keep signal below 10 V
28) Click Initialize Sample Flow button
29) Pump box Pump 1 breaker on
30) Ensure that Fridge P stabilizes near 805 (±10) torr after 2 min.

Fridge P 98 SA Purge Flow
31) Snoop trap fittings
32) Pump box Pump 1 breaker off
33) ≥ 10 min. after lamp on record values in first row of table below
34) Enable change-over valve
35) ≥ 10 min. after change-over enable, record values in table below

<table>
<thead>
<tr>
<th>UTC</th>
<th>Gas</th>
<th>O2d</th>
<th>CO2n</th>
<th>O2n</th>
<th>SPm</th>
<th>WTM</th>
<th>Tottn</th>
<th>mA</th>
<th>PdO2n</th>
<th>PdSPn</th>
<th>PdWTn</th>
</tr>
</thead>
<tbody>
<tr>
<td>17:47:00</td>
<td>WT</td>
<td>NA</td>
<td>0.7</td>
<td>4.0</td>
<td>NA</td>
<td>NA</td>
<td>H</td>
<td>NA</td>
<td>0.3</td>
<td>4.3</td>
<td>5.2</td>
</tr>
<tr>
<td>18:10:45</td>
<td>WT</td>
<td>421</td>
<td>0.1</td>
<td>2.1</td>
<td>9</td>
<td>-0.5</td>
<td>4</td>
<td>9</td>
<td>0.3</td>
<td>4.4</td>
<td>5.6</td>
</tr>
</tbody>
</table>

C. 20-min before take-off

1) Adjust / record program parameters (nominally set to a, 50, 3, 3, 4)
   Flag CA Cal Interval SD Cal Period 3 LTF 3 WTf 4
2) Click Start button on main screen
3) Click Proceed button on control screen
4) Minimize “Verify Run Plan” window
5) Note cryo temperature
6) Before LT starts (after HS-LS) or upon taxi, Pump box Pump 1 breaker on
7) Note time of wheels up

II. During Flight

Keep VNC off as much as possible, only connecting when necessary to adjust cals.
Record flight notes in text file AO2_YYYYMMDD_RF##_Notes.txt

III. Postflight

1) Note time of wheels down
2) Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)
3) Click End of Flight button
4) Close manual VAC valve
5) Pump box Pump 1 breaker off
6) Note cryo temperature
7) Cylinder box Power breaker off
11) Pump box Pump 2 breaker off
12) Pump box Power breaker off
13) Record pressures for a leak check
   PaWT 8446 PaSP 783 PLi840 12:03 UTC = 5:01
14) Open cylinder box lid and close green valves
15) Record cylinder pressures for a leak check
   LS 1410 HS 1530
   LT 130 WT 280
   UTC = 5:04
16) Close cylinder box lid
17) Log each hi-side cylinder pressure in software
18) Close program and Visual Basic
19) Copy data (*.mr, *.hr, *.txt) to laptop and then data and notes, etc. to pen drive
20) Shut down AO2 PC
21) Shut down laptop
22) After green “SP to Cell” light has gone out, O2 box Power breaker off
23) Rack power switch off
24) Pull trap, jumper quick-connects, and install stopper
25) Open trap and remove glass beads

\( \checkmark \) Swap \( \text{WT} + \text{LT} ? \)
\( \checkmark \) \( \text{180} \)

1490 as is
\( \checkmark \) \( \text{won't do} \)
\( \text{now 1990} \)
\( \text{can move m/ou} \)
\( \text{cracked green again} \Rightarrow 1990/11/3 \) 5:26
NCAR Airborne Oxygen Instrument (AO2) Checklist

V. 09.11.03

Date 09/11/07 Campaign HOPPO2 Flight R104 From HKO To FAR

I. Preflight

A. Day(s) before flight

1) Prepare trap with clean glass beads filled to 1 inch from bottom
2) Install trap in dewar
3) Record cylinder pressures (or copy from prev. postflight)
   LS = 170 HS = 1810
   LT = 2130 WT = 890
4) Turn on instrument, record pressures (or copy from prev. postflight)
   PaWT = 912, PaSP = 732, PLi840 = 22.6

B. 2-hours before take-off

1) Rack power switch on
2) O₂ box Power breaker on
3) Laptop power on
4) Load dry-ice in dewar to within 0.5 inches of lid
5) Record hi-side cylinder pressures and changes overnight (P / Δ)
   LS = 170 / -   HS = 1810 / -
   LT = 2130 / -20  WT = 890 / -
6) Open green knobs four ¼ turns and re-record pressures and any changes
   LS = 880 / +10    HS = 1820 / +10
   LT = 2130 / +20    WT = 920 / +30

7) Close cylinder box lid
8) Vnc into into AO2 (192.168.84.138)
9) Start AO2 program by clicking play in higold.vdp
10) Ensure that no USB errors are present in boxes at bottom of screen
11) Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times

AO2 PC Time 6:50:04, Rack laptop time 6:50:05

12) Log each hi-side cylinder pressure in software
13) Pump box Power breaker on
14) Cylinder box Power breaker on
15) Record instrument pressures and changes overnight (P / Δ)
   PaWT = 890 / -21, PaSP = 616 / -36, PLi840 = 25.6 / +3.0
16) Pump box Pump 2 breaker on
17) Manual VAC valve open
18) Check that PaCO₂ = 330 torr (± 5) and PaO₂ = 90 torr (± 1). If not, adjust.
   PaCO₂ = 330, PaO₂ = 90
19) Click Initialize Cal Flow button
20) Ensure that flow starts through both lines (110 ± 10)
21) Toggle changeover to check flows

WT to Cell: FIWT 12  FISP 10
WT to Bypass: F1WT  FISP

22) If necessary, adjust HA-3 to match bypass and cell flow on WT ±2 sccm

✓ 23) Check/adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr

✓ 24) Return to WT selected when done checking regulators

✓ 25) Check that PdWT (±0.1), PdSP (±0.1), and PdO2 (±0.01) are controlling

✓ 26) Light lamp and ensure that it comes on

✓ 27) If necessary, adjust PaO2 to keep signal below 10 V

✓ 28) Click Initialize Sample Flow button

✓ 29) Pump box Pump 1 breaker on

✓ 30) Ensure that Fridge P stabilizes near 805 (±10) torr after 2 min.

Fridge P 800 SA Purge Flow 115

✓ 31) Snoop trap fittings

✓ 32) Pump box Pump 1 breaker off

✓ 33) >= 10 min. after lamp on record values in first row of table below

✓ 34) Enable change-over valve

✓ 35) >= 10 min. after change-over enable, record values in table below

<table>
<thead>
<tr>
<th>UTC</th>
<th>Gas</th>
<th>O2d</th>
<th>CO2n</th>
<th>O2n</th>
<th>SPm</th>
<th>WTm</th>
<th>Totm</th>
<th>mAh</th>
<th>PdO2n</th>
<th>PdSPn</th>
<th>PdWTn</th>
</tr>
</thead>
<tbody>
<tr>
<td>19:10:00</td>
<td>WT</td>
<td>NA</td>
<td>0.4H</td>
<td>1.5</td>
<td>NA</td>
<td>NA</td>
<td>11</td>
<td>NA</td>
<td>0.3</td>
<td>4.1</td>
<td>5.1</td>
</tr>
<tr>
<td>19:21:00</td>
<td>WT</td>
<td>4.5</td>
<td>0.6H</td>
<td>2.1</td>
<td>16</td>
<td>-10</td>
<td>4</td>
<td>25</td>
<td>0.5</td>
<td>4.2</td>
<td>4.9</td>
</tr>
</tbody>
</table>

C. 20-min before take-off

✓ 1) Adjust/record program parameters (nominally set to a, 50, 3, 3, 4)

Flag Cal Interval 5d Cal Period 3 LTF 3 WTFL

✓ 2) Click Start button on main screen

✓ 3) Click Proceed button on control screen

✓ 4) Minimize “Verify Run Plan” window

✓ 5) Note cryo temperature

✓ 6) Before LT starts (after HS-LS) or upon taxi, Pump box Pump 1 breaker on

✓ 7) Note time of wheels up

UTC = 19:44:05

Cryo = -66

UTC = 20:26:30

II. During Flight

Keep VNC off as much as possible, only connecting when necessary to adjust cals.
Record flight notes in text file AO2 YYYYMMDD_RF#_Notes.txt

III. Postflight

✓ 1) Note time of wheels down

UTC = 18:15

✓ 2) Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)

✓ 3) Click End of Flight button

✓ 7) Close manual VAC valve

✓ 8) Pump box Pump 1 breaker off

✓ 9) Note cryo temperature

✓ 10) Cylinder box Power breaker off

Cryo = -62
11) Pump box Pump 2 breaker off
12) Pump box Power breaker off
13) Record pressures for a leak check
   PaWT 846 PaSP 838 PLi840 12.68
14) Open cylinder box lid and close green valves
15) Record cylinder pressures for a leak check
   LS 1700 HS 1720
   LT 2030 WT 680
16) Close cylinder box lid
17) Log each hi-side cylinder pressure in software
18) Close program and Visual Basic
19) Copy data (*.mr, *.hr, *.txt) to laptop and then data and notes, etc. to pen drive
20) Shut down AO2 PC
21) Shut down laptop
22) After green “SP to Cell” light has gone out, O2 box Power breaker off
23) Rack power switch off
24) Pull trap, jumper quick-connects, and install stopper
25) Open trap and remove glass beads
NCAR Airborne Oxygen Instrument (AO2) Checklist  V. 09.11.03

Date 091109  Campaign HACO2  Flight RF05  From PRC To CHC

I. Preflight

A. Day(s) before flight
   ✔ 1) Prepare trap with clean glass beads filled to 1 inch from bottom
   ✔ 2) Install trap in dewar
   ✔ 3) Record cylinder pressures (or copy from prev. postflight)
      LS 1740  HS 1740  244.9  UTC 23:50
      LT 3080 WT 680
   ✔ 4) Turn on instrument, record pressures (or copy from prev. postflight)
      PaWT 841  PaSP 330  PLi840 1.3  28.7  UTC = 23:52

B. 2-hours before take-off
   ✔ 1) Rack power switch on
   ✔ 2) O2 box Power breaker on
   ✔ 3) Laptop power on
   ✔ 4) Load dry-ice in dewar to within 0.5 inches of lid
      UTC = 18:20
   ✔ 5) Record hi-side cylinder pressures and changes overnight (P / Δ)
      LS 1740 / -10  HS 1740 / -10
      LT 3080 / -10  WT 680 / -
   ✔ 6) Open green knobs four ¼ turns and re-record pressures and any changes
      LS 1720 / +10  HS 1720 / +5
      LT 3000 / +10  WT 680 / -
   ✔ 7) Close cylinder box lid
   ✔ 8) Vnc into into AO2 (192.168.84.138)
   ✔ 9) Start AO2 program by clicking play in higold.vdp
   ✔ 10) Ensure that no USB errors are present in boxes at bottom of screen
   ✔ 11) Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times
      AO2 PC Time 06:44:49, Rack laptop time 06:44:51
   ✔ 12) Log each hi-side cylinder pressure in software
   ✔ 13) Pump box Power breaker on
   ✔ 14) Cylinder box Power breaker on
   ✔ 15) Record instrument pressures and changes overnight (P / Δ)
      PaWT 835 PaSP 313 / -7  PLi840 2851 = 24:59
   ✔ 16) Pump box Pump 2 breaker on
   ✔ 17) Manual VAC valve open
   ✔ 18) Check that PaCO2 = 330 torr (± 5) and PaO2 = 92 torr (± 1). If not, adjust.
      PaCO2 329  PaO2 95
   ✔ 19) Click Initialize Cal Flow button
   ✔ 20) Ensure that flow starts through both lines (110 ± 10)
   ✔ 21) Toggle changeover to check flows
22) If necessary, adjust HA-3 to match bypass and cell flow on WT +2 sccm
23) Check / adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr
24) Return to WT selected when done checking regulators
25) Check that PdWT (±0.1), PdSP (±0.1), and PdO2 (±0.01) are controlling
26) Light lamp and ensure that it comes on UTC = 08:53
27) If necessary, adjust PaO2 to keep signal below 10 V O2 signal 7.73
28) Click Initialize Sample Flow button
29) Pump box Pump 1 breaker on
30) Ensure that Fridge P stabilizes near 805 (±10) torr after 2 min. Fridge P 300 SA Purge Flow 115
31) Snoop trap fittings
32) Pump box Pump 1 breaker off
33) >= 10 min. after lamp on record values in first row of table below
34) Enable change-over valve UTC = 09:36
35) >= 10 min. after change-over enable, record values in table below

<table>
<thead>
<tr>
<th>UTC</th>
<th>Gas</th>
<th>O2d</th>
<th>CO2n</th>
<th>O2n</th>
<th>Spm</th>
<th>WTm</th>
<th>Totm</th>
<th>mA</th>
<th>PdO2n</th>
<th>PdSPn</th>
<th>PdWTn</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:16:00</td>
<td>w-t</td>
<td>NA</td>
<td>0.8</td>
<td>4</td>
<td>NA</td>
<td>NA</td>
<td>6</td>
<td>NA</td>
<td>0.6</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>09:26:00</td>
<td>w-t</td>
<td>W-T</td>
<td>0.6</td>
<td>15</td>
<td>-9</td>
<td>3</td>
<td>23</td>
<td>0.7</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

C. 20-min before take-off

1) Adjust / record program parameters (nominally set to a, 50, 3, 3, 4)
   Flag a Cal Interval 50 Cal Period 3 LTF 3 WTf 4
2) Click Start button on main screen
3) Click Proceed button on control screen UTC = 09:41:56
4) Minimize “Verify Run Plan” window
5) Note cryo temperature Cryo = -61
6) Before LT starts (after HS-LS) or upon taxi, Pump box Pump 1 breaker on
7) Note time of wheels up UTC = 10:26:36

II. During Flight

Keep VNC off as much as possible, only connecting when necessary to adjust cals.
Record flight notes in text file AO2_YYYYMMDD_RF##_Notes.txt

III. Postflight

1) Note time of wheels down UTC = 10:16:29
2) Let any calibration cycles finish (up to <5 min on ground and/or 2 gases)
3) Click End of Flight button
4) Close manual VAC valve
5) Pump box Pump 1 breaker off
6) Note cryo temperature Cryo = -59
7) Cylinder box Power breaker off
1) Pump box Pump 2 breaker off
2) Pump box Power breaker off
3) Record pressures for a leak check
   PaWT 240  PaSP 66 PLi840 2 1
   UTC = 3:19
4) Open cylinder box lid and close green valves
5) Record cylinder pressures for a leak check
   LS 1670 HS 1680
   LT 26 0 WT 440
   UTC = 3:24
6) Close cylinder box lid
7) Log each hi-side cylinder pressure in software
8) Close program and Visual Basic
9) Copy data (*.mr, *.hr, *.txt) to laptop and then data and notes, etc. to pen drive
10) Shut down AO2 PC
11) Shut down laptop
12) After green "SP to Cell" light has gone out, O2 box Power breaker off
13) Rack power switch off
14) Pull trap, jumper quick-connects, and install stopper
15) Open trap and remove glass beads
NCAR Airborne Oxygen Instrument (AO2) Checklist  
V. 09.11.03

I. Preflight

A. Day(s) before flight
   ✓ 1) Prepare trap with clean glass beads filled to 1 inch from bottom
   ✓ 2) Install trap in dewar
   ✓ 3) Record cylinder pressures (or copy from prev. postflight)
      LS 1630  HS 1655  1670  1680  UTC = 15:51
      LT 2010  WT 440  370  1780
   ✓ 4) Turn on instrument, record pressures (or copy from prev. postflight)
      PaWT 829  PaSP 619  PLi840 12.03  UTC = 20:01

B. 2-hours before take-off
   Instrument Operator __________
   ✓ 1) Rack power switch on
   ✓ 2) O2 box Power breaker on
   ✓ 3) Laptop power on
   ✓ 4) Load dry-ice in dewar to within 0.5 inches of lid
      UTC = __:__  20.04
   ✓ 5) Record hi-side cylinder pressures and changes overnight (P / Δ)
      LS ___/___  HS ___/___  1630/0  1655/0
      LT ___/___  WT ___/___  2010/0  440/0
   ✓ 6) Open green knobs four ¼ turns and re-record pressures and any changes
      LS ___/___  HS ___/___  1630/0  1655/0
      LT ___/___  WT ___/___  2010/1  440/0

   ✓ 7) Close cylinder box lid
   ✓ 8) Vnc into AO2 (192.168.84.138)
   ✓ 9) Start AO2 program by clicking play in higold.vdp
   ✓ 10) Ensure that no USB errors are present in boxes at bottom of screen
   ✓ 11) Check that NTP time sync is working on AO2 and laptop, >5-min after
      first sync, record times
      AO2 PC Time __:__ __, Rack laptop time __:__ __
   ✓ 12) Log each hi-side cylinder pressure in software
   ✓ 13) Pump box Power breaker on
   ✓ 14) Cylinder box Power breaker on
   ✓ 15) Record instrument pressures and changes overnight (P / Δ)
      PaWT ___/___  PaSP ___/___  PLi840 ___/___
   ✓ 16) Pump box Pump 2 breaker on
   ✓ 17) Manual VAC valve open
   ✓ 18) Check that PaCO2 = 330 torr (± 5) and PaO2 = 92 torr (± 1). If not, adjust.
      PaCO2 ___  PaO2 ___ (adjusted)
   ✓ 19) Click Initialize Cal Flow button
   ✓ 20) Ensure that flow starts through both lines (110 ± 10)
   ✓ 21) Toggle changeover to check flows
      WT to Cell:  FIWT ___  FISP ___

[Handwritten notes and annotations]
WT to Bypass: FISW  FISP

22. If necessary, adjust HA-3 to match bypass and cell flow on WT ±2 sccm
23. Check / adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr
24. Return to WT selected when done checking regulators
25. Check that PDWT 0.1, PdSP 0.1, and PdO2 0.01 are controlling
26. Light lamp and ensure that it comes on UTC = _______________
27. If necessary, adjust PaO2 to keep signal below 10 V O2 signal
28. Click Initialize Sample Flow button
29. Pump box Pump 1 breaker on
30. Ensure that Fridge P stabilizes near 805 (±10) torr after 2 min.
   Fridge P SA Purge Flow __________
31. Snoop trap fittings
32. Pump box Pump 1 breaker off
33. 10 min. after lamp on record values in first row of table below
34. Enable change-over valve UTC = __________
35. 10 min. after change-over enable, record values in table below

<table>
<thead>
<tr>
<th>UTC</th>
<th>Gas</th>
<th>O2</th>
<th>CO2</th>
<th>CO2n</th>
<th>O2n</th>
<th>SPm</th>
<th>WTm</th>
<th>Totm</th>
<th>mA</th>
<th>PdO2</th>
<th>PdSp</th>
<th>PdWTn</th>
</tr>
</thead>
<tbody>
<tr>
<td>21:10</td>
<td>%</td>
<td>NA</td>
<td>0.012</td>
<td>2.75</td>
<td>NA</td>
<td>NA</td>
<td>1.06</td>
<td>NA</td>
<td>0.341</td>
<td>4.07</td>
<td>7.17</td>
<td></td>
</tr>
<tr>
<td>21:20</td>
<td>%</td>
<td>0.422</td>
<td>0.82</td>
<td>1.71</td>
<td>1.19</td>
<td>0.23</td>
<td>0.37</td>
<td>1.69</td>
<td>0.52</td>
<td>3.35</td>
<td>5.9</td>
<td></td>
</tr>
</tbody>
</table>

C. 20-min before take-off

1. Adjust / record program parameters (nominally set to 0, 50, 3, 3, 4)
   Cal Interval Cal Period LTF WIF

2. Click Start button on main screen
3. Click Proceed button on control screen UTC = __________
4. Minimize “Verify Run Plan” window
5. Note cryo temperature Cryo = __________
6. Before LT starts (after HS-LS) or upon taxi, Pump box Pump 1 breaker on
7. Note time of wheels up UTC = __________

II. During Flight

Keep VNC off as much as possible, only connecting when necessary to adjust cals.
Record flight notes in text file AO2_YYYMMDD_RF##_Notes.txt

III. Postflight

1. Note time of wheels down UTC = __________
2. Let any calibration cycles finish (up to < 5 min on ground and/or 2 gases)
3. Click End of Flight button
4. Close manual VAC valve
5. Pump box Pump 1 breaker off
6. Note cryo temperature Cryo = __________
7. Cylinder box Power breaker off
11) Pump box Pump 2 breaker off
12) Pump box Power breaker off
13) Record pressures for a leak check
   PaWT  PaSP  PLi840
   UTC = :
14) Open cylinder box lid and close green valves
15) Record cylinder pressures for a leak check
   LS  HS  LT  WT
   UTC = :
16) Close cylinder box lid
17) Log each hi-side cylinder pressure in software
18) Close program and Visual Basic
19) Copy data (*.mr, *.hr, *.txt) to laptop and then data and notes, etc. to pen drive
20) Shut down AO2 PC
21) Shut down laptop
22) After green “SP to Cell” light has gone out, O₂ box Power breaker off
23) Rack power switch off
24) Pull trap, jumper quick-connects, and install stopper
25) Open trap and remove glass beads
NCAR Airborne Oxygen Instrument (AO2) Checklist

Date: 09.11.11  Campaign: HIRI-ZI  Flight: 2F06  From: WNM  To: WWW

I. Preflight

A. Day(s) before flight

1. Prepare trap with clean glass beads filled to 1 inch from bottom
2. Install trap in dewar
3. Record cylinder pressures (or copy from prev. postflight)
   LS 1670 HS 1650 CylT1 1650 UTC = 19:51
   LT 310 WT 1980
4. Turn on O2 box, start program, and record pressures (or copy from prev. postflight)
   PaWT 860 PaSP 854 PLi840 1203 TMan 11 UTC = 20:01

B. 2-hours before take-off

1. Rack power switch on
2. O2 box Power breaker on
3. Laptop power on
4. Load dry-ice in dewar to within 0.5 inches of lid
5. Record hi-side cylinder pressures and changes overnight (P/Δ)
   LS 1600/0  HS 1640/0 CylT1 13.51
   LT 360/-10 WT 418/418 110/-70
6. Open green knobs four ¼ turns and re-record pressures and any changes
7. Close cylinder box lid
8. Vnc into into AO2 (192.168.84.138)
9. Start AO2 program by clicking play in higold.vdp
10. Ensure that no USB errors are present in boxes at bottom of screen
11. Check that NTP time sync is working on AO2 and laptop, >5 min after first sync, record times
    AO2 PC Time: 19:56:38, Rack laptop timer: 19:56:40
12. Log each hi-side cylinder pressure in software
13. Pump box Power breaker on
14. Cylinder box Power breaker on
15. Record instrument pressures and changes overnight (P/Δ)
   PaWT 314/-11 PaSP 713/-61 PLi840 212 +0 TMan 0/-
16. Pump box Pump 2 breaker on
17. Manual VAC valve open
18. Check that PaCO2 = 330 torr (±5) and PaO2 = 94 torr (±1). If not, adjust.
   PaCO2 350  PaO2 94
19. Click Initialize Cal Flow button
20. Ensure that flow starts through both lines (110 ±10)
   F1WT (to cell) 100  F1SP (to bypass) 95
21) Toggle changeover to check flows in other position

- FIWT (to bypass) 100  FISP (to cell) 74

- If necessary, adjust HA-3 to match FIWT on bypass and cell to ±2 sccm

- Check / adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr

- Close cylinder box lid

- Return to WT selected when done checking regulators

- Check that PdWT (±0.1), PdSP (±0.1), and PdO2 (±0.01) are controlling

- Light lamp and ensure that it comes on

- If necessary, adjust PaO2 to keep signal below 10 V

- Click Initialize Sample Flow button

- Pump box Pump 1 breaker on

- Ensure that Fridge P stabilizes near 805 (±10) torr after 2 min. Fridge P 3.16 SA Purge Flow 1.16

- Snoop trap fittings

- Pump box Pump 1 breaker off

- 10 min. after lamp on record values in first row of table below

- Enable changeover valve (uncheck disable)

- 10 min. after change-over enable, record values in table below

<table>
<thead>
<tr>
<th>UTC</th>
<th>Pms</th>
<th>O2d</th>
<th>CO2n</th>
<th>O2n</th>
<th>Spm</th>
<th>WTm</th>
<th>Totm</th>
<th>mA</th>
<th>PdO2n</th>
<th>PdSpn</th>
<th>PdWTn</th>
</tr>
</thead>
<tbody>
<tr>
<td>19:58:55</td>
<td>437</td>
<td>0.988</td>
<td>1.8</td>
<td>NA</td>
<td>NA</td>
<td>4.78</td>
<td>NA</td>
<td>0.005</td>
<td>4</td>
<td>5.33</td>
<td></td>
</tr>
<tr>
<td>20:08:00</td>
<td>437</td>
<td>0.988</td>
<td>2.08</td>
<td>11.5</td>
<td>-7.95</td>
<td>1.02</td>
<td>9.5</td>
<td>0.007</td>
<td>4.2</td>
<td>5.6</td>
<td></td>
</tr>
</tbody>
</table>

- Disable changeover

- If necessary, toggle changeover to get SP to Cell

- Close WT 248 valve

**C. 20-min before take-off**

- WT 248 valve to Auto (uncheck close)

- Enable changeover (uncheck disable)

- Adjust / record program parameters (nominally set to a, 50, 3, 3, 4)

- Flag a Cal Interval 50 Cal Period 3  LTF 1  WRT 1

- Click Start button on main screen

- Click Proceed button on control screen

- Minimize “Verify Run Plan” window

- Note cryo temperature

- Before LT starts (after HS-LS) or upon taxi, Pump box Pump 1 breaker on

- If ground hold extended 10-20 min., set CallInt to 1 until take-off

- If ground hold extended > 20 min, go to Manual and run WT until take-off

- Note time of wheels up

**UTC = 20:45**

**Cryo = -60.05°**

**UTC = 20:56**

**UTC = 21:12:36**

II. During Flight

Keep VNC off as much as possible, only connecting when necessary to adjust cals.
Record flight notes in text file AO2_YYYYMMDD_RF##_Notes.txt

III. Postflight

1) Note time of wheels down
2) Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)
3) Click Stop button
4) Turn off lamp
5) Close SA, WT, SP, and O2 248 valves in software
6) Select None in cylinder box control section and uncheck any purges
7) Close manual VAC valve
8) Pump box Pump 1 breaker off
9) Note cryo temperature
10) Cylinder box Power breaker off
11) Pump box Pump 2 breaker off
12) Pump box Power breaker off
13) Record pressures for a leak check

PaWT \text{\textless} 66 PaSP \text{\textless} 25 PLi840 \text{\textless} 0.5 \text{\textless}\text{TMan}\text{\textless} 26.35 UTC = 5:20

LS 1605 HS 1620 Cylinder 1 24.996 UTC = 5:20
LT 3270 WT 1740 Cylinder 2 24.996

14) Open cylinder box lid and record cylinder pressures for a leak check

15) Close all 4 green valves
16) Close cylinder box lid
17) Log each hi-side cylinder pressure in software
18) Close program and Visual Basic
19) Copy data (*.mr, *.hr, *.txt) to laptop and then data and notes, etc. to pen drive
20) Shut down AO2 PC
21) Shut down laptop
22) After green “SP to Cell” light has gone out, O2 box Power breaker off
23) Rack power switch off
24) Pull trap, jumper quick-connects, and install stopper
25) Open trap and remove glass beads

IV. Troubleshooting / procedures

A. Time sync not working: set timeserver IP of timeserver to 192.168.84.1 and click update now. Also, can try 192.168.184.10. Ask tech about any server issues.

B. Other network problems: AO2 IP address = 192.168.84.138, Laptop IP address = 192.168.84.137.

C. O2 signal ~ 50% low and noisy. Turn lamp off and relight, up to 10 times to try to fix. Can also try full power down and back up of instrument.
NCAR Airborne Oxygen Instrument (AO2) Checklist

Date 2009.11.14  Campaign HIPPO2  Flight FO7 From N20  To A601

I. Preflight

A. Day(s) before flight

✓ Prepare trap with clean glass beads filled to 1 inch from bottom
✓ Install trap in dewar
✓ Record cylinder pressures (or copy from prev. postflight)
  LS 1540  HS 1510  Cyli1 24.95  UTC =22:10
  LT 370  WT 1680
✓ Turn on O2 box, start program, and record pressures (or copy from prev. postflight)
  PaWT 554  PaSP 709  PLi840 29.67 TMn 15  UTC =20:12

B. 2-hours before take-off

Instrument Operator JDB

✓ 1) Rack power switch on
✓ 2) O2 box Power breaker on
✓ 3) Laptop power on
✓ 4) Load dry-ice in dewar to within 0.5 inches of lid
✓ 5) Record hi-side cylinder pressures and changes overnight (P/A)
  LS 1590 / 15 0  HS 1610 / 20  Cyli1 25 / 0
  LT 360 / 10  WT 1320 / 140
✓ 6) Open green knobs four 1/4 turns and re-record pressures and any changes
  LS 1610 / 20  HS 1640 / 30  Cyli2 25 / 0
  LT 370 / 10  WT 1780 / 30
✓ 7) Close cylinder box lid
✓ 8) Vnc into into AO2 (192.168.84.138)
✓ 9) Start AO2 program by clicking play in higold.vdp
✓ 10) Ensure that no USB errors are present in boxes at bottom of screen
✓ 11) Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times
   AO2 PC Time 7:34:0 40, Rack laptop time 7:34:0 40
✓ 12) Log each hi-side cylinder pressure in software
✓ 13) Pump box Power breaker on
✓ 14) Cylinder box Power breaker on
✓ 15) Record instrument pressures and changes overnight (P/A)
  PaWT 862 / 6  PaSP 769 / 0  PLi840 263 / 3 TMn 19.1 / 1
✓ 16) Pump box Pump 2 breaker on
✓ 17) Manual VAC valve open
✓ 18) Check that PaCO2 = 330 torr (± 5) and PaO2 = 94 torr (± 1). If not, adjust.
   PaCO2 ≤ 34  PaO2 ≥ 94
✓ 19) Click Initialize Cal Flow button
✓ 20) Ensure that flow starts through both lines (110 ± 10)
    FIWT (to cell) ↓ 105  FISP (to bypass) ↓ 105
21) Toggle changeover to check flows in other position

FIWT (to bypass) \[\text{on}\] FISP (to cell) \[\text{on}\]

22) If necessary, adjust HA-3 to match FIWT on bypass and cell to \(\pm 2\) sccm

23) Check/adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr

24) Close cylinder box lid

25) Return to WT selected when done checking regulators

26) Check that PdWT (\(\pm 0.1\)), PdSP (\(\pm 0.1\)), and PdO2 (\(\pm 0.01\)) are controlling

27) Light lamp and ensure that it comes on

28) If necessary, adjust PaO2 to keep signal below 10 V

29) Click Initialize Sample Flow button

30) Pump box Pump 1 breaker on

31) Ensure that Fridge P stabilizes near 805 (\(\pm 10\)) torr after 2 min.

Fridge P \[\text{on} \] SA Purge Flow \[\text{on} \]

32) Snoop trap fittings

33) Pump box Pump 1 breaker off

34) \(\geq 10\) min. after lamp on record values in first row of table below

35) Enable changeover valve (uncheck disable)

36) \(\geq 10\) min. after change-over enable, record values in table below

<table>
<thead>
<tr>
<th>UTC</th>
<th>Gas</th>
<th>O2d</th>
<th>CO2n</th>
<th>O2n</th>
<th>SPm</th>
<th>WThm</th>
<th>Totm</th>
<th>mA</th>
<th>PdO2n</th>
<th>PdSPn</th>
<th>PdWThn</th>
</tr>
</thead>
<tbody>
<tr>
<td>19:56:00</td>
<td>WT</td>
<td>NA</td>
<td>0.27</td>
<td>163</td>
<td>NA</td>
<td>NA</td>
<td>69</td>
<td>NA</td>
<td>0.23</td>
<td>4.02</td>
<td>5.62</td>
</tr>
<tr>
<td>20:03:00</td>
<td>WT</td>
<td>444</td>
<td>0.7</td>
<td>2.04</td>
<td>16</td>
<td>-123</td>
<td>2.77</td>
<td>236</td>
<td>0.792</td>
<td>3.46</td>
<td>5.83</td>
</tr>
</tbody>
</table>

37) Disable changeover

38) If necessary, toggle changeover to get SP to Cell

39) Close WT 248 valve

C. 20-min before take-off

1) WT 248 valve to Auto (uncheck close)

2) Enable changeover (uncheck disable)

3) Adjust/record program parameters (nominally set to a, 50, 3, 3, 4)

   Flag a | Cal Interval | 50 | Cal Period | 3 | LTh | 3 | WTh | 4

4) Click Start button on main screen

5) Click Proceed button on control screen

6) Minimize "Verify Run Plan" window

7) Note cryo temperature

\[
\text{Cryo} = -60 \degree \text{C}
\]

8) Before LT starts (after HS-LS) or upon taxi, Pump box Pump 1 breaker on

9) If ground hold extended \(10-20\) min., set CalInt to 1 until take-off

10) If ground hold extended \(> 20\) min, go to Manual and run WT until take-off

11) Note time of wheels up

II. During Flight

Keep VNC off as much as possible, only connecting when necessary to adjust cals.
III. Postflight

1) Note time of wheels down

2) Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)

3) Click Stop button

4) Turn off lamp

5) Close SA, WT, SP, and O2 248 valves in software

6) Select None in cylinder box control section and uncheck any purges

7) Close manual VAC valve

8) Pump box Pump 1 breaker off

9) Note cryo temperature

10) Cylinder box Power breaker off

11) Pump box Pump 2 breaker off

12) Pump box Power breaker off

13) Record pressures for a leak check

PaWT 86 PaSP 746 PLi840 14.2 TMan 2133 UTC = 09:05

14) Open cylinder box lid and record cylinder pressures for a leak check

LS 1580 HS 1600 CyIT1 13.2 UTC = 09:10

LT 320 WT 1480 CyIT2 13.2

15) Close all 4 green valves

16) Close cylinder box lid

17) Log each hi-side cylinder pressure in software

18) Close program and Visual Basic

19) Copy data (*.mr, *.hr, *.txt) to laptop and then data and notes, etc. to pen drive

20) Shut down AO2 PC

21) Shut down laptop

22) After green “SP to Cell” light has gone out, O2 box Power breaker off

23) Rack power switch off

24) Pull trap, jumper quick-connects, and install stopper

25) Open trap and remove glass beads

Shut off breaker before laptop.

Data may or may not have
trans to mem stick.

IV. Troubleshooting / procedures

A. Time sync not working: set timeserver IP of timeserver to 192.168.84.1 and click update now. Also, can try 192.168.184.10. Ask tech about any server issues.

B. Other network problems: AO2 IP address = 192.168.84.138, Laptop IP address = 192.168.84.137.

C. O2 signal ~ 50% low and noisy. Turn lamp off and relight, up to 10 times to try to fix. Can also try full power down and back up of instrument.
NCAR Airborne Oxygen Instrument (AO2) Checklist  V. 09.11.11

Date 09/11/11  Campaign HIPPO  Flight #8 From A664 To PHV 0

I. Preflight

A. Day(s) before flight

1. Prepare trap with clean glass beads filled to 1 inch from bottom

2. Install trap in dewar

3. Record cylinder pressures (or copy from prev. postflight)
   - LS 160s
   - HS 1650
   - Cytl 17.1
   - UTC = 21:06

4. Turn on O₂ box, start program, and record pressures (or copy from prev. postflight)
   - PaWT 88.3
   - PaSP 71.4
   - PLi840 21.0
   - TMan 22.7
   - UTC = 22:25

Date = 09/11/11

B. 2-hours before take-off

1. Rack power switch on

2. O₂ box Power breaker on

3. Laptop power on

4. Load dry-ice in dewar to within 0.5 inches of lid

5. Record hi-side cylinder pressures and changes overnight
   - LS 1650/ +15
   - HS 1650/ +30
   - Cytl 124.5/ +7.9

6. Open green knobs four ¼ turns and re-record pressures and any changes
   - LS 1670/ +20
   - HS 1650/ +30
   - Cytl 2255

7. Close cylinder box lid

8. Ync into AO2 (192.168.84.138)

9. Start AO2 program by clicking play in higold.vdp

10. Ensure that no USB errors are present in boxes at bottom of screen

11. Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times

   AO2 PC Time 21:27:50
   Rack laptop time 21:27:57

12. Log each hi-side cylinder pressure in software

13. Pump box Power breaker on

14. Cylinder box Power breaker on

15. Record instrument pressures and changes overnight
   - PaWT 900/ +15
   - PaSP 380/ +4
   - PLi840 262/ +5
   - TMan 24.6/ +1.7

16. Pump box Pump 2 breaker on

17. Manual VAC valve open

18. Check that PaCO₂ = 330 torr (± 5) and PaO₂ = 94 torr (± 1). If not, adjust.
   - PaCO₂ 341
   - PaO₂ 94

19. Click Initialize Cal Flow button

20. Ensure that flow starts through both lines (110 ± 10)
   - FIWT (to cell) 1 x 1
   - FISP (to bypass) 1 x 1
21) Toggle changeover to check flows in other position.

FIWT (to bypass) 1
FISP (to cell) 0

22) If necessary, adjust HA-3 to match FIWT on bypass and cell to ±2 sccm

23) Check / adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr

24) Close cylinder box lid

25) Return to WT selected when done checking regulators

26) Check that PdWT (±0.1), PdSP (±0.1), and PdO2 (±0.01) are controlling

27) Light lamp and ensure that it comes on

28) If necessary, adjust PaO2 to keep signal below 10 V

29) Click Initialize Sample Flow button

30) Pump box Pump 1 breaker on

31) Ensure that Fridge P stabilizes near 805 (±10) torr after 2 min.

Fridge P 747 SA Purge Flow 714

32) Snoop trap fittings

33) Pump box Pump 1 breaker off

34) >= 10 min. after lamp on record values in first row of table below

35) Enable changeover valve (uncheck disable)

36) >= 10 min. after change-over enable, record values in table below

<table>
<thead>
<tr>
<th>UTC</th>
<th>Gas</th>
<th>O2d</th>
<th>CO2n</th>
<th>O2n</th>
<th>SPm</th>
<th>WTM</th>
<th>Totm</th>
<th>mA</th>
<th>PdO2n</th>
<th>PdSPn</th>
<th>PdWTm</th>
</tr>
</thead>
<tbody>
<tr>
<td>21:43:30</td>
<td>wt</td>
<td>0.61</td>
<td>3.7</td>
<td>NA</td>
<td>NA</td>
<td>8.4</td>
<td>NA</td>
<td>0.37</td>
<td>4.72</td>
<td>5.62</td>
<td>4.76</td>
</tr>
<tr>
<td>21:53:00</td>
<td>wt</td>
<td>0.63</td>
<td>1.94</td>
<td>18</td>
<td>-12.1</td>
<td>4</td>
<td>30</td>
<td>0.24</td>
<td>4.34</td>
<td>4.76</td>
<td></td>
</tr>
</tbody>
</table>

37) Disable changeover

38) If necessary, toggle changeover to get SP to Cell

39) Close WT 248 valve

C. 20-min before take-off

1) WT 248 valve to Auto (uncheck close)

2) Enable changeover (uncheck disable)

3) Adjust / record program parameters (nominal set to a, 50, 3, 3, 4)

   Flag 5a  Cal Interval 50  Cal Period 5  LTF 3  WTF 4

4) Click Start button on main screen

5) Click Proceed button on control screen

6) Minimize “Verify Run Plan” window

7) Note cryo temperature

8) Before LT starts (after HS-LS) or upon taxi, Pump box Pump 1 breaker on

9) If ground held extended 10-20 min., set CallInt to 1 until take-off

10) If ground held extended > 20 min, go to Manual and run WT until take-off

11) Note time of wheels up

II. During Flight

Keep-VNC-off as much as possible, only connecting when necessary to adjust cals.

A02 input test:

01:48:30  374.7 ± 0.5
01:49:30  374.5 ± 0.5
Record flight notes in text file AO2_YYYYMMDD_RF##_Notes.txt

III. Postflight

1. Note time of wheels down
2. Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)
3. Click Stop button
4. Turn off lamp
5. Close SA, WT, SP, and O2 248 valves in software
6. Select None in cylinder box control section and uncheck any purges
7. Close manual VAC valve
8. Pump box Pump 1 breaker off
9. Note cryo temperature
10. Cylinder box Power breaker off
11. Pump box Pump 2 breaker off
12. Pump box Power breaker off
13. Record pressures for a leak check
   PaWT 7616 PaSP 7.03 PLi84017.5 TMan 23.7 UTC = 07:40
   LS 1580 HS 1600 CylT1 13.8
   LT 360 WT 1200 CylT2 15
14. Open cylinder box lid and record cylinder pressures for a leak check
   UTC = 07:42
15. Close all 4 green valves
16. Close cylinder box lid
17. Log each hi-side cylinder pressure in software
18. Close program and Visual Basic
19. Copy data (*.mr, *.hr, *.txt) to laptop and then data and notes, etc. to pen drive
20. Shut down AO2 PC
21. Shut down laptop
22. After green “SP to Cell” light has gone out, O2 box Power breaker off
23. Rack power switch off
24. Pull trap, jumper quick-connects, and install stopper
25. Open trap and remove glass beads

IV. Troubleshooting / procedures

A. Time sync not working: set timeserver IP of timeserver to 192.168.84.1 and click update now. Also, can try 192.168.184.10. Ask tech about any server issues.

B. Other network problems: AO2 IP address = 192.168.84.138, Laptop IP address = 192.168.84.137.

C. O2 signal ~ 50 % low and noisy. Turn lamp off and relight, up to 10 times to try to fix. Can also try full power down and back up of instrument.
NCAR Airborne Oxygen Instrument (AO2) Checklist  
V. 09.11.11

Date 09/11/17  Campaign HIPPO  Flight AO2  From PWK To HANC

I. Preflight

A. Day(s) before flight
1) Prepare trap with clean glass beads filled to 1 inch from bottom
2) Install trap in dewar
3) Record cylinder pressures (or copy from prev. postflight)
   LS  1575  HS  1605  CylT1  24995  UTC  =  21:45
   LT  355   WT  1265
4) Turn on O2 box, start program, and record pressures (or copy from prev. postflight)
   PaWT  70  PaSP  68  PLi840  17.1  TMan  22.3  UTC  =  22:57

B. 2-hours before take-off
1) Rack power switch on
2) O2 box Power breaker on
3) Laptop power on
4) Load dry-ice in dewar to within 0.5 inches of lid
5) Record hi-side cylinder pressures and changes overnight (P / Δ)
   LS  1606/40  HS  1650/25  CylT1  25
   LT  250  WT  1285/20
6) Open green knobs four 1/4 turns and re-record pressures and any changes
   LS  1620/15  HS  1645/15  CylT2  25
   LT  350/10  WT  1290/15
7) Close cylinder box lid
8) Vnc into into AO2 (192.168.84.138)
9) Start AO2 program by clicking play in higold.vdp
10) Ensure that no USB errors are present in boxes at bottom of screen
11) Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times


12) Log each hi-side cylinder pressure in software
13) Pump box Power breaker on
14) Cylinder box Power breaker on
15) Record instrument pressures and changes overnight (P / Δ)
   PaWT  1057  PaSP  lybo  PLi840  273  TMan  21.5
16) Pump box Pump 2 breaker on
17) Manual VAC valve open
18) Check that PaCO2 = 330 torr (± 5) and PaO2 = 94 torr (± 1). If not, adjust.
   PaCO2  3.40  PaO2  94
19) Click Initialize Cal Flow button
20) Ensure that flow starts through both lines (110 ± 10)
   FIWT (to cell)  18  FISP (to bypass)  104
21) Toggle changeover to check flows in other position

FIWT (to bypass) \( \leq \) FISP (to cell) \( \geq \)

22) If necessary, adjust HA-3 to match FIWT on bypass and cell to \( \pm 2 \) scem

23) Check / adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr

24) Close cylinder box lid

25) Return to WT selected when done checking regulators

26) Check that PdWT (\( \pm 0.1 \)), PdSP (\( \pm 0.1 \)), and PdO2 (\( \pm 0.01 \)) are controlling

27) Light lamp and ensure that it comes on

28) If necessary, adjust PaO2 to keep signal below 10 V

29) Click Initialize Sample Flow button

30) Pump box Pump 1 breaker on

31) Ensure that Fridge P stabilizes near 805 (\( \pm 10 \)) torr after 2 min.

Fridge P \( \leq \) SA Purge Flow \( \geq \)

32) Snoop trap fittings

33) Pump box Pump 1 breaker off

\( \geq \) 10 min. after lamp on record values in first row of table below

38) Enable changeover valve (uncheck disable) UTC = 19:11

\( \geq \) 10 min. after change-over enable, record values in table below

<table>
<thead>
<tr>
<th>UTC</th>
<th>Gas</th>
<th>O2d</th>
<th>CO2n</th>
<th>O2n</th>
<th>SPm</th>
<th>WTm</th>
<th>Totm</th>
<th>mA</th>
<th>PdO2n</th>
<th>PdSPn</th>
<th>PdWTn</th>
</tr>
</thead>
<tbody>
<tr>
<td>19:11</td>
<td>NA</td>
<td>NA</td>
<td>0.75</td>
<td>5.35</td>
<td>NA</td>
<td>10.7</td>
<td>NA</td>
<td>0.376</td>
<td>4.36</td>
<td>6.1</td>
<td>5.82</td>
</tr>
<tr>
<td>17:26</td>
<td>NA</td>
<td>NA</td>
<td>456</td>
<td>2.36</td>
<td>2.66</td>
<td>10.7</td>
<td>8.68</td>
<td>6.27</td>
<td>0.26</td>
<td>4.0</td>
<td>5.82</td>
</tr>
</tbody>
</table>

37) Disable changeover

38) If necessary, toggle changeover to get SP to Cell

39) Close WT 248 valve

C. 20-min before take-off

1) WT 248 valve to Auto (uncheck close)

2) Enable changeover (uncheck disable)

3) Adjust / record program parameters (nominally set to a, 50, 3, 3, 4)

4) Click Start button on main screen

5) Click Proceed button on control screen

6) Minimize “Verify Run Plan” window

7) Note cryo temperature UTC = 19:40:00

8) Before LT starts (after HS-LS) or upon taxi, Pump box Pump 1 breaker on UTC = 19:52

9) If ground hold extended 10-20 min., set CallInt to 1 until take-off

10) If ground hold extended > 20 min., go to Manual and run WT until take-off UTC = 20:08:10

III. During Flight

Keep VNC off as much as possible, only connecting when necessary to adjust cals.
III. Postflight

1. Note time of wheels down
2. Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)
3. Click Stop button
4. Turn off lamp
5. Close SA, WT, SP, and O2 248 valves in software
6. Select None in cylinder box control section and uncheck any purges
7. Close manual VAC valve
8. Pump box pump 1 breaker off
9. Note cryo temperature
10. Cylinder box power breaker off
11. Pump box pump 2 breaker off
12. Pump box power breaker off
13. Record pressures for a leak check
   PaWT 862 PaSP 761 PLi840 14.3 TMan 24.7 UTC = 03:53
14. Open cylinder box lid and record cylinder pressures for a leak check
   LS 568 HS 669 CylT1 16.9
   LT 350 WT 1010 CylT2 16.2

15. Close all 4 green valves
16. Close cylinder box lid
17. Log each hi-side cylinder pressure in software
18. Close program and Visual Basic
19. Copy data (*.mr, *.hr, *.txt) to laptop and then data and notes, etc. to pen drive
20. Shut down AO2 PC
21. Shut down laptop
22. After green “SP to Cell” light has gone out, O2 box power breaker off
23. Rack power switch off
24. Pull trap, jumper quick-connects, and install stopper
25. Open trap and remove glass beads

IV. Troubleshooting / procedures

A. Time sync not working; set timeserver IP of timeserver to 192.168.84.1 and click update now. Also, can try 192.168.184.10. Ask tech about any server issues.

B. Other network problems: AO2 IP address = 192.168.84.138, Laptop IP address = 192.168.84.137.

C. O2 signal ~ 50% low and noisy. Turn lamp off and relight, up to 10 times to try to fix. Can also try full power down and back up of instrument.
NCAR Airborne Oxygen Instrument (AO2) Checklist  V. 09.11.11

Date 09/11/20  Campaign Hippo2  Flight RF-lo  From PANC To PANC

I. Preflight

A. Day(s) before flight

1. Prepare trap with clean glass beads filled to 1 inch from bottom

2. Install trap in dewar

3. Record cylinder pressures (or copy from prev. postflight)
   LS 1540  HS 1545  CyIT1 18.6  UTC = 0:25
   LT 345 WT 19  17:08

4. Turn on O2 box, start program, and record pressures (or copy from prev. postflight)
   PaWT 865  PaSP 757 PLi840 21.2TMan 233  UTC = 0:30

B. 2-hours before take-off

1. Rack power switch on

2. O2 box Power breaker on

3. Laptop power on

4. Load dry-ice in dewar to within 0.5 inches of lid

5. Record hi-side cylinder pressures and changes overnight (P/Δ)

6. Open green knobs four ¼ turns and re-record pressures and any changes

7. Close cylinder box lid

8. Vnc into into AO2 (192.168.84.138)

9. Start AO2 program by clicking play in higold.vdp

10. Ensure that no USB errors are present in boxes at bottom of screen

11. Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times

AO2 PC Time 16:40, Rack laptop time 16:41:09

12. Log each hi-side cylinder pressure in software

13. Pump box Power breaker on

14. Cylinder box Power breaker on

15. Record instrument pressures and changes overnight (P/Δ)

16. Pump box Pump 2 breaker on

17. Manual VAC valve open

18. Check that PaCO2 = 330 torr (±5) and PaO2 = 94 torr (±1). If not, adjust

19. Click Initialize Cal Flow button

20. Ensure that flow starts through both lines (110 ± 10)

FIWT (to cell) 0  FISP (to bypass) 0
21) Toggle changeover to check flows in other position

FIWT (to bypass) 110 FISP (to cell) 105

22) If necessary, adjust HA-3 to match FIWT on bypass and cell to ±2 sccm

23) Check/adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr

24) Close cylinder box lid

25) Return to WT selected when done checking regulators

26) Check that PdWT (±0.1), PdSP (±0.1), and PdO2 (±0.01) are controlling

27) Light lamp and ensure that it comes on

28) If necessary, adjust PaO2 to keep signal below 10 V

29) Click Initialize Sample Flow button

30) Pump box Pump 1 breaker on

31) Ensure that Fridge P stabilizes near 805 (±10) torr after 2 min.

Fridge P 798 SA Purge Flow 11.6

32) Snoop trap fittings

33) Pump box Pump 1 breaker off

34) >= 10 min. after lamp on record values in first row of table below

35) Enable changeover valve (uncheck disable) UTC = 18:16

36) >= 10 min. after change-over enable, record values in table below

<table>
<thead>
<tr>
<th>UTC</th>
<th>Gas</th>
<th>O2d</th>
<th>CO2n</th>
<th>O2n</th>
<th>SPm</th>
<th>WTm</th>
<th>Totm</th>
<th>mΔ</th>
<th>PdO2n</th>
<th>PdSpn</th>
<th>PdWTn</th>
</tr>
</thead>
<tbody>
<tr>
<td>18:16</td>
<td>W</td>
<td>NA</td>
<td>0.76</td>
<td>3.18</td>
<td>NA</td>
<td>NA</td>
<td>11.6</td>
<td>NA</td>
<td>0.364</td>
<td>4.35</td>
<td>4.4</td>
</tr>
<tr>
<td>18:33</td>
<td>W</td>
<td>0.64</td>
<td>2.0</td>
<td>9.9</td>
<td>6.3</td>
<td>16</td>
<td>0.45</td>
<td>4.2</td>
<td>6.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

37) Disable changeover

38) If necessary, toggle changeover to get SP to Cell

39) Close WT 248 valve

C. 20-min before take-off

1) WT 248 valve to Auto (uncheck close)

2) Enable changeover (uncheck disable)

3) Adjust/record program parameters (nominally set to a, 50, 3, 3, 4)

   Flag  Cal Interval 50 Cal Period 3 LTF 3 WTf 4

4) Click Start button on main screen

5) Click Proceed button on control screen

6) Minimize "Verify Run Plan" window

7) Note cryo temperature

8) Before LT starts (after HS-LS) or upon taxi, Pump box Pump 1 breaker on

9) If ground hold extended 10-20 min., set CallInt to 1 until take-off

10) If ground hold extended > 20 min., go to Manual and run WT until take-off

11) Note time of wheels up

UTC = 19:02:10

II. During Flight

Keep VNC off as much as possible, only connecting when necessary to adjust cals.
III. Postflight

1. Note time of wheels down UTC = 02:34:55
2. Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)
3. Click Stop button
4. Turn off lamp
5. Close SA, WT, SP, and O2 248 valves in software
6. Select None in cylinder box control section and uncheck any purges
7. Close manual VAC valve
8. Pump box Pump 1 breaker off
9. Note cryo temperature
10. Cylinder box Power breaker off
11. Pump box Pump 2 breaker off
12. Pump box Power breaker off
13. Record pressures for a leak check
   PaWT 669 PaSP 729 PLi840 340 TMan 25.2 UTC = 02:46
14. Open cylinder box lid and record cylinder pressures for a leak check
   LS 1520 HS 1560 Cy1T1 17.4 UTC = 02:46.8
   LT 340 WT 740 Cy1T2 16.8
15. Close all 4 green valves
16. Close cylinder box lid
17. Log each hi-side cylinder pressure in software
18. Close program and Visual Basic
19. Copy data (*.mr, *.hr, *.txt) to laptop and then data and notes, etc. to pen drive
20. Shut down AO2 PC
21. Shut down laptop
22. After green “SP to Cell” light has gone out, O2 box Power breaker off
23. Rack power switch off
24. Pull trap, jumper quick-connects, and install stopper
25. Open trap and remove glass beads

IV. Troubleshooting / procedures

A. Time sync not working: set timeserver IP of timeserver to 192.168.84.1 and click update now. Also, can try 192.168.184.10. Ask tech about any server issues.

B. Other network problems: AO2 IP address = 192.168.84.138, Laptop IP address = 192.168.84.137.

C. O2 signal ~ 50 % low and noisy. Turn lamp off and relight, up to 10 times to try to fix. Can also try full power down and back up of instrument.
NCAR Airborne Oxygen Instrument (AO2) Checklist  

Date 09/11/22  Campaign HIPOZ  Flight REFII  From PANCA To VCBJC

1. Preflight

   A. Day(s) before flight NO day before flight 5
      Date = 09/11/22
      1) Prepare trap with clean glass beads filled to 1 inch from bottom
      2) Install trap in dewar
      Trap Letters Top/Bottom = C/B
      3) Record cylinder pressures (or copy from prev. postflight)
         LS 1490  HS 1640  CyL T1 16.9
         LT 535  WT 275
      4) Turn on O2 box, start program, and record pressures (or copy from prev. postflight)
         PaWT 865  PaSP 577  PLi840 21.9  TMan17.1
         UTC = 15:21
         UTC = 16:25

   B. 2-hours before take-off
      Instrument Operator  JD B
      1) Rack power switch on
      2) O2 box Power breaker on
      3) Laptop power on
      4) Load dry-ice in dewar to within 0.5 inches of lid
         UTC = 17:00
      5) Record hi-side cylinder pressures and changes overnight (P / Δ)
         LS 1520 + 30  HS 1580 + 50  CyL T2 16.7
         LT 340 + 5  WT 9.5 + 2.5
      6) Open green knobs four ¼ turns and re-record pressures and any changes
      7) Close cylinder box lid
      8) Vic into into AO2 (192.168.84.138)
      9) Start AO2 program by clicking play in higold.vdp
      10) Ensure that no USB errors are present in boxes at bottom of screen
      11) Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times
       AO2 PC Time 17:01, Rack laptop time 17:01
       12) Log each hi-side cylinder pressure in software
      13) Pump box Power breaker on
      14) Cylinder box Power breaker on
      15) Record instrument pressures and changes overnight (P / Δ)
         PaWT 269  PaSP 237  PLi84022 18.8  TMan17.8 + 2
      16) Pump box Pump 2 breaker on
      17) Manual VAC valve open
      18) Check that PaCO2 = 330 torr (± 5) and PaO2 = 94 torr (± 1). If not, adjust.
         PaCO2 336  PaO2 95
      19) Click Initialize Cal Flow button
      20) Ensure that flow starts through both lines (110 ± 10)
         FIWT (to cell) 108  FISP (to bypass) 104
21) Toggle changeover to check flows in other position

22) FIWT (to bypass) 109 FISP (to cell) 103

23) If necessary, adjust HA-3 to match FIWT on bypass and cell to ±2 sccm

24) Close cylinder box lid

25) Return to WT selected when done checking regulators

26) Check that PdWT (±0.1), PdSP (±0.1), and PdO2 (±0.01) are controlling

27) Light lamp and ensure that it comes on

28) If necessary, adjust PaO2 to keep signal below 10 V

29) Click Initialize Sample Flow button

30) Pump box Pump 1 breaker on

31) Ensure that Fridge P stabilizes near 805 (±10) torr after 2 min.

Fridge P 497 SA Purge Flow 115

32) Snoop trap fittings

33) Pump box Pump 1 breaker off

34) >= 10 min. after lamp on record values in first row of table below

35) Enable changeover valve (uncheck disable) UTC = 17:49

36) >= 10 min. after change-over enable, record values in table below

<table>
<thead>
<tr>
<th>UTC</th>
<th>Gas</th>
<th>O2d</th>
<th>CO2n</th>
<th>O2n</th>
<th>SPm</th>
<th>WTm</th>
<th>Totm</th>
<th>mA</th>
<th>PdO2n</th>
<th>PdSPn</th>
<th>PdWTn</th>
</tr>
</thead>
<tbody>
<tr>
<td>17:48:00</td>
<td>WT</td>
<td>2,6</td>
<td>1,5</td>
<td>1,5</td>
<td>NA</td>
<td>NA</td>
<td>11.9</td>
<td>NA</td>
<td>0.22</td>
<td>3.9</td>
<td>4.03</td>
</tr>
<tr>
<td>18:02:00</td>
<td>WT</td>
<td>423</td>
<td>0.82</td>
<td>1.5</td>
<td>0.01</td>
<td>5.6</td>
<td>9.8</td>
<td>0.27</td>
<td>4.1</td>
<td>4.96</td>
<td></td>
</tr>
</tbody>
</table>

37) Disable changeover

38) If necessary, toggle changeover to get SP to Cell

39) Close WT 248 valve

C. 20-min before take-off

1) WT 248 valve to Auto (uncheck close)

2) Enable changeover (uncheck disable)

3) Adjust / record program parameters (nominally set to a, 50, 3, 3, 4)

   Flag | Cal Interval | Cal Period | LTf | WTF |
   ----|--------------|------------|-----|-----|
   3   | 3            | 3          |     |     |

4) Click Start button on main screen

5) Click Proceed button on control screen

6) Minimize “Verify Run Plan” window

7) Note cryo temperature

   Cryo = -56

8) Before LT starts (after HS-LS) or upon taxi, Pump box Pump 1 breaker on

9) If ground hold extended 10-20 min., set CallInt to 1 until take-off

10) If ground hold extended > 20 min., go to Manual and run WT until take-off

11) Note time of wheels up

II. During Flight

Keep VNC off as much as possible, only connecting when necessary to adjust cals.
Record flight notes in text file AO2 YYYYMMDD_RF###_Notes.txt

III. Postflight

1) Note time of wheels down
2) Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)
3) Click Stop button
4) Turn off lamp
5) Close SA, WT, SP, and O2 248 valves in software
6) Select None in cylinder box control section and uncheck any purges
7) Close manual VAC valve
8) Pump box Pump 1 breaker off
9) Note cryo temperature
10) Cylinder box Power breaker off
11) Pump box Pump 2 breaker off
12) Pump box Power breaker off
13) Record pressures for a leak check
14) Open cylinder box lid and record cylinder pressures for a leak check
15) Close all 4 green valves
16) Close cylinder box lid
17) Log each hi-side cylinder pressure in software
18) Close program and Visual Basic
19) Copy data (*.mr, *.hr, *.txt) to laptop and then data and notes, etc. to pen drive
20) Shut down AO2 PC
21) Shut down laptop
22) After green "SP to Cell" light has gone out, O2 box Power breaker off
23) Rack power switch off
24) Pull trap, jumper quick-connects, and install stopper
25) Open trap and remove glass beads

IV. Troubleshooting / procedures

A. Time sync not working: set timeserver IP of timeserver to 192.168.84.1 and click update now. Also, can try 192.168.184.10. Ask tech about any server issues.

B. Other network problems: AO2 IP address = 192.168.84.138, Laptop IP address = 192.168.84.137.

C. O2 signal ~ 50% low and noisy. Turn lamp off and relight, up to 10 times to try to fix. Can also try full power down and back up of instrument.