

## NCAR Airborne Oxygen Instrument (AO2) Checklist

V. 08.12.12

## I. Preflight

A. Day(s) before flight

Date (YYMMDD) = 20081212

- 1) Prepare trap with clean glass beads filled to 1 inch from bottom  
 2) Install trap in dewar Trap Letters Top/Bottom = \_\_\_ / \_\_\_  
 3) Load cylinders and connect plumbing if necessary *Done yesterday*  
 4) If not done as part of a recent post-flight, record cylinder pressures for an overnight leak check and leave green valves closed UTC = 11:15 MST  
 LS 300 / 4.7 HS 1170 / 6.1  
 LT 700 / 5.6 WT 0 / 0 (18:15 UTC)  
 5) If not done recently, turn on instrument, record pressures for an overnight leak check and leave 248 and VAC valves closed UTC = \_\_\_ : \_\_\_  
 PaWT \_\_\_\_\_ PaCO2 \_\_\_\_\_  
 PaSP \_\_\_\_\_ PaO2 \_\_\_\_\_

B. 2-hours before take-off

Date (YYMMDD) 081213 Flight (e.g. RF01) TF01Instrument Operator J Bent

CHECK FLIGHT +

- 1) O<sub>2</sub> box Power breaker on (takes ~ 4-min to come up on internet, 6-min for program to start, and 7.5-min for screen to be active) UTC = 11:20  
 2) Laptop power on if not already  
 3) Load dry-ice in dewar to within 0.5 inches of lid UTC = 11:10 SB  
 4) Record cylinder pressures for overnight leak check (high / low)  
 (hi / low,  $\Delta$ hi /  $\Delta$ low)  
 LS 300 / 4.7, \_\_\_ / \_\_\_ HS 1170 / 6.1, \_\_\_ / \_\_\_  
 LT 700 / 5.6, \_\_\_ / \_\_\_ WT 0 / 0, \_\_\_ / \_\_\_  
 5) Open green knobs four ¼ turns and note any changed hi-side pressures  
 LS 1170 HS 1200  
 LT 690 WT 310  
 6) Close cylinder box lid (one screw)  
 7) Open terminal on laptop and vnc ("vncviewer 192.168.84.138") into AO2  
 8) Start AO2 program by clicking play in higold.vdp (higold.vdp opens automatically after ~ 5 min.)  
 9) Ensure that no USB errors are present in boxes at bottom of screen  
 10) Check that NTP time sync is working by right-clicking clock, selecting Adjust Date and Time, then selecting Internet Time tab  
 AO2 PC Time 6:26:00, Rack laptop time 11:26:02  
 11) Log each hi-side cylinder pressure in software by clicking Cylinder Record button then entering pressure from (5) above and clicking Log P  
 12) Pump box Power breaker on  
 13) Pump box Fridge breaker on UTC = \_\_\_ : \_\_\_  
 14) Cylinder box Power breaker on

- ✓ 15) Record instrument pressures for any overnight leak checks (P / change)  
PaWT 850 /      PaCO2 604 /       
PaSP 801 /      PaO2 78.1 /
- ✓ 16) Pump box Pump 2 breaker on
- ✓ 17) Manual VAC valve open
- ✓ 18) Check that PaCO2 = 615 torr (± 5) and PaO2 = 75 torr (± 1). If not, adjust  
PaCO2 617 PaO2 74
- ✓ 19) Click Initialize Cal Flow button
- ✓ 20) Open Cylinder Box lid and spin WT regulator knob to ~ 4 psi.
- ✓ 21) Ensure that WT flow starts through both lines and WT light on cyl. box lit  
FIWT 224 FISP 214
- ✓ 22) Adjust regulator pressures for WT, LT, LS, and HS by selecting gas in software and setting PaSP to 785 +/- 5 torr (will settle to 780)
- ✓ 23) Return to WT selected when done adjusting regulators
- ✓ 24) Close cylinder box lid (all 3 screws)
- ✓ 25) Check that PdWT (±0.1), PdSP (±0.1), and PdO2 (±0.01) are controlling ✓
- ✓ 26) Light lamp (select RF On check box and click "Spark for 2-seconds" button) and ensure that it comes on UTC = 11:46
- ✓ 27) After ~ 10 min. record values in first row of table below
- ✓ 28) Once outside hangar and fueling of aircraft is finished, click Initialize Sample Flow button and proceed
- ✓ 29) Pump box Pump 1 breaker on *PUMP SOUNDS UNHAPPY - PERIODIC VIBRATIONS EVERY 1-2 Sec*
- ✓ 30) Ensure that Fridge P stabilizes near 805 (±10) torr after 2 min.  
Fridge P 730 SA Purge Flow 220
- ✓ 31) Snoop large trap connections (including 1/8" swage, QCs, and flanges)
- ✓ 32) If necessary, adjust HA-3 to match bypass and cell flow ±1 scfm
- ✓ 33) Enable change-over valve UTC = 19:27:50
- ✓ 34) After ~ 10 min. record values in second row of table below

C. 20-min before take-off

FOR TE01, use calinterval = 30, cal period = 3, LT freq = 1, WT freq = 1

- ✓ 1) Adjust output flag (flight code), cal interval, cal period, LT freq, and WT freq values if necessary and note values (nominally set to a, 40, 3.0, 3, 4)  
a Flag      Cal Interval 30 Cal Period 3 LTF 1 WtF 1
- ✓ 2) Click Start button on main screen
- ✓ 3) Click Proceed button on control screen UTC = 12:39:00
- ✓ 4) Minimize "Verify Run Plan" window
- 5) Note time at which taxi starts UTC =     :    :
- 6) Note time of wheels up UTC =     :    :

~~SP-OUT~~  
↓  
slope diff

UTC	Gas	O2d	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn
18:59:50	WT	NA	11.56	NA	NA	<del>362</del>	NA	0.682	5.6	5.1
19:37:00	WT	12524	234	-11.5	18.6	546	-25.9	0.006	4.8	5.3
:	:									
:	:									

WT P is @ 840  
when other tanks  
are selected  
is this ok?

II. During Flight

UTC	Notes
: :	DURING CHECK FLIGHT, A02 VUV Lamp
: :	failed - turned off, possibly
: :	
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Time of shutdown roughly, not landing

III. Postflight

- 1) Note time of wheels down and skip to (3) UTC = 22:30 ish
- 2) Note time of taxi stop UTC = \_\_:\_\_:\_\_
- 3) Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)
- 4) Click Stop button
- 5) Turn off lamp
- 6) Close SA, WT, and SP 248 valves and open O2 248 valve in software
- 7) Pump box Pump 1 breaker off
- 8) Select None in cal box control section
- 9) Pump box Fridge breaker off
- 10) Note cryo temperature Cryo = -78 C
- 11) Cylinder box Power breaker off
- 12) >= 1 minute after WT and SP 248 valves were closed, close O2 248 valve using check box in software

- 13) Close manual VAC valve
- 14) Pump box Pump 2 breaker off
- 15) Pump box Power breaker off
- 16) Record pressures for a leak check
 

PaWT	<u>934</u>	PaCO2	<u>621</u>
PaSP	<u>927</u>	PaO2	<u>74</u>

Recorded after Green valves were closed - prep work finished.

UTC = 22:38

After

DIDN'T HAVE TIME

- 17) Open cylinder box lid and **close green valves**
- 18) ~~Back all regulator knobs fully out~~
- 19) Record cylinder pressures for a leak check
 

LS	<u>1120 / 4.5</u>	HS	<u>1170 / 5</u>
LT	<u>700 / 5</u>	WT	<u>0 / 6</u>
- 20) Close cylinder box lid (all 3 screws)
- 21) Log each hi-side cylinder pressure in software by clicking Cylinder Record button then entering "open" pressure from above and clicking Log P
- 22) Close program (red X) and Visual Basic if necessary (red X)
- 23) Optional: ftp data (requires satellite or hard-line server connection). Open command window, cd to C:\Data, ftp to ftp.eol.ucar.edu, log in as anonymous, cd (in one step) to /pub/temp/field/incoming/ao2data, and put YYMMDD\*.mr, YYMMDD\*.hr, and hgcylllog.txt

(NO TIME)

- 24) Shut down AO2 PC
- 25) Shut down laptop
- 26) After green "SP to Cell" light has gone out (~ 5-min), O2 box Power breaker off
- 27) Tell technician it is OK to power down
- 28) Pull trap, take to lab, open and remove glass beads. Note amount and location of ice: \_\_\_\_\_
- 29) Pull cylinders if necessary for lab calibration



## NCAR Airborne Oxygen Instrument (AO2) Checklist

V. 08.12.16

## I. Preflight

A. Day(s) before flight

Date (YYMMDD) = 081216

- 1) Prepare trap with clean glass beads filled to 1 inch from bottom - installed 12/15, used for some ground testing  
 2) Install trap in dewar Trap Letters Top/Bottom = A/C  
 3) Load cylinders and connect plumbing if necessary  
 4) If not done as part of a recent post-flight, record cylinder pressures for an overnight leak check and leave green valves closed UTC = 23:53  
 LS 930/4.3 HS 1170/4.1  
 LT 650/4.3 WT 1700/4.2  
 5) If not done recently, turn on instrument, record pressures for an overnight leak check and leave 248 and VAC valves closed UTC = 23:54  
 PaWT 845 PaCO2 349  
 PaSP 839 PaO2 83.5

B. 2-hours before take-off

Date (YYMMDD) 081217 Flight (e.g. RF01) TF02  
Instrument Operator BS

- 1) O<sub>2</sub> box Power breaker on (<sup>5 min</sup>takes ~ 4-min to come up on internet, <sup>5 min</sup>6-min for program to start, and <sup>5 min</sup>7.5-min for screen to be active) UTC = 16:08  
 2) Laptop power on if not already  
 3) Load dry-ice in dewar to within 0.5 inches of lid UTC = 16:00  
 4) Record cylinder pressures for overnight leak check (high / low)  
 (hi / low, Δhi / Δlow)  
 LS 920/4.1, HS 1150/4.1, -20/0  
 LT 680/4.1, +20/-0.2 WT 1680/4.1, -20/-0.1  
 5) Open green knobs four ¼ turns and note any changed hi-side pressures  
 LS 920 HS 1160  
 LT 680 WT 1690  
 6) Close cylinder box lid (~~one screw~~)  
 7) Open terminal on laptop and vnc ("vncviewer 192.168.84.138") into AO2  
 8) Start AO2 program by clicking play in higold.vdp (higold.vdp opens automatically after ~ 5 min.)  
 9) Ensure that no USB errors are present in boxes at bottom of screen  
 10) Check that NTP time sync is working by right-clicking clock, selecting Adjust Date and Time, then selecting Internet Time tab  
 AO2 PC Time 4:19:00, Rack laptop time 9:19:02  
 11) Log each hi-side cylinder pressure in software by clicking Cylinder Record button then entering pressure from (5) above and clicking Log P  
 12) Pump box Power breaker on  
 13) Pump box Fridge breaker on UTC =    :     
 14) Cylinder box Power breaker on

- ✓ 15) Record instrument pressures for any overnight leak checks (P / change)  
PaWT  $840.7 - 9.3$  PaCO2  $345.01 - 4$   
PaSP  $791 / 48$  PaO2  $84.1 / +.6$
- ✓ 16) Pump box Pump 2 breaker on
- ✓ 17) Manual VAC valve open
- ✓ 18) Check that PaCO2 = 350 torr ( $\pm 5$ ) and PaO2 = 85 torr ( $\pm 1$ ). If not, adjust  
PaCO2 same PaO2 same
- ✓ 19) Click Initialize Cal Flow button
- ~~20) Open Cylinder Box lid and spin WT regulator knob to ~4 psi.~~
- ✓ 21) Ensure that WT flow starts through both lines and WT light on cyl. box lit  
FIWT 118 FISP 115
- ✓ 22) Adjust regulator pressures for WT, LT, LS, and HS by selecting gas in software and setting PaSP to 785 +/- 5 torr (will settle to 780)
- ✓ 23) Return to WT selected when done adjusting regulators *checking and/or*
- ~~24) Close cylinder box lid (all 3 screws)~~
- ✓ 25) Check that PdWT ( $\pm 0.1$ ), PdSP ( $\pm 0.1$ ), and PdO2 ( $\pm 0.01$ ) are controlling
- ✓ 26) Light lamp (select RF On check box and click "Spark for 2-seconds" button) and ensure that it comes on UTC = 16:31
- ✓ 27) After ~ 10 min. record values in first row of table below
- ✓ 28) Once outside hangar and fueling of aircraft is finished, click Initialize Sample Flow button and proceed *checked @ 16:32 before reling*
- ✓ 29) Pump box Pump 1 breaker on
- ✓ 30) Ensure that Fridge P stabilizes near 805 ( $\pm 10$ ) torr after 2 min.  
Fridge P 800 SA Purge Flow 122
- ✓ 31) Snoop large trap connections (including 1/8" swage, QCs, and flanges)
- ~~32) If necessary, adjust HA-3 to match bypass and cell flow  $\pm 1$  scfm~~
- ✓ 33) Enable change-over valve UTC = 16:33
- ✓ 34) After ~ 10 min. record values in second row of table below

EDIT  
"if necessary" EDIT

? S

how set to 2.7?

C. 20-min before take-off

- ✓ 1) Adjust output flag (flight code), cal interval, cal period, LT freq, and WT freq values if necessary and note values (nominally set to a, 40, 3.0, 3, 4)  
Flag 9 Cal Interval 30 Cal Period 30 LTf 3 WTf 4
- ✓ 2) Click Start button on main screen
- ✓ 3) Click Proceed button on control screen UTC = 17:45:06
- ✓ 4) Minimize "Verify Run Plan" window
- ✓ 5) Note time at which taxi starts ~ UTC = 17:54:50
- 6) Note time of wheels up UTC = 18:03:36

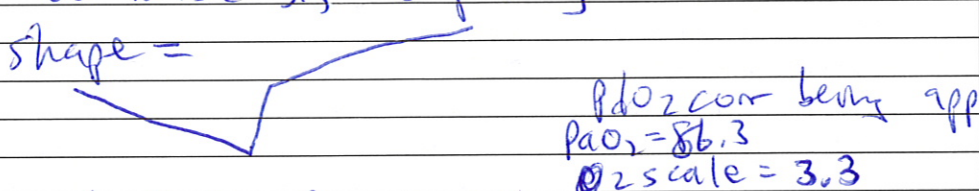
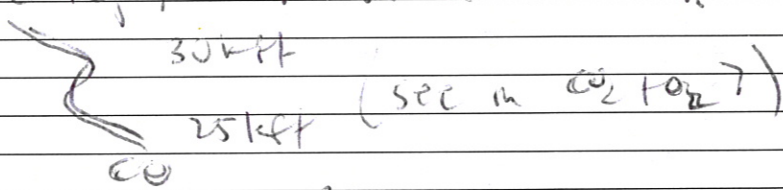
rolling: 18:03:10

30 2.5 min below

UTC	Gas	O2d	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn
16:51:	WT	NA	4.1	NA	NA	9.4	NA	0.93	6.4	5.6
17:19:20	WT		0.99			1.0		0.4	6	5
17:43:00	WT	653	4.0	8.6	-7.3	1.7	16	0.5	5	5
:	:									

no vs.

II. During Flight

UTC	Notes
: : 2:15	from 18:18 to today
: :	No p cab?
: :	
: :	MED Stat 1 cal is off 0.8 instead of 1
: :	MED H2O not working
: :	MED CO2 = 40 ppm?!
: :	Aoz STAT pags low
19:12:30	light chop
19:41:	O2 noise $\sim 4$ on STA $p_{O_2} = 0.05$
19:50:	on HS, $M\Delta = 8.5 (6.5 / -2.4 / 1.8)$
: :	O2 noise 3.5 $\rightarrow$ 5 per meg
: :	shape = 
: :	
19:55:30	out of 45 for 41 kft
20:27:	Aoz DSM out $\rightarrow$ rebooted
20:29:	descending $\rightarrow$ to MAN to avoid cab
2: :	to PNC
: :	Fred says say strut air O3 $\sim 3 = 400$
20:42:50	cloud top, see ck out in $\sim 1$ min
: :	
: :	
20:50:	2 layers over PNC
21:17:	back to auto cal
21:15	$\rightarrow$ Aoz CO2 looks weird

37  
36  
29  
22  
15  
8  
1  
(+1)

Applied tonight?

Aoz  $\sim 34$

Aoz

Aoz stat  
MED H2O  
MED CO2

stats on 2 laptops  
"aoz" as host on 2 laptops  
R installed on 2 laptops  
ftp to laptop?  
win scp

22:32

PaO2



## III. Postflight

- 48 hrs
- ✓ 1) Note time of wheels down and skip to (3)      ~ UTC = 22:37 :
  - ✓ 2) Note time of taxi stop      ~ UTC = 22:39 :
  - ✓ 3) Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)
  - ✓ 4) Click Stop button
  - ✓ 5) Turn off lamp
  - ✓ 6) Close SA, WT, and SP 248 valves and open O2 248 valve in software
  - ✓ 7) Pump box Pump 1 breaker off
  - ✓ 8) Select None in cal box control section
  - ✓ 9) Pump box Fridge breaker off
  - ✓ 10) Note cryo temperature      (why purging LS?)      Cryo = -78 .1 C
  - ✓ 11) Cylinder box Power breaker off
  - ✓ 12) >= 1 minute after WT and SP 248 valves were closed, close O2 248 valve using check box in software
  - ✓ 13) Close manual VAC valve
  - ✓ 14) Pump box Pump 2 breaker off
  - ✓ 15) Pump box Power breaker off
  - ✓ 16) Record pressures for a leak check      UTC = 22:41

PaWT	<u>847.7</u>	PaCO2	<u>396</u>
PaSP	<u>822.5</u>	PaO2	<u>84.5</u>
  - ✓ 17) Open cylinder box lid and **close green valves**
  - ~~X~~ 18) ~~Back all regulator knobs fully out~~
  - ✓ 19) Record cylinder pressures for a leak check      UTC = 22:42

LS	<u>900/4.0</u>	HS	<u>1100/4.3</u>
LT	<u>670/4.2</u>	WT	<u>520/4.2</u>
  - ✓ 20) Close cylinder box lid (all 3 screws)
  - ✓ 21) Log each hi-side cylinder pressure in software by clicking Cylinder Record button then entering "open" pressure from above and clicking Log P
  - ✓ 22) Close program (red X) and Visual Basic if necessary (red X)
  - ✓ 23) Optional: ftp data (requires satellite or hard-line server connection). Open command window, cd to C:\Data, ftp to ftp.eol.ucar.edu, log in as anonymous, cd (in one step) to /pub/temp/field/incoming/ao2data, and put YYMMDD\*.mr, YYMMDD\*.hr, and hgcylog.txt
  - ✓ 24) Shut down AO2 PC
  - ~~X~~ 25) Shut down laptop
  - ✓ 26) After green "SP to Cell" light has gone out (~ 5-min), O<sub>2</sub> box Power breaker off
  - ✓ 27) Tell technician it is OK to power down
  - ✓ 28) Pull trap, take to lab, open and remove glass beads. Note amount and location of ice: frost on top 39
  - ~~X~~ 29) Pull cylinders if necessary for lab calibration

Gary Granger  
R →  
Linux CentOS 5

# NCAR Airborne Oxygen Instrument (AO2) Checklist

V. 09.01.03

15:31  
596 609  
610 625  
608 623

## I. Preflight

### A. Day(s) before flight

Date (YYMMDD) = 090105

- 1) Prepare trap with clean glass beads filled to 1 inch from bottom
- 2) Install trap in dewar Trap Letters Top/Bottom = A/C
- 3) Load cylinders and connect plumbing if necessary
- 4) If ~~not done as part of a recent post-flight~~, record cylinder pressures for an overnight leak check and leave green valves closed UTC = 24:00  
 LS 780/13.4 HS 900/13.3  
 LT 570/11.2 WT 270/3.4
- 5) If ~~not done recently~~, turn on instrument, record pressures for an overnight leak check and leave 248 and VAC valves closed UTC = 24:00  
 PaWT 790 PaCO2 ~360  
 PaSP 783 PaO2 ~85

EDIT X

EDIT  
(w/ reg 5 min out, no need of low side leak check)  
EDIT X

### B. 2-hours before take-off

Date (YYMMDD) 20090106 Flight (e.g. RF01) RF02  
Instrument Operator JD B/B S TF03

- 1) O<sub>2</sub> box Power breaker on (takes ~ 4-min to come up on internet and 5-min for program to start and screen to be active) UTC = 15:14 (no display)
- 2) Laptop power on if not already
- 3) Load dry-ice in dewar to within 0.5 inches of lid UTC = 15:14
- 4) Record cylinder pressures for overnight leak check (high / low)  
(hi / low, Δhi / Δlow)  
 LS 780/13.2, 0/-0.2 HS 910/13.4, 0/-0.1  
 LT 580/10.5, 0/-0.7 WT 2140/3.2-30/-0.2
- 5) Open green knobs four ¼ turns and note any changed hi-side pressures  
 LS        HS no changes  
 LT        WT        re-record any (note changes)
- 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 (higold.vdp opens automatically after ~5 min.)
- 9) Ensure that no USB errors are present in boxes at bottom of screen
- 10) Check that NTP time sync is working by right-clicking clock, selecting Adjust Date and Time, then selecting Internet Time tab  
 AO2 PC Time 3:32:30, Rack laptop time 8:32:31
- 11) Log each hi-side cylinder pressure in software by clicking Cylinder Record button then entering pressure from (5) above and clicking Log P
- 12) Pump box Power breaker on
- 13) Pump box Fridge breaker on UTC =    :
- 14) Cylinder box Power breaker on

EDIT X

EDIT X

EDIT



- ✓ 15) Record instrument pressures for any overnight leak checks (P / change)  
 PaWT 783 / -7 PaCO2 358 / -  
 PaSP 743 / -40 PaO2 86 / -
- ✓ 16) Pump box Pump 2 breaker on
- ✓ 17) Manual VAC valve open
- ✓ 18) Check that PaCO2 = 350 torr (± 5) and PaO2 = 85 torr (± 1). If not, adjust  
 PaCO2 354 PaO2 86
- ✓ 19) Click Initialize Cal Flow button
- ✓ 20) Ensure that WT flow starts through both lines and WT light on cyl. box lit  
 FIWT 116 FISP 112
- ✓ 21) Check regulator pressures for WT, LT, LS, and HS by selecting gas in software and setting PaSP to 785 +/- 5 torr (adjust if necessary) X
- ✓ 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 (select RF On check box and click "Spark for 2-seconds" button) and ensure that it comes on UTC = 15:45
- ✓ 25) After ~ 10 min. record values in first row of table below
- ✓ 26) Once outside hangar and fueling of aircraft is finished, click Initialize Sample Flow button and proceed
- ✓ 27) Pump box Pump 1 breaker on
- ✓ 28) Ensure that Fridge P stabilizes near 805 (±10) torr after 2 min.  
 Fridge P 801 SA Purge Flow 118
- ✓ 29) Snoop large trap connections (including 1/8" swage, QCs, and flanges)
- ✓ 30) If necessary, adjust HA-3 to match bypass and cell flow ±1 sccm FISP → 116
- ✓ 31) Enable change-over valve UTC = 16:26
- ✓ 32) After ~ 10 min. record values in second row of table below
- ✓ 33) Verify that inflight tools/spares (IX below) are available. } ? earlier

EDIT

EDIT

Noise prob. leakage

EDIT

C. 20-min before take-off

- ✓ 1) Adjust output flag (flight code), cal interval, cal period, LT freq, and WT freq values if necessary and note values (nominally set to a, 40, 3.0, 3, 4)  
 Flag a Cal Interval 30 Cal Period 2.7 LTF 3 WtF 4
- ✓ 2) Click Start button on main screen
- ✓ 3) Click Proceed button on control screen UTC = 16:47: -
- ✓ 4) Minimize "Verify Run Plan" window
- ✓ 5) Note time at which taxi starts ~ UTC = 16:34: -
- ✓ 6) Note time of wheels up 16:41:25 UTC = 16:41:30

UTC	Gas	O2d	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn
15:50:00	WT	NA	4.3	NA	NA	23	NA	0.3	5	5
16:09:	WT		30			36		1.4	5	6
16:31:	WT	602	4	16	2	12	M	9.3	6	5

was flow/paCO2?

? coil screw broken?  
 → sech's motion

fuel pump off/on  
 → no change  
 lamp off/on ~ 24  
 PaO2 789 sig 48.4  
 huge spikes with then 11 per mg

II. During Flight

UTC	Notes
...	Noise Problem... PaCO <sub>2</sub> & 335
...	FLWT & 108
...	Noise & 3 V D
16:28:	TO MAN chkr, unchecked AS purge to an on WT during taxi out (PCAB chkr?)
16:32:	PCAB = 601 - 601.5
16:35:	PCAB → 609
16:42:	after TO, holding down → 609
16:44:	TO → WT switch to LS gives motion sens period... back to AUTO, starts purging LS and running SAs immediately
16:55:	to SA ~ 27 kft
17:07:	Fred says in Strat
17:10:	17:14 → messing w/ baggage door - PCAB? (leaking)
17:16:30	17:30 breath test on inlet → probably didn't see b/c went to car → need to report w/ CO <sub>2</sub> bottles anyway
17:43:30	44:25 did breath test → no apparent leaks
17:53:43	to MAN → SA, right @ V6 clouds
...	Screen
...	Blue handbook
...	PCAN + update values
...	Aoz stat → data sys problem
...	MED CO <sub>2</sub> + H <sub>2</sub> O act working
...	MEDSTAT 2 work factors working
...	Stepdn prob → email
...	FL X 3 → shipping
...	ARC
...	Aoz/MED - HIPPO
...	START
...	email both x 2
...	REP0 inlet leak tests

50 sec step then 2 min if O<sub>2</sub> noise = 5 purging in 4 sec

data sys problem working factors working

motion effect on MED CO<sub>2</sub> → screws in box? or leak inlet?

III. Postflight

- 1) Note time of wheels down and skip to (3)      ~ UTC = 18:11 : \_\_
- 2) Note time of taxi stop      UTC = \_\_ : \_\_ : \_\_
- 3) Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)

4) Click Stop button



- 5) Turn off lamp
- 6) Close SA, WT, and SP 248 valves and open O2 248 valve in software
- 7) Pump box Pump 1 breaker off
- 8) Select None in cal box control section
- 9) Pump box Fridge breaker off
- 10) Note cryo temperature
- 11) Cylinder box Power breaker off

Pl. 840 = 1202 Cryo = 75.6 C

12) >= 1 minute after WT and SP 248 valves were closed, close O2 248 valve using check box in software  
acc opened p2o2 to amb -

O disable ch1over?

- 13) Close manual VAC valve
- 14) Pump box Pump 2 breaker off
- 15) Pump box Power breaker off

UTC = 18:16

16) Record pressures for a leak check

PaWT	<u>848</u>	PaCO2	<u>337</u>
PaSP	<u>824</u>	PaO2	<u>86</u>

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

18) Record cylinder pressures for a leak check

UTC = 18:20

LS	<u>780 / 4.1</u>	HS	<u>900 / 4.2</u>
LT	<u>570 / 4.6</u>	WT	<u>600 / 4.5</u>

19) Close cylinder box lid (all 3 screws)

check rate...

20) Log each hi-side cylinder pressure in software by clicking Cylinder Record button then entering "open" pressure from above and clicking Log P

21) Close program (red X) and Visual Basic if necessary (red X)

22) Scp data to laptop. Open desktop shortcut to C:\Data, sort files by most recent Date Modified, select YYMMDD\*.mr, YYMMDD\*.hr, and hgcylog.txt, then right-click and "Send-to" ads@192.168.84.139:/home/ads/ao2.

inst + an drive

23) Shut down AO2 PC → copy to pen - instent pen - copy + click "yes" in mount pen drive

24) Shut down laptop

25) After green "SP to Cell" light has gone out (~ 5-min), O2 box Power breaker off

26) Tell technician it is OK to power down

27) Pull trap, take to lab, open and remove glass beads. Note amount and location of ice: \_\_\_\_\_ ?

28) Pull cylinders if necessary for lab calibration

what if nec? close in software get a leak check?

no, bc man vac still open pulling on SP side

EDIT

insert stopper



~~2~~ Phil

# NCAR Airborne Oxygen Instrument (AO2) Checklist

V. 09.01.08

## I. Preflight

A. Day(s) before flight

Date (YYMMDD) = 090107

- 1) Prepare trap with clean glass beads filled to 1 inch from bottom
- 2) Install trap in dewar Trap Letters Top/Bottom = A / E
- 3) Load cylinders and connect plumbing if necessary
- 4) If not done as part of a recent post-flight, record cylinder pressures for an overnight leak check and leave green valves closed UTC = \_\_ : \_\_  
 LS \_\_\_ / \_\_\_ HS \_\_\_ / \_\_\_  
 LT \_\_\_ / \_\_\_ WT \_\_\_ / \_\_\_
- 5) If not done recently, turn on instrument, record pressures for an overnight leak check and leave 248 and VAC valves closed UTC = \_\_ : \_\_  
 PaWT \_\_\_ PaCO2 \_\_\_  
 PaSP \_\_\_ PaO2 \_\_\_

B. 2-hours before take-off

Date (YYMMDD) 090108 Flight (e.g. RF01) RF01 leg 1  
Instrument Operator BS

- 1) O<sub>2</sub> box Power breaker on (takes ~ 4-min to come up on internet and 5-min for program to start and screen to be active) UTC = 14 : 34
- 2) Laptop power on if not already
- 3) Load dry-ice in dewar to within 0.5 inches of lid ~ UTC = 14 : 00
- 4) Record cylinder pressures for overnight leak check (high / low)  
( hi / low , Δhi / Δlow )  
 LS 790 / 4.3 , +10 / +.2 HS 910 / 4.4 , +10 / +.2 ✓  
 LT 590 / 4.5 , +20 / -.6 WT 2070 / 4.5 , +20 / 0
- 5) Open green knobs four ¼ turns and note any changed hi-side pressures  
 LS 790 HS 920 *re-record*  
 LT 580 WT 2080
- 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 2 : 46 : 10 , Rack laptop time 14 : 46 : 12
- 11) Log each hi-side cylinder pressure in software by clicking Cylinder Record button then entering pressure from (5) above and clicking Log P
- 12) Pump box Power breaker on
- 13) Pump box Fridge breaker on \_\_\_\_\_ UTC = \_\_ : \_\_
- 14) Cylinder box Power breaker on
- 15) Record instrument pressures for any overnight leak checks (P / change)  
 PaWT 857 / \_\_\_ PaCO2 602 / \_\_\_

FOIT

602 ?

PaSP 774 / \_\_\_\_\_ PaO2 592 / \_\_\_\_\_

- ✓ 16) Pump box Pump 2 breaker on
- ✓ 17) Manual VAC valve open
- ✓ 18) Check that PaCO2 = 340 torr (± 5) and PaO2 = ~~85~~ 88 torr (± 1). If not, adjust PaCO2 338 PaO2 88
- ✓ 19) Click Initialize Cal Flow button
- ✓ 20) Ensure that WT flow starts through both lines and WT light on cyl. box lit FIWT 112 FISP 109 ~ 110
- ✓ 21) Check regulator pressures for WT, LT, LS, and HS are PaSP to 785 +/- 5 torr by selecting gas in software (adjust if necessary)
- ✓ 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 = 14:56
- ✓ 25) After ~ 10 min. record values in first row of table below
- ✓ 26) Once outside hangar and fueling of aircraft is finished, click Initialize Sample Flow button and proceed
- ✓ 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 121
- ✓ 29) Snoop large trap connections (including 1/8" swage, QCs, and flanges)
- ✗ 30) If necessary, adjust HA-3 to match bypass and cell flow ± 2 sccm
- ✓ 31) Enable change-over valve ~ UTC = 15:06
- ✓ 32) After ~ 10 min. record values in second row of table below
- ✓ 33) Verify that inflight tools/spares (IX below) are available.

C. 20-min before take-off

- ✓ 1) Adjust output flag (flight code), cal interval, cal period, LT freq, and WT freq values if necessary and note values (nominally set to a, 40, 3.0, 3, 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 = 15:41:10
- ✓ 4) Minimize "Verify Run Plan" window
- ✓ 5) Note time at which taxi starts UTC = 16:00:20
- ✓ 6) Note time of wheels up UTC = 16:08:45 16:08:20

UTC	Gas	O2d	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn
<u>15:02:</u>	<u>WT</u>	<u>NA</u>	<u>2.1</u>	<u>NA</u>	<u>NA</u>	<u>20</u>	<u>NA</u>	<u>0.3</u>	<u>5</u>	<u>5</u>
<u>15:37:</u>	<u>WT</u>	<u>599</u>	<u>2.5</u>	<u>7</u>	<u>-5</u>	<u>342</u>	<u>12</u>	<u>0.3</u>	<u>5</u>	<u>5</u>
⋮										
⋮										

EDIT

EDIT

EDIT

EDIT

50 sec + (25 values x 2.5 sec x 2) = 125

25 x 5 per mag → 1 per mag  
25 x 4 sec = 100 sec  
150 sec =

mag est = 2.3 (magly ~ 2.5?)

GET of (FI) Gas Purge



II. During Flight

UTC	Notes
16:08:	→ 16 <sup>th</sup> 19 p cab from 625 → 668 torr
:	CO <sub>2</sub> from 326 to 314
:	- 12 torr (ppm) / +43 torr
:	
:	
16:26:40	on HS CO <sub>2</sub> signal (234) pegging low
:	→ look at D/A statement 1000
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AEROS, not says 344  
H<sub>2</sub>O now 2.46

Post-flight

(page missing) see ~~post flight for flight 6~~

did wheels down = 17:16:35

1, 4, 5, 6, 7, 8, 10 (-75), 11, 12, 13, 14, 15, 17, 19,  
21, 22, 23

# NCAR Airborne Oxygen Instrument (AO2) Checklist

V. 09.01.08

## I. Preflight

A. Day(s) before flight day of Date (YYMMDD) = 090109

- 1) Prepare trap with clean glass beads filled to 1 inch from bottom
- 2) Install trap in dewar Trap Letters Top/Bottom = b / d
- 3) Load cylinders and connect plumbing if necessary
- 4) If not done as part of a recent post-flight, record cylinder pressures for an overnight leak check and leave green valves closed UTC = \_\_ : \_\_  
 LS \_\_\_ / \_\_\_ HS \_\_\_ / \_\_\_  
 LT \_\_\_ / \_\_\_ WT \_\_\_ / \_\_\_
- 5) If not done recently, turn on instrument, record pressures for an overnight leak check and leave 248 and VAC valves closed UTC = \_\_ : \_\_  
 PaWT \_\_\_ PaCO2 \_\_\_  
 PaSP \_\_\_ PaO2 \_\_\_

B. 2-hours before take-off Date (YYMMDD) 090109 Flight (e.g. RF01) Rfor  
Instrument Operator BS

- 1) O<sub>2</sub> box Power breaker on (takes ~ 4-min to come up on internet and 5-min for program to start and screen to be active) UTC = 17:20
- 2) Laptop power on if not already
- 3) Load dry-ice in dewar to within 0.5 inches of lid ~ UTC = 17:15
- 4) Record cylinder pressures for overnight leak check (high / low)

( hi / low , Δhi / Δlow )

LS 730 / \_\_\_ , \_\_\_ / \_\_\_ HS 870 / \_\_\_ , \_\_\_ / \_\_\_  
570 LT 1860 / \_\_\_ , \_\_\_ / \_\_\_ WT 570 / 1860 , \_\_\_ / \_\_\_

- 5) Open green knobs four ¼ turns and note any changed hi-side pressures

LS 730 HS 880  
LT 1860 WT 1860

- 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 5:56:20, Rack laptop time 17:56:20
- 11) Log each hi-side cylinder pressure in software by clicking Cylinder Record button then entering pressure from (5) above and clicking Log P
- 12) Pump box Power breaker on
- 13) Pump box Fridge breaker on UTC = \_\_ : \_\_
- 14) Cylinder box Power breaker on
- 15) Record instrument pressures for any overnight leak checks (P / change)  
 PaWT 999 / \_\_\_ PaCO2 320 / \_\_\_

EDIT } no low  
} both  
} high change

(Never got flights from yesterday)



PaSP 679 / \_\_\_\_\_ PaO2 85.5 / \_\_\_\_\_

- ✓ 16) Pump box Pump 2 breaker on
- ✓ 17) Manual VAC valve open
- ✓ 18) Check that PaCO2 = 340 torr (± 5) and PaO2 = 85 torr (± 1). If not, adjust  
 (alt) PaCO2 341 PaO2 85.5 89 → lang v ≈ 9.0 (<9.5)
- ✓ 19) Click Initialize Cal Flow button
- ✓ 20) Ensure that WT flow starts through both lines and WT light on cyl. box lit  
 FIWT 104 FISP 102
- ✓ 21) Check regulator pressures for WT, LT, LS, and HS are PaSP to 785 +/- 5 torr by selecting gas in software (adjust if necessary)
- ✓ 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 = 18:03
- ✓ 25) After ~ 10 min. record values in first row of table below
- ✓ 26) Once outside hangar and fueling of aircraft is finished, click Initialize Sample Flow button and proceed
- ✓ 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 112
- ✓ 29) Snoop large trap connections (including 1/8" swage, QCs, and flanges)
- ✗ 30) If necessary, adjust HA-3 to match bypass and cell flow ±1 sccm
- ✓ 31) Enable change-over valve (opened sp before) UTC = 19:41
- ✓ 32) After ~ 10 min. record values in second row of table below
- ✓ 33) Verify that inflight tools/spares (IX below) are available.

C. 20-min before take-off

- ✓ 1) Adjust output flag (flight code), cal interval, cal period, LT freq, and WT freq values if necessary and note values (nominally set to a, 40, 3.0, 3, 4)  
 Flag 9 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 = 19:52:20
- ✓ 4) Minimize "Verify Run Plan" window
- ✓ 5) Note time at which taxi starts ~ UTC = 20:16:
- ✓ 6) Note time of wheels up UTC = 20:24:10

UTC	Gas	O2d	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn
17:35:	WT	NA	4.35	NA	NA	-2	NA	.4	6	5
19:00:	WT		2.8	-1	0	-3	-1	.3	5	4
19:57:	WT	52	3.6	6	-13	-2	(19)	.7	6	8
:	:	:	:	:	:	:	:	:	:	:

EDIT

EDIT

ext gnd delay closed sp

check results #adj if nec.

EDIT X

AOL 2.00  
 L1840 is (184)  
 Screen HS off scale in cell  
 take out flow v. float

Remove Floorment  
 remove screen for fire access

row sig looks noisy, tried lowering PaCO2 → no help  
 " " " PaO2 → no help  
 → reset to 343 + 91

X → save to digital file

II. During Flight

UTC	Notes
21:00:—	21:25 cool mtn wave activity
21:56:30	low over edmonton
21:57:—	to MAN to SA (avoiding LT cal)
22:07:—	→ 22:32 (at least) OR hairy
: : :	big spikes...
: : :	
: : :	O <sub>2N</sub> PdO <sub>2N</sub> PdSP <sub>N</sub> PdWT <sub>N</sub>
: : :	14 0.6 9.0 12.6
: : :	80 45 9 13
: : :	
: : :	→ coil loose or P again?
~ 22:41:30	back to AUTO
: : :	
23:00:05	tuned PdO <sub>2</sub> + PdKet cons off and
: : :	this fixed the problem.
23:00:55	tuned PdO <sub>2</sub> con back on → still OK
: : :	
: : :	PdKet con is bad!
~ 23:22:—	low over Ft. Smith
~ 23:22:—	A <sub>O2</sub> noise came back
23:41:21	PdO <sub>2</sub> con off... doesn't help!
:02:35	low over Yellowknife
:→:05:50	
00:06:34	PdO <sub>2</sub> con back on → step ramps back!
00:07:35	" " " off → still there?!
00:12	→ PaCO <sub>2</sub> = 359 torr
00:12:15	— 00:12:20 decreased PaCO <sub>2</sub> 335, flows down
00:18:45	set cal wt to 10, to trigger a cal
00:19:25	set back to 90
00:55	checked dewar... a few grape sized chunks floating, but not a lot T = -70
	→ look for LiTIO trends
1:52:03	low over m-lake
2:03:21	Chiller T = -67
2:30	-64

⊖ +BC  
+CO

GOOD software test!

- need Pd repressing to work (does amp change... - yes b/c of ÷)
- need WT-WT filter...
- need an H<sub>2</sub>O correction for dewar warming??



III. Postflight

- 2024
- 1) Note time of wheels down and skip to (3) ~ UTC = 04:05:
  - 2) Note time of taxi stop UTC =    :   :
  - 3) Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)
  - 4) Click Stop button
  - 5) Turn off lamp
  - 6) Close SA, WT, and SP 248 valves and open O2 248 valve in software
  - 7) Pump box Pump 1 breaker off
  - 8) Select None in cal box control section
  - 9) Pump box Fridge breaker off
  - 10) Note cryo temperature Cryo = -54 C
  - 11) Cylinder box Power breaker off
  - 12) >= 1 minute after WT and SP 248 valves were closed, close O2 248 valve using check box in software
  - 13) Close manual VAC valve = Man breaker disable Chlore
  - 14) Pump box Pump 2 breaker off UTC = 04:08
  - 15) Pump box Power breaker off
  - 16) Record pressures for a leak check
 

PaWT	<u>930.6</u>	PaCO2	<u>332</u>
PaSP	<u>815.9</u>	PaO2	<u>92</u>
  - 17) Open cylinder box lid and **close green valves**
  - 18) Record cylinder pressures for a leak check UTC = 04:10

LS	<u>720/</u>	HS	<u>830/</u>
LT	<u>570/</u>	WT	<u>1640/</u>
  - 19) Close cylinder box lid (~~all 3 screws~~)
  - 20) Log each hi-side cylinder pressure in software by clicking Cylinder Record button then entering "open" pressure from above and clicking Log P
  - 21) Close program (red X) and Visual Basic if necessary (red X)
  - 22) Scp data to laptop and copy to pen drive.
  - 23) Shut down AO2 PC
  - 24) Shut down laptop
  - 25) After green "SP to Cell" light has gone out (~ 5-min), O<sub>2</sub> box Power breaker off
  - 26) Tell technician it is OK to power down
  - 27) Pull trap, take to lab, open and remove glass beads and replace with stopper.
  - 28) Pull cylinders if necessary for lab calibration

checked marks made next day

# NCAR Airborne Oxygen Instrument (AO2) Checklist

V. 09.01.08

## I. Preflight

A. Day(s) before flight Date (YYMMDD) = \_\_\_\_\_

- 1) Prepare trap with clean glass beads filled to 1 inch from bottom
- 2) Install trap in dewar Trap Letters Top/Bottom = \_\_\_ / \_\_\_
- 3) Load cylinders and connect plumbing if necessary
- 4) If not done as part of a recent post-flight, record cylinder pressures for an overnight leak check and leave green valves closed UTC = \_\_\_ : \_\_\_  
 LS 760 / 720 HS 870 / 830  
 LT 540 / 570 WT 1270 / 1640 (16903 on #11?)
- 5) If not done recently, turn on instrument, record pressures for an overnight leak check and leave 248 and VAC valves closed UTC = \_\_\_ : \_\_\_  
 ~ PaWT 937 ~ PaCO2 11  
 ~ PaSP 933 ~ PaO2 7

090109  
RF02 PF

B. 2-hours before take-off Date (YYMMDD) 090112 Flight (e.g. RF01) RF03  
Instrument Operator BS

- 1) O<sub>2</sub> box Power breaker on (takes ~ 4-min to come up on internet and 5-min for program to start and screen to be active) ~ UTC = 16:00
- 2) Laptop power on if not already
- 3) Load dry-ice in dewar to within 0.5 inches of lid UTC = 16:55
- 4) Record cylinder pressures for overnight leak check (high / low)  
 (hi / low, Δhi / Δlow) is read?  
 LS 760 / , +40 / HS 870 / , +40 /  
 LT 540 / , -30 / WT 1270 / , 3 /
- 5) Open green knobs four ¼ turns and note any changed hi-side pressures + and changes  
 LS 760 - HS 870 - re-record  
 LT 550 +10 WT 1670
- 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 5:00:30, Rack laptop time 17:00:31
- 11) Log each hi-side cylinder pressure in software by clicking Cylinder Record button then entering pressure from (5) above and clicking Log P
- 12) Pump box Power breaker on
- 13) Pump box Fridge breaker on \_\_\_\_\_ UTC = \_\_\_ : \_\_\_
- 14) Cylinder box Power breaker on
- 15) Record instrument pressures for any overnight leak checks (P / change)  
 PaWT 932 - PaCO2 12.8 - (Recorded earlier)

5:49:10  
17:49:11

PaSP 875 (-58) PaO2 851 -

- ✓ 16) Pump box Pump 2 breaker on
- ✓ 17) Manual VAC valve open
- ✓ 18) Check that PaCO2 = 340 torr (± 5) and PaO2 = 85 torr (± 1). If not, adjust  
PaCO2 336 PaO2 90
- ✓ 19) Click Initialize Cal Flow button
- ✓ 20) Ensure that WT flow starts through both lines and WT light on cyl. box lit  
FIWT 115 FISP 108
- ✓ 21) Check regulator pressures for WT, LT, LS, and HS are PaSP to 785 +/- 5 torr by selecting gas in software (adjust if necessary)
- ✓ 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 = 17:07
- ✓ 25) After ~ 10 min. record values in first row of table below
- ✓ 26) Once outside hangar and fueling of aircraft is finished, click Initialize Sample Flow button and proceed
- ✓ 27) Pump box Pump 1 breaker on
- ✓ 28) Ensure that Fridge P stabilizes near 805 (±10) torr after 2 min.  
Fridge P 805 SA Purge Flow 115
- ✓ 29) Snoop large trap connections (including 1/8" swage, QCs, and flanges)
- ✓ 30) If necessary, adjust HA-3 to match bypass and cell flow ±1 scem
- ✓ 31) Enable change-over valve UTC = 18:10
- ✓ 32) After ~ 10 min. record values in second row of table below
- ✓ 33) Verify that inflight tools/spares (IX below) are available.

C. 20-min before take-off

- ✓ 1) Adjust output flag (flight code), cal interval, cal period, LT freq, and WT freq values if necessary and note values (nominally set to a, 40, 3.0, 3, 4)  
Flag 9 Cal Interval 40 Cal Period 2.7 LTf 3 Wtf 4
- ✓ 2) Click Start button on main screen
- ✓ 3) Click Proceed button on control screen UTC = 18:18:22
- ✓ 4) Minimize "Verify Run Plan" window
- ✓ 5) Note time at which taxi starts ~ UTC = 18:26:30
- ✓ 6) Note time of wheels up UTC = 18:44:23

UTC	Gas	O2d	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn
17:10:	WT	NA	1.08	NA	NA	11	NA	03	4	4
18:20:	WT		2.4							
:	:									
:	:									

338 91

do later--

PaCO2 now 340  
dropped to 332  
flows: 110/109

II. During Flight

UTC	Notes
18:53:30	~ 5 min after take off, dropped CO2 output
: : :	cut off to 100 and added 300, required
: : :	pausing program to d.
18:55:30	~ 2 min later, changed adder to 130
: : 43	
: : :	
00:13:10	CO2 n = 0.47    O2 n = 4.0
: : :	
: : :	
: : :	
: : :	See 090112_RF03-Notes.txt
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1.32

TO DO: cal L1810  
 add offset to main window for CO2 output  
 add offset to A02 STAT

## III. Postflight

- 1) Note time of wheels down and skip to (3) UTC = 01:35:44  
 2) Note time of taxi stop UTC =    :   :     
 3) Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)  
 4) Click Stop button  
 5) Turn off lamp  
 6) Close SA, WT, and SP 248 valves and open O2 248 valve in software  
 7) Pump box Pump 1 breaker off  
 8) Select None in cal box control section  
 9) ~~Pump box Fridge breaker off~~  
 10) Note cryo temperature Cryo = -74 C  
 11) Cylinder box Power breaker off  
 12)  $\geq$  1 minute after WT and SP 248 valves were closed, close O2 248 valve  
 using check box in software + disable chover  
 13) Close manual VAC valve  
 14) Pump box Pump 2 breaker off  
 15) Pump box Power breaker off  
 16) Record pressures for a leak check UTC = 1:39  

	PaWT <u>866</u>	PaCO2 <u>329</u>
<i>ambient</i>	PaSP <u>762</u>	PaO2 <u>92</u>

 17) Open cylinder box lid and **close green valves**  
 18) Record cylinder pressures for a leak check UTC = 1:42  

LS <u>7201</u>	HS <u>830</u>
LT <u>5701</u>	WT <u>14301</u>

 19) Close cylinder box lid (all 3 screws)  
 20) Log each hi-side cylinder pressure in software by clicking Cylinder Record  
 button then entering "open" pressure from above and clicking Log P  
 21) Close program (red X) and Visual Basic if necessary (red X)  
 22) Scp data to laptop and copy to pen drive.  
 23) Shut down AO2 PC  
 24) Shut down laptop  
 25) After green "SP to Cell" light has gone out (~ 5-min), O<sub>2</sub> box Power breaker  
 off  
 26) Tell technician it is OK to power down  
 27) Pull trap, take to lab, open and remove glass beads and replace with stopper.  
 28) Pull cylinders if necessary for lab calibration



# NCAR Airborne Oxygen Instrument (AO2) Checklist

V. 09.01.08

## I. Preflight

A. Day(s) before flight

Date (YYMMDD) = 090113

- 1) Prepare trap with clean glass beads filled to 1 inch from bottom
- 2) Install trap in dewar Trap Letters Top/Bottom = B / P
- 3) Load cylinders and connect plumbing if necessary
- 4) If not done as part of a recent post-flight, record cylinder pressures for an overnight leak check and leave green valves closed UTC = 23:10  
 LS 720 / \_\_\_ HS 840 / \_\_\_  
 LT 530 / \_\_\_ WT 1450 / \_\_\_
- 5) If not done recently, turn on instrument, record pressures for an overnight leak check and leave 248 and VAC valves closed UTC = 23:10  
 PaWT 858 PaCO2 331  
 PaSP 852 PaO2 90

B. 2-hours before take-off

Date (YYMMDD) 090114 Flight (e.g. RF01) RF04  
Instrument Operator BBS

- 1) O<sub>2</sub> box Power breaker on (takes ~ 4-min to come up on internet and 5-min for program to start and screen to be active) UTC = 16:45
- 2) Laptop power on if not already
- 3) Load dry-ice in dewar to within 0.5 inches of lid UTC = 17:09
- 4) Record cylinder pressures for overnight leak check (high / low) (hi / low, Δhi / Δlow)  
 LS 720 / \_\_\_ , \_\_\_ / \_\_\_ HS 840 / \_\_\_ , \_\_\_ / \_\_\_  
 LT 540 / +10 , \_\_\_ / \_\_\_ WT 1430 / -20 , \_\_\_ / \_\_\_
- 5) Open green knobs four ¼ turns and note any changed hi-side pressures  
 LS 730 HS 830  
 LT 540 WT 1430
- 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 4:49:40, Rack laptop time 16:49:42
- 11) Log each hi-side cylinder pressure in software by clicking Cylinder Record button then entering pressure from (5) above and clicking Log P
- 12) Pump box Power breaker on
- 13) Pump box Fridge breaker on \_\_\_\_\_ UTC = \_\_\_:\_\_\_
- 14) Cylinder box Power breaker on
- 15) Record instrument pressures for any overnight leak checks (P / change)  
 PaWT 857 / -1 PaCO2 327 / -4

after pull out

6:42:35  
18:42:37

EQH

m 18 hrs ⇒ -2.5 torr/hr

PaSP 804 1-48 PaO2 90 1-

- ✓ 16) Pump box Pump 2 breaker on
- ✓ 17) Manual VAC valve open
- ✓ 18) Check that PaCO2 = 340 torr (± 5) and PaO2 = 85 torr (± 1). If not, adjust  
PaCO2 327 PaO2 90
- ✓ 19) Click Initialize Cal Flow button
- ✓ 20) Ensure that WT flow starts through both lines and WT light on cyl. box lit  
FIWT 111 FISP 110
- ✓ 21) Check regulator pressures for WT, LT, LS, and HS are PaSP to 785 +/- 5 torr by selecting gas in software (adjust if necessary)
- ✓ 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 = 17:28
- ✓ 25) After ~ 10 min. record values in first row of table below
- ✓ 26) Once outside hangar and fueling of aircraft is finished, click Initialize Sample Flow button and proceed
- ✓ 27) Pump box Pump 1 breaker on
- ✓ 28) Ensure that Fridge P stabilizes near 805 (±10) torr after 2 min.  
Fridge P 805 SA Purge Flow 115
- ✓ 29) Snoop large trap connections (including 1/8" swage, QCs, and flanges)
- ✗ 30) If necessary, adjust HA-3 to match bypass and cell flow ±1 scfm
- ✓ 31) Enable change-over valve UTC = 18:52:40
- ✓ 32) After ~ 10 min. record values in second row of table below
- ✓ 33) Verify that inflight tools/spares (IX below) are available.



C. 20-min before take-off

- ✓ 1) Adjust output flag (flight code), cal interval, cal period, LT freq, and WT freq values if necessary and note values (nominally set to a, 40, 3.0, 3, 4)  
Flag a Cal Interval 40 Cal Period 3.7 LTf 3 Wtf 4
- ✓ 2) Click Start button on main screen
- ✓ 3) Click Proceed button on control screen UTC = 19:04:45
- ✓ 4) Minimize "Verify Run Plan" window
- ✗ 5) Note time at which taxi starts ~ UTC = 19:26:30
- ✓ 6) Note time of wheels up ~ UTC = 19:26:30

UTC	Gas	O2d	O2h	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn
<u>17:54:04</u>	<u>WT</u>	<u>NA</u>	<u>1.8</u>	<u>NA</u>	<u>NA</u>	<u>1</u>	<u>NA</u>	<u>.3</u>	<u>—</u>	<u>5</u>
<u>18:56:30</u>	<u>WT</u>	<u>530</u>	<u>3.4</u>	<u>16</u>	<u>-5</u>	<u>5</u>	<u>20</u>	<u>.5</u>	<u>6</u>	<u>5</u>
:	:	:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:	:	:

look @ preflight noise when increased

SCW 4  $\frac{\alpha_{O_3}}{\alpha_{O_2}} \times \frac{700 \text{ ppb}}{0.2} = 1 \times 10^{-6}$

II. During Flight

UTC	Notes
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## III. Postflight

- 1) Note time of wheels down and skip to (3) ~ UTC 03:57:     
 2) Note time of taxi stop UTC =    :   :     
 3) Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)  
 4) Click Stop button  
 5) Turn off lamp  
 6) Close SA, WT, and SP 248 valves and open O2 248 valve in software  
 7) Pump box Pump 1 breaker off  
 8) Select None in cal box control section  
 9) Pump box Fridge breaker off  
 10) Note cryo temperature Cryo = 74 C  
 11) Cylinder box Power breaker off  
 12)  $\geq$  1 minute after WT and SP 248 valves were closed, close O2 248 valve using check box in software  
 13) Close manual VAC valve  
 14) Pump box Pump 2 breaker off  
 15) Pump box Power breaker off  
 16) Record pressures for a leak check UTC = 03:55  
     PaWT 879 PaCO2 329  
     PaSP 866 PaO2 91  
 17) Open cylinder box lid and **close green valves**  
 18) Record cylinder pressures for a leak check UTC = 03:57  
     LS 680 / -40 HS 790 / -40  
     LT 530 / -40 WT 1140 / -290  
 19) Close cylinder box lid (all 3 screws)  
 20) Log each hi-side cylinder pressure in software by clicking Cylinder Record button then entering "open" pressure from above and clicking Log P  
 21) Close program (red X) and Visual Basic if necessary (red X)  
 22) Scp data to laptop and copy to pen drive.  
 23) Shut down AO2 PC  
 24) Shut down laptop  
 25) After green "SP to Cell" light has gone out (~ 5-min), O<sub>2</sub> box Power breaker off  
 26) Tell technician it is OK to power down  
 27) Pull trap, take to lab, open and remove glass beads and replace with stopper.  
 28) Pull cylinders if necessary for lab calibration

if don't  
 close  
 MAN  
 quickly  
 then  
 PaSP will  
 be low

# NCAR Airborne Oxygen Instrument (AO2) Checklist

V. 09.01.08

## I. Preflight

A. Day(s) before flight

Date (YYMMDD) = 090115

- 1) Prepare trap with clean glass beads filled to 1 inch from bottom
- 2) Install trap in dewar Trap Letters Top/Bottom = A / C
- 3) Load cylinders and connect plumbing if necessary
- 4) If not done as part of a recent post-flight, record cylinder pressures for an overnight leak check and leave green valves closed UTC = \_\_ : \_\_  
 LS \_\_\_ / \_\_\_ HS \_\_\_ / \_\_\_  
 LT \_\_\_ / \_\_\_ WT \_\_\_ / \_\_\_
- 5) If not done recently, turn on instrument, record pressures for an overnight leak check and leave 248 and VAC valves closed UTC = \_\_ : \_\_  
 PaWT \_\_\_ PaCO2 \_\_\_  
 PaSP \_\_\_ PaO2 \_\_\_

B. 2-hours before take-off

Date (YYMMDD) 090116 Flight (e.g. RF01) RF05  
Instrument Operator BBS

Balboa Travel  
(800) 359-8773

- 1) O<sub>2</sub> box Power breaker on (takes ~ 4-min to come up on internet and 5-min for program to start and screen to be active) UTC = \_\_ : \_\_
- 2) Laptop power on if not already
- 3) Load dry-ice in dewar to within 0.5 inches of lid UTC = 18:30
- 4) Record cylinder pressures for overnight leak check (high / low)  
 ( hi / low , Δhi / Δlow )  
 LS 710 / \_\_ , \_\_ / \_\_ HS 810 / \_\_ , \_\_ / \_\_  
 LT 530 / \_\_ , \_\_ / \_\_ WT 1200 / \_\_ , \_\_ / \_\_
- 5) Open green knobs four ¼ turns and note any changed hi-side pressures  
 LS 720 HS 820  
 LT 530 WT 1210
- 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 *if not manually update*  
 AO2 PC Time 6:42:00 , Rack laptop time 18:42:00
- 11) Log each hi-side cylinder pressure in software by clicking Cylinder Record button then entering pressure from (5) above and clicking Log P
- 12) Pump box Power breaker on
- 13) Pump box Fridge breaker on UTC = \_\_ : \_\_
- 14) Cylinder box Power breaker on
- 15) Record instrument pressures for any overnight leak checks (P / change)  
 PaWT 899 / \_\_\_ PaCO2 330 / \_\_\_





P 21870  
20.14

- PaSP 835 / \_\_\_\_\_ PaO2 90 / \_\_\_\_\_
- ✓ 16) Pump box Pump 2 breaker on
- ✓ 17) Manual VAC valve open
- ✓ 18) Check that PaCO2 = 340 torr ( $\pm 5$ ) and PaO2 = 85 torr ( $\pm 1$ ). If not, adjust PaCO2 330 PaO2 90
- ✓ 19) Click Initialize Cal Flow button
- ✓ 20) Ensure that WT flow starts through both lines and WT light on cyl. box lit  
FIWT 110 FISF 105
- ✓ 21) Check regulator pressures for WT, LT, LS, and HS are PaSP to 785  $\pm 5$  torr by selecting gas in software (adjust if necessary)
- ✓ 22) Return to WT selected when done checking regulators
- ✓ 23) Check that PdWT ( $\pm 0.1$ ), PdSP ( $\pm 0.1$ ), and PdO2 ( $\pm 0.01$ ) are controlling
- ✓ 24) Light lamp and ensure that it comes on UTC = 20:49
- ✗ 25) After ~ 10 min. record values in first row of table below
- ✓ 26) Once outside hangar and fueling of aircraft is finished, click Initialize Sample Flow button and proceed
- ✓ 27) Pump box Pump 1 breaker on
- ✓ 28) Ensure that Fridge P stabilizes near 805 ( $\pm 10$ ) torr after 2 min.  
Fridge P 802 SA Purge Flow 115
- ✗ 29) Snoop large trap connections (including 1/8" swage, QCs, and flanges)
- ✗ 30) If necessary, adjust HA-3 to match bypass and cell flow  $\pm 1$  sccm
- ✓ 31) Enable change-over valve UTC = 20:45
- 32) After ~ 10 min. record values in second row of table below
- ✓ 33) Verify that inflight tools/spares (IX below) are available.

~~PaSP problems~~  
I took 1 hr to fix (see notes for)



~~SO LATER~~  
never did...

C. 20-min before take-off

- ✓ 1) Adjust output flag (flight code), cal interval, cal period, LT freq, and WT freq values if necessary and note values (nominally set to a, 40, 3.0, 3, 4)  
Flag 40m Cal Interval 2.75 Cal Period 3 LTf 4 WTf \_\_\_\_\_
- ✓ 2) Click Start button on main screen
- ✓ 3) Click Proceed button on control screen UTC = 20:51:28
- ✓ 4) Minimize "Verify Run Plan" window
- ✗ 5) Note time at which taxi starts UTC = \_\_\_\_\_
- ✓ 6) Note time of wheels up ~ UTC = 20:56:28

UTC	Gas	O2d	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn
: :		NA		NA	NA		NA			
: :										
: :										
: :										

heavy pump on take-off!

cal out to 5 min to get a double 3pt (with freq = 1) cal



II. During Flight

UTC	Notes
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## III. Postflight

- 1) Note time of wheels down and skip to (3) UTC = 03:45:56  
 2) Note time of taxi stop UTC =    :   :     
 3) Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)  
 4) Click Stop button  
 5) Turn off lamp  
 6) Close SA, WT, and SP 248 valves and open O2 248 valve in software  
 7) Pump box Pump 1 breaker off  
 8) Select None in cal box control section  
 9) ~~Pump box Fridge breaker off~~  
 10) Note cryo temperature Cryo = 74 C  
 11) Cylinder box Power breaker off  
 12)  $\geq$  1 minute after WT and SP 248 valves were closed, close O2 248 valve using check box in software  
 13) Close manual VAC valve  
 14) Pump box Pump 2 breaker off  
 15) Pump box Power breaker off  
 16) Record pressures for a leak check UTC = 03:50  
     PaWT 884 PaCO2 321  
     PaSP 870 PaO2 90  
 17) Open cylinder box lid and **close green valves**  
 18) Record cylinder pressures for a leak check UTC = 03:52  
     LS 620 /     HS 780 /      
     LT 520 /     WT 970 /      
 19) Close cylinder box lid (all 3 screws)  
 20) Log each hi-side cylinder pressure in software by clicking Cylinder Record button then entering "open" pressure from above and clicking Log P  
 21) Close program (red X) and Visual Basic if necessary (red X)  
 22) Scp data to laptop and copy to pen drive.  
 23) Shut down AO2 PC  
 24) Shut down laptop  
 25) After green "SP to Cell" light has gone out (~ 5-min), O<sub>2</sub> box Power breaker off  
 26) Tell technician it is OK to power down  $\leftarrow$  main breaker  
 27) Pull trap, take to lab, open and remove glass beads and replace with stopper.  
 28) Pull cylinders if necessary for lab calibration

1250  
 Tony  
 checklist

Shields for  
 spray in gl

# NCAR Airborne Oxygen Instrument (AO2) Checklist

V. 09.01.15

Flight Date (YYMMDD) 090118 Flight (e.g. RF01) RF06

## I. Preflight

### A. Day(s) before flight

Date = 090117

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

2) Install trap in dewar

Trap Letters Top/Bottom = A/C

3) Record cylinder pressures for an overnight leak check

LS 690 HS 180  
LT 20 WT 970

*10<sup>0</sup> copy: 170 prior post flight*

UTC = 03:52 RF05 9/16

4) Turn on instrument, record pressures for the leak check

PaWT 884 PaCO<sub>2</sub> 321  
PaSP 870 PaO<sub>2</sub> 90

*(or copy)*

UTC =    :    

### B. 2-hours before take-off

Instrument Operator BBS

0) Rack power switch on

1) O<sub>2</sub> box Power breaker on

2) Laptop power on

3) Load dry-ice in dewar to within 0.5 inches of lid

*1" (short flight) full @*

UTC = 19:24

4) Record hi-side cylinder pressures for overnight leak check (P / Δ)

LS 710 / +20 HS 810 / +30  
LT 540 / +20 WT 1010 / +40

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

LS 710 / - HS 820 / +10  
LT 540 / - WT 1020 / +10

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 7:06:00, Rack laptop time 19:06:03

*192.168.84.138*

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 902 / +18 PaSP 832 / -38 *leak*

15) Pump box Pump 2 breaker on

16) Manual VAC valve open

17) Check that PaCO<sub>2</sub> = 330 torr (± 5) and PaO<sub>2</sub> = 90 torr (± 1). If not, adjust.

PaCO<sub>2</sub> 323 PaO<sub>2</sub> 90 → set back to 330

18) Click Initialize Cal Flow button

19) Ensure that WT flow starts through both lines (110 ± 5), record after 1 min

FIWT 111 FISP 108

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

*worse on switching, got balanced @*

*111 / 109 → need to tune SP 1250 more*

*EDIT  
don't need?  
EDIT*

*⊙*

*⊙*

*laptop came up before server, restarted → diff now ⊙*



- ✓ 21) Return to WT selected when done checking regulators
- ✓ 22) Check that PdWT ( $\pm 0.1$ ), PdSP ( $\pm 0.1$ ), and PdO2 ( $\pm 0.01$ ) are controlling
- ✓ 23) Light lamp and ensure that it comes on UTC = 19:24
- ✓ 24) Once outside and fueling finished, click Initialize Sample Flow button
- ✓ 25) Pump box Pump 1 breaker on
- ✓ 26) Ensure that Fridge P stabilizes near 805 ( $\pm 10$ ) torr after 2 min.  
Fridge P 801 SA Purge Flow 116
- ✓ 27) Snoop main trap connections (including 1/8" swage, QCs, and flanges)
- ✓ 28) If necessary, adjust HA-3 to match bypass and cell flow  $\pm 2$  sccm
- ✓ 29)  $\geq 10$  min. after lamp on, record values in first row of table below
- ✓ 30) Enable change-over valve UTC = 20:20
- 31)  $\geq 10$  min. after change-over enable, record values in table below

↑ more up?  
EODT  
EODBT

do an for mated (VAC) check  
add CO2 v  
1.0 x 0.0

UTC	Gas	O2d	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn
20:17:50	WT	NA	5.0	NA	NA	3.9	NA	2.5	5	6
20:31:00	WT	463	2.8	13	12	2	24	1.4	5	7

C. 20-min before take-off

- ✓ 1) Adjust / record program parameters (nominally set to a, 40, 2.7, 3, 4)  
Flag 2 Cal Interval 40 Cal Period 2.7 LTF \_\_\_ WTF \_\_\_
- ✓ 2) Click Start button on main screen
- ✓ 3) Click Proceed button on control screen UTC = 20:40:59
- ✓ 4) Minimize "Verify Run Plan" window
- ✓ 5) Note time of wheels up ~ UTC = 4:03:30

II. During Flight

← EODBT → keep vnc 6 A as much as possible  
Record flight notes in text file YYMMDD\_RF##\_Notes.txt

III. Postflight

- ✓ 1) Note time of wheels down UTC = 02:59:26
- 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 cal box control section and uncheck any purges
- ✓ 7) Close manual VAC valve
- ✓ 8) Pump box Pump 1 breaker off
- ✓ 9) Note cryo temperature Cryo = -76.5
- ✓ 10) Cylinder box Power breaker off
- ✓ 11) Pump box Pump 2 breaker off
- ✓ 12) Pump box Power breaker off

Noise good from lamp on to 30 min later, then to 3x4 ... ?

noise in flight - better  
why flows diff?  
gas usage call  
slowly out  
front leak  
TO DO: fine 1250  
SA 5000

✓ 13) Record pressures for a leak check  
PaWT 863 PaSP 850 PaLi840 1207

UTC = 3 : 06

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

✓ 15) Record cylinder pressures for a leak check

LS 670 HS 770  
LT 530 WT 770

UTC = 3 : 15

✓ 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.

✓ 20) Shut down AO2 PC

✓ 21) Shut down laptop

✓ 22) After green "SP to Cell" light has gone out, O<sub>2</sub> box Power breaker off

✓ 23) Rack power switch off

✓ 24) Pull trap and replace with stopper. Open trap and remove glass beads

no time before  
spray, just shut down  
rebooted  
tdid

# NCAR Airborne Oxygen Instrument (AO2) Checklist V. 09.01.20

Flight Date (YYMMDD) 090120 Flight (e.g. RF01) RF07

## I. Preflight

### A. Day(s) before flight

Date = 090119 UTC

- 1) Prepare trap with clean glass beads filled to 1 inch from bottom
- 2) Install trap in dewar Trap Letters Top/Bottom = A / C
- 3) Record cylinder pressures (or copy from prev. postflight)

LS 670 HS 770 UTC =     :    

LT 530 WT 770 *was open over night 1/20 - 1/21*

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

PaWT 863 PaSP 850 UTC =     :    

*In software, this was acc. recorded on 1/14/2009 as 770. check all*

### B. 2-hours before take-off

Instrument Operator JDB

- 0) Rack power switch on
- 1) O<sub>2</sub> box Power breaker on
- 2) Laptop power on
- 3) Load dry-ice in dewar to within 0.5 inches of lid UTC =     :
- 4) Record hi-side cylinder pressures for overnight leak check (P / Δ)

LS 650 / 4-20 HS 750 / 4-20 → *Low-side P on HS, WT*

LT 520 / 4-10 WT 730 / 4-40 *is 1.5psi*

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

LS 630 / 0 HS 750 / 0  
LT 520 / 0 WT 730 / 0

- 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 7:26:11, Rack laptop time 19:26:13

- 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 851 / -2 PaSP 813 / -37 *EDIT PaC 840:*

- 15) Pump box Pump 2 breaker on
- 16) Manual VAC valve open
- 17) Check that PaCO<sub>2</sub> = 330 torr (± 5) and PaO<sub>2</sub> = 90 torr (± 1). If not, adjust.

PaCO<sub>2</sub> 331 PaO<sub>2</sub> 93

- 18) Click Initialize Cal Flow button
- 19) Ensure that WT flow starts through both lines (110 ± 10)

FIWT 107 FISP 102

- 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

*WT is high. all others 785-786  
WT adj ↓ from 795 to 787*

*didn't record*



- 22) Return to WT selected when done checking regulators
- 23) Check that PdWT ( $\pm 0.1$ ), PdSP ( $\pm 0.1$ ), and PdO2 ( $\pm 0.01$ ) are controlling
- 24) Light lamp and ensure that it comes on UTC = 19:40
- 25) Once outside and fueling finished, click Initialize Sample Flow button
- 26) Pump box Pump 1 breaker on
- 27) Ensure that Fridge P stabilizes near 805 ( $\pm 10$ ) torr after 2 min.  
Fridge P 800 SA Purge Flow 116
- 28) Conduct trap leak check procedure (smoog)
- 29)  $\geq 10$  min. after lamp on, record values in first row of table below
- 30) Enable change-over valve UTC = 20:48
- 31)  $\geq 10$  min. after change-over enable, record values in table below

UTC	Gas	O2d	CO2n	O2n	SPm	WTm	Totm	m $\Delta$	PdO2n	PdSPn	PdWTn
20:08:13	WT	NA	1.04	1.35	NA	NA	1	NA	0.3	4.4	5
20:52:30	WT	440	.9	2.4	12	70	0	22	.4	5	7

00:39:00 SA  $\uparrow$  1 3-4 11 -11 -1 21 13 4 7

C. 20-min before take-off

- 1) Adjust / record program parameters (nominally set to a, 40, 2.7, 3, 4)  
Flag a Cal Interval 40 Cal Period 47 LTf 3 WTf 4
- 2) Click Start button on main screen
- 3) Click Proceed button on control screen UTC = 20:53:02
- 4) Minimize "Verify Run Plan" window
- 5) Note time of wheels up UTC = 21:13:24

II. During Flight

21:13:30 MFDUCA

Keep VNC off as much as possible, only connecting when necessary to adjust cal.  
Record flight notes in text file YYMMDD\_RF##\_Notes.txt

III. Postflight

- 1) Note time of wheels down UTC = 05:51:10
- 2) Let any calibration cycles finish (up to < 5-min on ground and/or 2 gases)
- 3) Click Stop button 05:52:30
- 4) Turn off lamp
- 5) Close SA, WT, SP, and O2 248 valves in software
- 6) Select None in cal box control section and uncheck any purges
- 7) Close manual VAC valve
- 8) Pump box Pump 1 breaker off
- 9) Note cryo temperature EDIT cylinder Box values control section  
Cryo = -72.5
- 10) Cylinder box Power breaker off
- 11) Pump box Pump 2 breaker off
- 12) Pump box Power breaker off

ABT

EDIT 7Li840

- ✓ 13) Record pressures for a leak check  
PaWT 871.6 PaSP 827 PaLi840 12 UTC = 5:56
- ✓ 14) Open cylinder box lid and **close green valves**
- ✓ 15) Record cylinder pressures for a leak check  
LS 630 HS 710 UTC = 5:58  
LT 510 WT 430
- ✓ 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.
- ✓ 20) Shut down AO2 PC
- ✓ 21) Shut down laptop
- ✓ 22) After green "SP to Cell" light has gone out, O<sub>2</sub> box Power breaker off
- ✓ 23) Rack power switch off
- ✓ 24) Pull trap and replace with stopper. Open trap and remove glass beads

EDIT - put in procedure for SCP (space is fine, but add right click, send to)

---

IF AERO FREEZES, disconnect for left (outboard) ethernet cable from Netgear box, reconnect.  
also, "Ping acserver" or "ping 192.168.84.1" (we are 192.168.84.134)

---

F8 in VNC gives unix menu (for full screen, etc)

## NCAR Airborne Oxygen Instrument (AO2) Checklist

V. 09.01.21

Flight Date (YYMMDD) 090123 Flight (e.g. RF01) RF08

## I. Preflight

## A. Day(s) before flight

Date = 090121

- 1) Prepare trap with clean glass beads filled to 1 inch from bottom
- 2) Install trap in dewar Trap Letters Top/Bottom = A / C
- 3) Record cylinder pressures (or copy from prev. postflight)
 

LS	<u>620</u>	HS	<u>740</u>	UTC =	<u>23:39</u>
LT	<u>495</u>	WT	<u>1100</u>		
- 4) Turn on instrument, record pressures (or copy from prev. postflight)
 

PaWT	<u>852</u>	PaSP	<u>848</u>	PLi840	<u>12</u>	UTC =	<u>23:39</u>
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## B. 2-hours before take-off

Instrument Operator JD13

- 0) Rack power switch on
- 1) O<sub>2</sub> box Power breaker on
- 2) Laptop power on
- 3) Load dry-ice in dewar to within 0.5 inches of lid UTC = 17:00
- 4) Record hi-side cylinder pressures for overnight leak check (P / Δ)
 

LS	<u>630 / +10</u>	HS	<u>920 / -20</u>
LT	<u>510 / +15</u>	WT	<u>1090 / -10</u>
- 5) Open green knobs four ¼ turns and re-record pressures and any changes
 

LS	<u>630 / 0</u>	HS	<u>790 / +20</u>
LT	<u>510 / 0</u>	WT	<u>1100 / +10</u>
- 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 7:37:50, Rack laptop time 7:37:51
- 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	<u>836 / -16</u>	PaSP	<u>756 / .12</u>	PLi840	<u>16.8 / +4.8</u>
------	------------------	------	------------------	--------	--------------------
- 15) Pump box Pump 2 breaker on
- 16) Manual VAC valve open
- 17) Check that PaCO<sub>2</sub> = 330 torr (± 5) and PaO<sub>2</sub> = 90 torr (± 1). If not, adjust.
 

PaCO<sub>2</sub> 336 PaO<sub>2</sub> 95 → adj. +0 90
- 18) Click Initialize Cal Flow button
- 19) Ensure that WT flow starts through both lines (110 ± 10)
 

FIWT	<u>720</u>	FISP	<u>784</u>	109	106
------	------------	------	------------	-----	-----
- 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) Return to WT selected when done checking regulators
- 23) Check that PdWT ( $\pm 0.1$ ), PdSP ( $\pm 0.1$ ), and PdO2 ( $\pm 0.01$ ) are controlling
- 24) Light lamp and ensure that it comes on UTC = 19:51:51
- 25)  $\geq 10$  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 ( $\pm 10$ ) torr after 2 min.  
Fridge P 805 SA Purge Flow 2.5
- 29) Snoop trap fittings
- 30) Enable change-over valve UTC = 20:33
- 31)  $\geq 10$  min. after change-over enable, record values in table below

UTC	Gas	O2d	CO2n	O2n	SPm	WTm	Totm	m $\Delta$	PdO2n	PdSPn	PdWTn
<u>20:02:28</u>	<u>WT</u>	NA	<u>.7</u>	<u>2.6</u>	NA	NA	<u>14.5</u>	NA	<u>.2</u>	<u>4.4</u>	<u>6.2</u>
<u>20:50:50</u>	<u>WT</u>		<u>0.8</u>	<u>2.8</u>	<u>10.3</u>	<u>-11.9</u>	<u>.9</u>	<u>22</u>	<u>.47</u>	<u>3.6</u>	<u>5.2</u>

## C. 20-min before take-off

- 1) Adjust / record program parameters (nominally set to a, 40, 2.7, 3, 4)  
a  Flag 40  $\rightarrow$  Cal Interval 2.7 Cal Period 3  $\rightarrow$  LTf 7  $\rightarrow$  WTf      UTC = 20:57:00
- 2) Click Start button on main screen
- 3) Click Proceed button on control screen UTC = 20:48:43
- 4) Minimize "Verify Run Plan" window
- 5) Note time of wheels up UTC = 21:04:00

## 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 UTC = 24:14:21
- 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 Cryo = -71.9
- 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 853 PaSP 827 PLi840 12.21 UTC ~~04~~: 19
  - 14) Open cylinder box lid and **close green valves**
  - 15) Record cylinder pressures for a leak check  
LS 580 HS 690 UTC = 4: 21  
LT 490 WT 840
  - 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, O<sub>2</sub> 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) 090126 Flight (e.g. RF01) RF09

**I. Preflight**

(Day of - no maint day)

Date = 090126

**A. Day(s) before flight**

- 1) Prepare trap with clean glass beads filled to 1 inch from bottom
- 2) Install trap in dewar Trap Letters Top/Bottom = B / D

- 3) Record cylinder pressures (or copy from prev. postflight)
  - LS ~~605~~ HS ~~705~~ (no maint. day) UTC = 01 : 02
  - LT ~~505~~ WT ~~860~~

- 4) Turn on instrument, record pressures (or copy from prev. postflight)
  - PaWT \_\_\_\_\_ PaSP \_\_\_\_\_ PLi840 \_\_\_\_\_ UTC = \_\_ : \_\_

**B. 2-hours before take-off**

Instrument Operator JDR

- 0) Rack power switch on
- 1) O<sub>2</sub> box Power breaker on
- 2) Laptop power on
- 3) Load dry-ice in dewar to within 0.5 inches of lid UTC = 00 : 20
- 4) Record hi-side cylinder pressures for overnight leak check (P / Δ)

LS 605 / +25 HS 705 / +15  
 LT 505 / +15 WT 860 / +20

- 5) Open green knobs four ¼ turns and re-record pressures and any changes
  - LS 810 / +5 HS 705 / 0
  - LT 605 / 0 WT 880 / +20

- 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 01 : 11 : 04, Rack laptop time 01 : 11 : 16

- 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 853 / ( ) PaSP 762 / ( ) PLi840 194 / ( )

- 15) Pump box Pump 2 breaker on
- 16) Manual VAC valve open
- 17) Check that PaCO<sub>2</sub> = 330 torr (± 5) and PaO<sub>2</sub> = 95 torr (± 1). If not, adjust.

PaCO<sub>2</sub> 337 PaO<sub>2</sub> 97

- 18) Click Initialize Cal Flow button
- 19) Ensure that WT flow starts through both lines (110 ± 10)

FIWT 108 FISP 106

- 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

HS 777 → 765

- ✓ 22) Return to WT selected when done checking regulators
- ✓ 23) Check that PdWT ( $\pm 0.1$ ), PdSP ( $\pm 0.1$ ), and PdO2 ( $\pm 0.01$ ) are controlling
- ✓ 24) Light lamp and ensure that it comes on UTC = 01:49
- ✓ 25)  $\geq 10$  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 ( $\pm 10$ ) torr after 2 min.  
Fridge P 804 SA Purge Flow 115
- ✓ 29) Snoop trap fittings
- ✓ 30) Enable change-over valve UTC = 01:31
- ✓ 31)  $\geq 10$  min. after change-over enable, record values in table below

*in a rush bcz  
of missed maint  
des*

UTC	Gas	O2d	CO2n	O2n	SPm	WTm	Totm	m $\Delta$	PdO2n	PdSPn	PdWTn
01:26:00	WT	NA	.57	1.5	NA	NA	13.4	NA	0.3	4.9	5.0
01:41:00	WT	438	.57	4.4	19	-9	9.3	26	0.8	4.9	7.0

C. 20-min before take-off

- ✓ 1) Adjust / record program parameters (nominally set to a, 40, 2.7, 3, 4)  
Flag a Cal Interval 40 Cal Period 2.7 LTf 3 WTf 4
- ✓ 2) Click Start button on main screen
- ✓ 3) Click Proceed button on control screen UTC = 02:01:38
- ✓ 4) Minimize "Verify Run Plan" window
- ✓ 5) Note time of wheels up UTC = 02:22:18

II. During Flight

Keep VNC off as much as possible, only connecting when necessary to adjust cal.  
Record flight notes in text file YYMMDD\_RF##\_Notes.txt

III. Postflight

- ✓ 1) Note time of wheels down UTC = 18:52:30 ?
- ✓ 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 Cryo = -71.9
- ✓ 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 856 PaSP 827 PLi840 1205 UTC = 08:56
- ✓ 14) Open cylinder box lid and **close green valves**
- ✓ 15) Record cylinder pressures for a leak check  
LS 580 HS 680 UTC =    :     
LT 490 WT 680
- ✓ 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, O<sub>2</sub> 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) 090128 Flight (e.g. RF01) RF10

## I. Preflight

A. Day(s) before flight Date = 090127

- 1) Prepare trap with clean glass beads filled to 1 inch from bottom
- 2) Install trap in dewar Trap Letters Top/Bottom = A / D
- 3) Record cylinder pressures (or copy from prev. postflight)
 

LS	<u>580</u>	HS	<u>690</u>	UTC = <u>15:57</u>
LT	<u>500</u>	WT	<u>680</u>	

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

PaWT	<u>861</u>	PaSP	<u>687</u>	PLi840	<u>17.74</u>	UTC = <u>16:45</u>
<i>(last flight 856 827 12.21 @ end)</i>						

B. 2-hours before take-off Instrument Operator JDB

- 0) Rack power switch on
- 1) O<sub>2</sub> box Power breaker on
- 2) Laptop power on
- 3) Load dry-ice in dewar to within 0.5 inches of lid UTC = 14:20
- 4) Record hi-side cylinder pressures for overnight leak check (P / Δ)

LS	<u>580 / 0</u>	HS	<u>690 / 0</u>
LT	<u>490 / -10</u>	WT	<u>680 / 0</u>

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

LS	<u>590 / 0</u>	HS	<u>695 / +5</u>
LT	<u>500 / +10</u>	WT	<u>690 / +10</u>

- 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 2:35:30, Rack laptop time 02:35:30

- 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	<u>818 / -43</u>	PaSP	<u>551 / -136</u>	PLi840	<u>216 / + 3.86</u>
------	------------------	------	-------------------	--------	---------------------
- 15) Pump box Pump 2 breaker on
- 16) Manual VAC valve open
- 17) Check that PaCO<sub>2</sub> = 330 torr (± 5) and PaO<sub>2</sub> = 90 torr (± 1). If not, adjust.
 

PaCO <sub>2</sub>	<u>330</u>	PaO <sub>2</sub>	<u>92 / was 97</u>
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- 18) Click Initialize Cal Flow button
- 19) Ensure that WT flow starts through both lines (110 ± 10)
 

FIWT	<u>107</u>	FISP	<u>102</u>
------	------------	------	------------
- 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

WT	<u>792</u>	HS	<u>775</u>	LS	<u>785</u>	WT	<u>785</u>
	↓		↓				
	<u>785</u>		<u>785</u>				

*Need to restart laptop*



Turned  
off flow  
to WT, SP,  
turned off  
lamp

- 22) Return to WT selected when done checking regulators
- 23) Check that PdWT ( $\pm 0.1$ ), PdSP ( $\pm 0.1$ ), and PdO2 ( $\pm 0.01$ ) are controlling
- 24) Light lamp and ensure that it comes on UTC = 14:52
- 25)  $\geq 10$  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 ( $\pm 10$ ) torr after 2 min.  
Fridge P 802 SA Purge Flow 115
- 29) Snoop trap fittings
- 30) Enable change-over valve UTC = 17:01
- 31)  $\geq 10$  min. after change-over enable, record values in table below

UTC	Gas	O2d	CO2n	O2n	SPm	WTm	Totm	m $\Delta$	PdO2n	PdSPn	PdWTn
15:12:30	WT	NA	.57	1.7	NA	NA	7.8	NA	0.3	4.5	5.9
17:10:00	WT	451	.6	1.5	14	-10	3.3	239	0.38	3.9	6.7

10 C. 20-min before take-off

- 1) Adjust / record program parameters (nominally set to a, 40, 2.7, 3, 4)  
Flag 10 Cal Interval 2.7 Cal Period 2.7 Ltf 3 Wtf 4
- 2) Click Start button on main screen
- 3) Click Proceed button on control screen UTC = 17:14: \_
- 4) Minimize "Verify Run Plan" window
- 5) Note time of wheels up UTC = 17:25:55

## 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 UTC = 01:21:15
- 2) Let any calibration cycles finish (up to  $\leq 5$ -min on ground and/or 2 gases)
- 3) Click Stop button 01:32:20
- 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 Cryo = -79.6
- 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 773 PaSP 767 PLi840 14.01 UTC = 01:33
- ✓ 14) Open cylinder box lid and **close green valves**
- ✓ 15) Record cylinder pressures for a leak check  
LS 520 HS 620 UTC = 01:35  
LT 400 WT 430
- ✓ 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, O<sub>2</sub> 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) 20090130 Flight (e.g. RF01) RF11

## I. Preflight

### A. Day(s) before flight

Date = 20090129

- 1) Prepare trap with clean glass beads filled to 1 inch from bottom
- 2) Install trap in dewar Trap Letters Top/Bottom = B / C
- 3) Record cylinder pressures (or copy from prev. postflight)

LS 520 HS 640  
LT 480 WT 420

UTC = 14:30 (?)

9:30 local

SPENT  
DAS WORKING  
FOR PLASVS

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

PaWT X PaSP X PLi840 X

UTC = X

Instrument Operator JDB

### B. 2-hours before take-off

- 0) Rack power switch on
- 1) O<sub>2</sub> box Power breaker on
- 2) Laptop power on
- 3) Load dry-ice in dewar to within 0.5 inches of lid UTC = 14:42
- 4) Record hi-side cylinder pressures for overnight leak check (P / Δ)

LS 550 / +30 HS 620 / +20  
LT 470 / -10 WT 420 / 0

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

LS 560 / +10 HS 650 / +30  
LT 480 / +10 WT 420 / 0

- 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 2:48:50, Rack laptop time 14:48:46

- 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 788 PaSP 5024 PLi840 20.7

- 15) Pump box Pump 2-breaker on
- 16) Manual VAC valve open
- 17) Check that PaCO<sub>2</sub> = 330 torr (± 5) and PaO<sub>2</sub> = 90 torr (± 1). If not, adjust.

PaCO<sub>2</sub> 330 PaO<sub>2</sub> 91

- 18) Click Initialize Cal Flow button
- 19) Ensure that WT flow starts through both lines (110 ± 10)

FIWT 720 FISP 718 112 107

- 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

All were around 720. Adjusted up.

NOT FAR ENOUGH APART TO JUSTIFY TWEAKING POSSIBLY MESSING THINGS UP

- ✓ 22) Return to WT selected when done checking regulators
- ✓ 23) Check that PdWT ( $\pm 0.1$ ), PdSP ( $\pm 0.1$ ), and PdO2 ( $\pm 0.01$ ) are controlling
- ✓ 24) Light lamp and ensure that it comes on UTC = 15:01
- ✓ 25)  $\geq 10$  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 ( $\pm 10$ ) torr after 2 min.  
Fridge P 802 SA Purge Flow 115
- ✓ 29) Snoop trap fittings
- ✓ 30) Enable change-over valve UTC = 15:24
- ✓ 31)  $\geq 10$  min. after change-over enable, record values in table below

UTC	Gas	O2d	CO2n	O2n	SPm	WTm	Totm	m $\Delta$	PdO2n	PdSPn	PdWTn
15:16:20	WT	NA	0.6	1.2	NA	NA	10.7	NA	0.3	4.3	6.3
15:30:00	WT	470	0.7	2.7	13.7	-8.8	4.1	22.8	0.4	4.1	5.7

## C. 20-min before take-off

- ✓ 1) Adjust / record program parameters (nominally set to a, 40, 2.7, 3, 4).  
Flag a Cal Interval 40 Cal Period 2.7 Ltf 3 Wtf 4
- ✓ 2) Click Start button on main screen
- ✓ 3) Click Proceed button on control screen UTC = 15:33:00
- ✓ 4) Minimize "Verify Run Plan" window
- ✓ 5) Note time of wheels up UTC = 16:00:50

## 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 UTC = 22:08:25
- ✓ 2) Let any calibration cycles finish (up to  $< 5$ -min on ground and/or 2 gases)
- ✓ 3) Click Stop button 220827
- ✓ 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  $\rightarrow$  unsel purges @ 22:14
- ✓ 7) Close manual VAC valve
- ✓ 8) Pump box Pump 1 breaker off
- ✓ 9) Note cryo temperature Cryo = -79.45
- ✓ 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 788 PaSP 785 PLi840 13.94 UTC = 22:11
- 14) Open cylinder box lid and **close green valves**
- 15) Record cylinder pressures for a leak check  
LS 310 HS 605 UTC = 22:13  
LT 460 WT 290
- 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, O<sub>2</sub> box Power breaker off
- 23) Rack power switch off
- 24) Pull trap and replace with stopper. Open trap and remove glass beads