Date 110809 Campaign HIPPO 5 Flight RF01 From BJC To BJC

NCAR Airborne Oxygen Instrument (AO2) Checklist V. 2011.08.11

→ "CYOT" = cyl. box manifold T
→ planning to measure HIMIL body P on PaCO2

I. Preflight

Upload lng cyl log to AO2 w/ manual LP 1430 - change filter

A. Day(s) before flight — Date = 110808

✓ 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) Power rack, O_2 box, Cylinder box, laptop, vnc, start program, and record pressures

PaWT 850 PaSP 811 PLi840 Lo pcs TMan 36 UTC = 22:14

✓ 4) Crack and close green valves, then record cylinder pressures

LS 2200 HS 2220 LP 1480 UTC = 22:17

LT 1670 WT 2130 CylT2 X

✓ 5) Log each hi-side cylinder pressure in software (pressures must be logged at least once between flights)

✓ 6) Stop program, close Visual Basic and vnc, shut down Windows, power down O_2 and Cylinder box, power down laptop and rack

B. 2-hours before take-off — Instrument Operator BBS/ASW

— 1) Rack power switch on

✓ 2) O_2 box Power breaker on

✓ 3) Laptop power on

✓ 4) Pump box Power breaker on

✓ 5) Load dry-ice in dewar to within 0.5 inches of lid — UTC = 13:35 (reading on angle)

✓ 6) Record hi-side cylinder pressures and changes overnight (P / Δ)

LS 2170 / -30 HS 2210 / -10 LP (1430) / -50

LT 1640 / -30 WT 2120 / -10 CylT2 30.0 / X (once inst. on)

✓ 7) Open green knobs four ¼ turns and note any pressure changes (P / Δ)

LS 2190 / +20 HS 2220 / +10 LP 1430 / —

LT 1660 / +20 WT 2130 / +10

✓ 8) Close cylinder box lid

✓ 9) Vnc into into AO2 (192.168.84.138)

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

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

X ✓ 12) Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times

AO2 PC Time 1:33:00, Rack laptop time 1:33:02

X ✓ 13) Cylinder box Power breaker on

X ✓ 14) Record instrument pressures and changes overnight (P / Δ)

PaWT 829 / -21 PaSP 776 / -35 PLi840 — / — TMan 25.6 / -10

~2 torr/hr

✓ ✓ 15) Pump box Pump 2 breaker on

✓ ✓ 16) Manual VAC valve open

✓ ✓ 17) Check that PaCO2 = 305 torr (± 5) and PaO2 = 85 torr (± 1). If not, adjust.

PaCO2 306 PaO2 86

✓ 18) Click Initialize Cal Flow button

Date 110809 Campaign HIPPO 5 Flight RF07

100+ vol EDIT?

✓ ✓ 19) Ensure that flow starts through both lines (110 ± 10)
FlWT (to cell) 100 FlSP (to bypass) 100

X ✓ 20) Toggle changeover to check flows in other position
FlWT (to bypass) 98 FlSP (to cell) 102

X ○ 21) If necessary, adjust HA-3 to match FlWT on bypass and cell to ±2 sccm

X ✓ 22) Check / adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr

X ✓ 23) Close cylinder box lid

✓ ✓ 24) Return to WT selected when done checking regulators

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

15:58 ✓ ✓ 26) Light lamp and ensure that it comes on UTC = 13:47

X X 27) If necessary, adjust PaO2 to keep signal below 9.5 V O_2 signal = 6.9V

✓ ✓ 28) Open manual Line Purge on/off valve

✓ ✓ 29) Ensure inlet manual 3-way valve to Line Purge cylinder

✓ ✓ 30) Click Initialize Sample Flow button

✓ ✓ 31) Pump box Pump 1 breaker on

X ✓ 32) If necessary, adjust Line Purge regulator to 1 psig

○ ✓ 33) Ensure that PaSA stabilizes near 795 (±10) torr after 2 min.
PaSA 790 SA Purge Flow 109 790

adj. sa purge flow in software?

EDIT?

X ✓ 34) Snoop trap fittings

X ✓ 35) >= 10 min. after lamp on record values in first row of table below

UTC	O2d	CO2n	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn	PaSAn
13:59	NA	0.8	1.1	NA	NA	9	NA	0.03	5.0	4.4	4.0
14:09	575	0.9	1.4	15	-4	6	19	0.02	4.4	5.3	3.2
nominal	500+	0.7	2.0	±10	±10	±10	±20	0.05	5.0	5.0	5.0

X ✓ 36) Enable changeover valve (uncheck disable) UTC = 14:02

X ✓ 37) >= 10 min. after change-over enable, record values in table above

X ✓ 38) Disable changeover

X ✓ 39) If necessary, toggle changeover to get SP to Cell

X ✓ 40) Click Close WT 248 valve

C. 45-min before take-off

change in software

X ✓ 1) WT 248 valve to Auto (uncheck close)

X ✓ 2) Enable changeover (uncheck disable)

✓ ✓ 3) Adjust / record program parameters (initially set to a, ~~15, 3.0, 3, (2)~~)
Flag a Cal Interval 15 Cal Period 3.0 LTf 3 WTf 2

"C" 15:59:40 ✓ ✓ 4) Click Start button on main screen UTC = 14:25:03

✓ ✓ 5) Note cryo temperature Cryo = 24 → cyl 1.60x man T.

__ 6) After 3rd Cal cycle (39 min after clicking start, sequence: WT-HS-LS-LT-SA-LS-HS-SA-HS-LS-WT) set Cal Interval to 50 and WTfreq to 4

__ 7) Immediately before runway, switch 3-way valve to inlet UTC = __ : __ : __

__ 8) Note time of wheels up UTC = __ : __ : __

__ 9) Close Inlet Purge cylinder green valve and manual Inlet Purge on/off valve

note in A02 IV re: inlet tests

0

Date 110809 Campaign HIPPO5 Flight RF01

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 and add any action items to AO2_TODO_YYMMDD_GV.doc

__ 1) At high point of first ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = __ : __ : __
__ 2) At high point of last ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = __ : __ : __
__ 3) On final descent, open Line Purge cylinder green valve and on/off valve

See AO2 IV Notebook

Adjust cal schedule as necessary with a goal of sampling at least some portion of every level low and high leg, avoiding overlapping cals at same altitude on the way up and down above 29 kft, and avoiding any cals on northernmost and southernmost profile (keeping in mind 45 second inlet delay):

III. Postflight

✓ 1) Note time of wheels down UTC = 20 : 07 : 58
✓ 2) As soon as off runway, request permission and switch inlet 3-way to line purge
✓ 3) Note cryo temperature Cryo = 13.9 (Hyl Chart
✓ 4) Click Stop button
✓ 5) Close manual VAC valve
✓ **6) Close all 4 cal cylinder green valves**
X 7) Close cylinder box lid
✓ 8) Wait 5 to 10 minutes after touchdown
✓ **9) Close Line Purge cylinder green valve** and manual Line Purge on/off valve
✓ 10) Cylinder box Power breaker off
✓ 11) Pump box Pump 2 breaker off
✓ 12) Pump box Pump 1 breaker off
✓ 13) Pump box Power breaker off
✓ 14) Close program and Visual Basic
✓ 15) Copy data (*.mr, *.hr, *.txt) to laptop and then data and notes, etc. to pen drive
✓ 16) Shut down AO2 PC
✓ 17) Shut down laptop
✓ 18) After green "SP to Cell" light has gone out, O_2 box Power breaker off
__ 19) Rack power switch off
__ 20) Pull trap, jumper quick-connects, and install stopper
__ 21) Open trap and remove glass beads
__ 22) ftp *.mr, *.hr, hgcyllog.txt, and AO2_*_Notes.txt files for this flight to the ao2raw directory on catalog.eol.ucar.edu (or email if ftp does not work)
__ 23) email a scan of this checksheet to BBS (or fax if scanner not available)

EDT to add time

__ check $PaCO_2$ + PaSA vs PSXC

OSA leak 3

Date 110810 Campaign HIPPO5 Flight RF02 From BJC To BJC

NCAR Airborne Oxygen Instrument (AO2) Checklist V. 2011.08.11

I. Preflight

A. Day(s) before flight Date = 110810

- ✓ 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) Power rack, O_2 box, Cylinder box, laptop, vnc, start program, and record pressures
  PaWT 855 PaSP 817 PLi840 pegged TMan 34.4 UTC = 21 : 57
- ✓ 4) Crack and close green valves, then record cylinder pressures
  LS 2130 HS 2180 LP 1340 UTC = 21 : 59
  LT 1640 WT 1940 CylT2 26.9
- ✓ 5) Log each hi-side cylinder pressure in software (pressures must be logged at least once between flights)
- ✓ 6) Stop program, close Visual Basic and vnc, shut down Windows, power down O_2 and Cylinder box, power down laptop and rack

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

- ✓ 1) Rack power switch on
- ✓ 2) O_2 box Power breaker on
- ✓ 3) Laptop power on
- ✓ 4) Pump box Power breaker on
- ✓ 5) Load dry-ice in dewar to within 0.5 inches of lid UTC = 13 : 31
- ✓ 6) Record hi-side cylinder pressures and changes overnight (P / Δ)
  LS 2130 / 0 HS 2190 / +10 LP 1380 / +40
  LT 1630 / −10 WT 1750 / +16 CylT2 ____ / ___ (once inst. on)
- ✓ 7) Open green knobs four ¼ turns and note any pressure changes (P / Δ)
  LS 2130 / 0 HS 2180 / −10 LP 1400 / +20
  LT 1630 / 0 WT 1940 / −10
- ✓ 8) Close cylinder box lid
- ✓ 9) Vnc into into AO2 (192.168.84.138)
- ✓ 10) Start AO2 program by clicking play in higold.vdp
- ✓ 11) Ensure that no USB errors are present in boxes at bottom of screen
- ✓ 12) Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times
  AO2 PC Time 1 : 57 : 28, Rack laptop time 1 : 57 : 28
- ✓ 13) Cylinder box Power breaker on
- ✓ 14) Record instrument pressures and changes overnight (P / Δ)
  PaWT 826 / −29 PaSP 767 / 50 PLi840 12 / — (pegged) TMan 22 / −12
- ✓ 15) Pump box Pump 2 breaker on
- ✓ 16) Manual VAC valve open
- ✓ 17) Check that PaCO2 = 305 torr (± 5) and PaO2 = 85 torr (± 1). If not, adjust.
  PaCO2 306 PaO2 85
- ✓ 18) Click Initialize Cal Flow button

Date 110811 Campaign HIPPO 5 Flight RF02

✓ 19) Ensure that flow starts through both lines (110 ± 10)
FlWT (to cell) 96 FlSP (to bypass) 98
✓ 20) Toggle changeover to check flows in other position
FlWT (to bypass) 94 FlSP (to cell) 99
X 21) If necessary, adjust HA-3 to match FlWT on bypass and cell to ±2 sccm
✓ 22) Check / adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr
✓ 23) Close cylinder box lid
✓ 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 = 13 : 41
✓ 27) If necessary, adjust PaO2 to keep signal below 9.5 V O_2 signal = 7.5
✓ 28) Open manual Line Purge on/off valve
✓ 29) Ensure inlet manual 3-way valve to Line Purge cylinder
✓ 30) Click Initialize Sample Flow button
✓ 31) Pump box Pump 1 breaker on
✓ 32) If necessary, adjust Line Purge regulator to 1 psig
✓ 33) Ensure that PaSA stabilizes near 795 (±10) torr after 2 min.
PaSA ~~789~~ SA Purge Flow 101-116
✓ 34) Snoop trap fittings
✓ 35) >= 10 min. after lamp on record values in first row of table below

UTC	O2d	CO2n	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn	PaSAn
13:52	NA	0.7	1.5	NA	NA	12	NA	0.034	5.4	5.2	2.6
14:08	543	0.6	1.8	17.2	-4.4	6.0	21	0.027	4.8	4.6	3.6
nominal	500+	0.7	2.0	±10	±10	±10	±20	0.05	5.0	5.0	5.0

✓ 36) Enable changeover valve (uncheck disable) UTC = 13 : 53
✓ 37) >= 10 min. after change-over enable, record values in table above
X 38) Disable changeover
X 39) If necessary, toggle changeover to get SP to Cell
X 40) Click Close WT 248 valve

Sy

C. 45-min before take-off

tested Pmeas steps, then restarted as "a" w/ cal Int=15 WTfreq=4

X 1) WT 248 valve to Auto (uncheck close)
X 2) Enable changeover (uncheck disable)
✓ 3) Adjust / record program parameters (initially set to a, 15, 3.0, 3, 2)
Flag ~~b~~ a Cal Interval ~~8~~ 15 Cal Period 3.0 LTf 3 WTf 2
✓ 4) Click Start button on main screen UTC = 14 : 14 : 35
✓ 5) Note cryo temperature Cryo = -81.4
__ 6) After 3rd Cal cycle (39 min after clicking start, sequence: WT-HS-LS-LT-SA-LS-HS-SA-HS-LS-WT) set Cal Interval to 50 and WTfreq to 4
X ~~7) Immediately before runway, switch 3-way valve to inlet UTC = __ : __ : __~~
✓ 8) Note time of wheels up UTC = 08 : 00 : 24 my watch
~~9) Close Inlet Purge cylinder green valve and manual Inlet Purge on/off valve~~

Level @ 15:23

✓ after 5-min of LP at top of mit. climb, switch to inlet 15 : 30 : 02

15:45:32 ✓ 5 min before descent from mit. climb, switch to LP

16:16:11 ✓ at low point (KCZT) of same descent, switch to inlet.

Date 110811 Campaign HIPPO 5 Flight RF02 See back!

once in BL
at low point before final climb (M89) go to Pressure Mea Mode

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 and add any action items to AO2_TODO_YYMMDD_GV.doc

X 1) At high point of first ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = __ : __ : __

X 2) At high point of last ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = __ : __ : __

X 3) On final descent, open Line Purge cylinder green valve and on/off valve

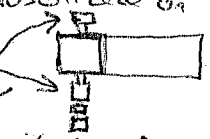
Adjust cal schedule as necessary with a goal of sampling at least some portion of every level low and high leg, avoiding overlapping cals at same altitude on the way up and down above 29 kft, and avoiding any cals on northernmost and southernmost profile (keeping in mind 45 second inlet delay):

III. Postflight

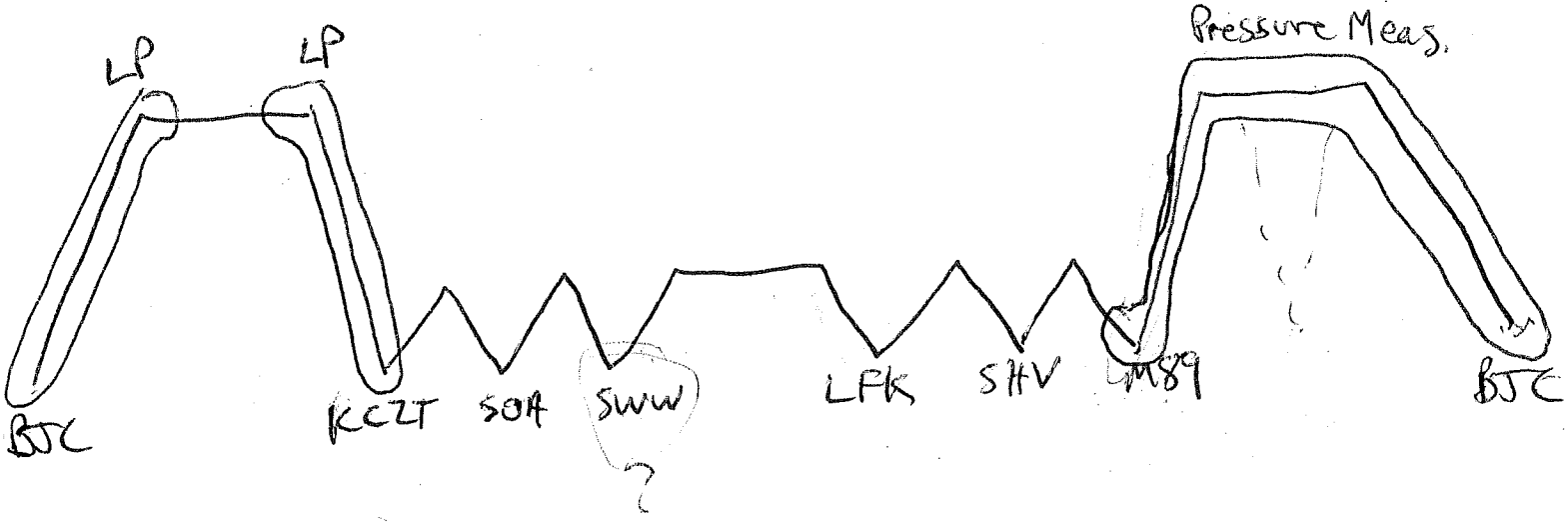
✓ 1) Note time of wheels down UTC = 21:46:36
✓ 2) As soon as off runway, request permission and switch inlet 3-way to line purge
✓ 3) Note cryo temperature Cryo = ~79.6
✓ 4) Click Stop button
✓ 5) Close manual VAC valve
✓ 6) **Close all 4 cal cylinder green valves** Trap reconnected 21:51
✓ 7) Close cylinder box lid
✓ 8) Wait 5 to 10 minutes after touchdown
✓ 9) **Close Line Purge cylinder green valve** and manual Line Purge on/off valve
✓ 10) Cylinder box Power breaker off
✓ 11) Pump box Pump 2 breaker off
✓ 12) Pump box Pump 1 breaker off
✓ 13) Pump box Power breaker off
✓ 14) Close program and Visual Basic
✓ 15) Copy data (*.mr, *.hr, *.txt) to laptop and then data and notes, etc. to pen drive
✓ 16) Shut down AO2 PC
✓ 17) Shut down laptop
✓ 18) After green "SP to Cell" light has gone out, O_2 box Power breaker off
__ 19) Rack power switch off
__ 20) Pull trap, jumper quick-connects, and install stopper
__ 21) Open trap and remove glass beads
__ 22) ftp *.mr, *.hr, hgcyllog.txt, and AO2_*_Notes.txt files for this flight to the ao2raw directory on catalog.eol.ucar.edu (or email if ftp does not work)
__ 23) email a scan of this checksheet to BBS (or fax if scanner not available)

Shuka's Tests:

15:27:32 - Injected BC @ SP2 inlet (aerosolized on ground) (saw leak)
15:31:25 - Tightened fitting
15:31:30 - Tightened bulkhead fitting
15:33:03 - Second BC test @ inlet (this time no leak seen)



A02:



Pressure Meas. Mode

- ✓ click STOP 19:16:00
- ✓ close program (red X)
- ✓ click play
- ✓ change flag to 4
- ✓ click START 19:17:04
- ✓ click MAN ctrl.
- ✓ deselect 'none'
- ✓ uncheck any purges
- ✓ CO2 vol "to amb"
- ✓ SA 248 open
- ✓ Pump 1 off
- ✓ check if data logging

Every 5kft or 5 min, record Ps:

	$PaCO_2$	PaSA	MEDP1	PSXC(mBR)
~~19:28~~	648	1609		855
1930	586	1547		775
1939	~~[illegible]~~	1248		465
1941	285	544		367
1950	183 ~~300~~	300		250
1955	140	151		183

(continued on back of MED checksheet)

15:10 ReSTART on Take Off

7:37 PaSP open to try to vent down PaSA
19:37:45 Closed PaSP
19:39:01 opening org@ drop 1248=PaSA
1940.25 vented P@ ~~org~~ org drop, now down to 546

Date 110816 Campaign HIPPO 5 Flight RF03 From BJC To ADC

NCAR Airborne Oxygen Instrument (AO2) Checklist V. 2011.08.15

I. Preflight

A. Day(s) before flight

Date = 160815

- X 1) Prepare trap with clean glass beads filled to 1 inch from bottom
- X 2) Install trap in dewar — Trap Letters Top/Bottom = B / D
- ✓ 3) Power rack, O_2 box, Cylinder box, laptop, vnc, start program, and record pressures
  PaWT 121 PaSP -2 PLi840 12.0 TMan 34.4 UTC = 21 : 05
- ✓ 4) Crack and close green valves, then record cylinder pressures
  LS 2130 HS 2170 LP 1310 UTC = 21 : 10
  LT 1520 WT 1790 CylT2 28.0
- ✓ 5) Log each hi-side cylinder pressure in software (pressures must be logged at least once between flights)
- ✓ 6) Stop program, close Visual Basic and vnc, shut down Windows, power down O_2 and Cylinder box, power down laptop and rack

B. 2-hours before take-off

Instrument Operator JDB

- ✓ 1) Rack power switch on
- ✓ 2) O_2 box Power breaker on
- ✓ 3) Laptop power on
- ✓ 4) Pump box Power breaker on
- 5) Load dry-ice in dewar to within 0.5 inches of lid UTC = 13 : 21
- ✓ 6) Record hi-side cylinder pressures and changes overnight (P / Δ)
  LS 2130 0 HS 2180 / +10 LP 1240 / -70
  LT 1630 / +110 WT 1740 / -50 CylT2 29.4 / -5.0 (once inst. on)
- ✓ 7) Open green knobs four ¼ turns and note any pressure changes (P / Δ)
  LS 2130 / 0 HS 2180 / 0 LP 1290 / +50
  LT 1630 / 0 WT 1810 / +70
- ✓ 8) Close cylinder box lid
- ✓ 9) Vnc into into AO2 (192.168.84.138)
- ✓ 10) Start AO2 program by clicking play in higold.vdp
- ✓ 11) Ensure that no USB errors are present in boxes at bottom of screen
- ✓ 12) Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times
  AO2 PC Time 1 : 18 : 00 , Rack laptop time 1 : 18 : 01
- ✓ 13) Cylinder box Power breaker on
- ✓ 14) Record instrument pressures and changes overnight (P / Δ)
  PaWT 845 / +720 PaSP -1 / +1 PLi840 12.0 / 0 TMan 26.7 / 7.7
- ✓ 15) Pump box Pump 2 breaker on
- ✓ 16) Manual VAC valve open
- ✓ 17) Check that PaCO2 = 305 torr (± 5) and PaO2 = 85 torr (± 1). If not, adjust.
  PaCO2 304 PaO2 84
- ✓ 18) Click Initialize Cal Flow button

Date 110816 Campaign HIPPO 5 Flight RF03

✓ 19) Ensure that flow starts through both lines (100 ± 10)
FlWT (to cell) 100 FlSP (to bypass) 101
✓ 20) Toggle changeover to check flows in other position
FlWT (to bypass) 99 FlSP (to cell) 102
X 21) If necessary, adjust HA-3 to match FlWT on bypass and cell to ±2 sccm
✓ 22) Check / adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr
✓ 23) Close cylinder box lid
✓ 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 = 13 : 35
X 27) If necessary, adjust PaO2 to keep signal below 9.5 V O_2 signal = 8.31 @ 14:18
✓ 28) Open manual Line Purge on/off valve
✓ 29) Ensure inlet manual 3-way valve to Line Purge cylinder
✓ 30) Click Initialize Sample Flow button
✓ 31) Pump box Pump 1 breaker on
X 32) If necessary, adjust Line Purge regulator to 1 psig
✓ 33) Ensure that PaSA stabilizes near 790 (±10) torr after 2 min.
PaSA 793 SA Purge Flow 97-104
✓ 34) Snoop trap fittings
✓ 35) >= 10 min. after lamp on record values in first row of table below

UTC	O2d	CO2n	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn	PaSAn
13 : 45	NA	0.8	1.0	NA	NA	14	NA	0.03	5.0	4.4	4.2
14 : 09	588	0.74	1.1	15	-5.7	3.8	20.7	0.03	5.7	4.2	3.3
nominal	500+	0.7	2.0	±10	±10	±10	±20	0.05	5.0	5.0	5.0

✓ 36) Enable changeover valve (uncheck disable) UTC = 13 : 46
✓ 37) >= 10 min. after change-over enable, record values in table above
X 38) Disable changeover
X 39) If necessary, toggle changeover to get SP to Cell
X 40) Click Close WT 248 valve

C. 45-min before take-off

X 1) WT 248 valve to Auto (uncheck close)
X 2) Enable changeover (uncheck disable)
✓ 3) Adjust / record program parameters (initially set to a, 15, 3.0, 3, 2)
Flag a Cal Interval 15 Cal Period 3.0 LTf 3 WTf 2
✓ 4) Click Start button on main screen UTC = 14 : 17 : 00
✓ 5) Note cryo temperature Cryo = -80.1
✓ 6) After 3rd Cal cycle (39 min after clicking start, sequence: WT-HS-LS-LT-SA-LS-HS-SA-HS-LS-WT) set Cal Interval to 50 and WTfreq to 4
✓ 7) Immediately before runway, switch 3-way valve to inlet UTC = 15 : 07 : 23
✓ 8) Note time of wheels up UTC = 15 : 08 : 14
✓ 9) Close Inlet Purge cylinder green valve and manual Inlet Purge on/off valve

14:46:15 CLOSED WINDOW SHADES @ SIDE OF AC2 (USUALLY CLOSED)

UTC 15:11:15

Date 110816 Campaign HIPPO 5 Flight RF03

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 and add any action items to AO2_TODO_YYMMDD_GV.doc

✓ 1) At high point of first ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = 15:55:30 - 15:56:30

✓ 2) At high point of first ascent, check all 3 bulkhead nuts. If any finger loose, tighten 1/8 turn with wrench and recheck. Anne checked - not loose

17:45:00
17:46:00
Breath Test

3) At high point of last ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = 17:45:00 - 17:46:00

4) On final descent, open Line Purge cylinder green valve and on/off valve → UTC 20:27:00

18:04 → tested all fittings and NO1A O3 bulkhead ferrule is loose (was fine on how 40)

Adjust cal schedule as necessary with a goal of sampling at least some portion of every level low and high leg, avoiding overlapping cals at same altitude on the way up and down above 29 kft, and avoiding any cals on northernmost and southernmost profile (keeping in mind 45 second inlet delay):

III. Postflight

✓ 1) Note time of wheels down UTC = 21:15:09

✓ 2) As soon as off runway, switch inlet 3-way to line purge UTC = 21:16:03

✓ 3) Note cryo temperature Cryo = -778

4) Click Stop button

5) Close manual VAC valve → forgot to close until 21:30

- open CO2 V01 "to amb"
- turn Pump 1 off
- open SA248
- vent trap line

6) **Close all 4 cal cylinder green valves**

7) Close cylinder box lid

8) Wait 5 to 10 minutes after touchdown

9) **Close Line Purge cylinder green valve** and manual Line Purge on/off valve

10) Cylinder box Power breaker off

11) Pump box Pump 2 breaker off

12) Pump box Pump 1 breaker off

13) Pump box Power breaker off

14) Close program and Visual Basic

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

16) Shut down AO2 PC

17) Shut down laptop

18) After green "SP to Cell" light has gone out, O_2 box Power breaker off

19) Rack power switch off

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

21) Open trap and remove glass beads

22) ftp *.mr, *.hr, hgcyllog.txt, and AO2_*_Notes.txt files for this flight to the ao2raw directory on catalog.eol.ucar.edu (or email if ftp does not work)

23) email a scan of this checksheet to BBS (or fax if scanner not available)

PaCO2 755
PoSA 749
PSXC 1004
MEDP1 747.1

noisy between 744-751

Date 110818 Campaign HIPPO5 Flight RF04 From PANC To PANC

NCAR Airborne Oxygen Instrument (AO2) Checklist V. 2011.08.15

I. Preflight

A. Day(s) before flight

Date = 110817

- ✓ 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) Power rack, O_2 box, Cylinder box, laptop, vnc, start program, and record pressures
  PaWT 976 PaSP 758 PLi840 12 TMan 20.6 UTC = 18:56
- ✓ 4) Crack and close green valves, then record cylinder pressures UTC = 18:59
  LS 1995 HS 2030 LP 1230
  LT 1550 WT 1550 CylT2 17.7
- ✓ 5) Log each hi-side cylinder pressure in software (pressures must be logged at least once between flights)
- ✓ 6) Stop program, close Visual Basic and vnc, shut down Windows, power down O_2 and Cylinder box, power down laptop and rack

DAY BEFORE TO CLEAN OUT U TUBES

B. 2-hours before take-off

JDB Instrument Operator JDB

- ✓ 1) Rack power switch on
- ✓ 2) O_2 box Power breaker on
- ✓ 3) Laptop power on
- ✓ 4) Pump box Power breaker on
- ✓ 5) Load dry-ice in dewar to within 0.5 inches of lid UTC = 16:20
- ✓ 6) Record hi-side cylinder pressures and changes overnight (P / Δ) (see above)
  LS 1985/-20 HS 2010/-20 LP 1100/-230 (RAN GAS, AND DIDN'T NOTE
  LT 1535/-15 WT 1500/-50 CylT2 17/-.7 (once inst. on) P3 @ END OF
- ✓ 7) Open green knobs four ¼ turns and note any pressure changes (P / Δ) MAINT DAY)
  LS 1990/+5 HS 2020/+10 LP 1160/+60
  LT 1535/0 WT 1500/0
- ✓ 8) Close cylinder box lid
- ✓ 9) Vnc into into AO2 (192.168.84.138)
- ✓ 10) Start AO2 program by clicking play in higold.vdp
- ✓ 11) Ensure that no USB errors are present in boxes at bottom of screen
- ✓ 12) Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times
  AO2 PC Time 16:43:08, Rack laptop time 16:43:09
- ✓ 13) Cylinder box Power breaker on
- ✓ 14) Record instrument pressures and changes overnight (P / Δ) (see above)
  PaWT 837/-39 PaSP 772/+14 PLi840 13/+1 TMan 20/-.6 (again, not real; representi
- ✓ 15) Pump box Pump 2 breaker on
- ✓ 16) Manual VAC valve open
- ✓ 17) Check that PaCO2 = 305 torr (± 5) and PaO2 = 85 torr (± 1). If not, adjust. Δ value:
  303 PaCO2 303 PaO2 84 84
- ✓ 18) Click Initialize Cal Flow button

Date 110818 Campaign HIPPO5 Flight RF04

✓ ✓ 19) Ensure that flow starts through both lines (100 ± 10)
91 87 FlWT (to cell) 88 FlSP (to bypass) 85
✓ ✓ 20) Toggle changeover to check flows in other position
91 88 FlWT (to bypass) 87 FlSP (to cell) 87
X ✓ 21) If necessary, adjust HA-3 to match FlWT on bypass and cell to ±2 sccm
WT was @960 → ✓ ✓ 22) Check / adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr
LT was @930 ✓ ✓ 23) Close cylinder box lid
LS was @923 ✓ ✓ 24) Return to WT selected when done checking regulators
HS was @~930 ✓ ✓ 25) Check that PdWT (±0.1), PdSP (±0.1), and PdO2 (±0.01) are controlling 20110817
(consistent w/ notes from HIPPO2 AZ check sheets) ✓ ✓ 26) Light lamp and ensure that it comes on UTC = 16:50 19:29
✓ X 27) If necessary, adjust PaO2 to keep signal below 9.5 V O_2 signal = 8.43 8.43
✓ ✓ 28) Open manual Line Purge on/off valve
✓ ✓ 29) Ensure inlet manual 3-way valve to Line Purge cylinder
✓ ✓ 30) Click Initialize Sample Flow button
✓ ✓ 31) Pump box Pump 1 breaker on
✓ ✓ 32) If necessary, adjust Line Purge regulator to 1 psig
✓ ✓ 33) Ensure that PaSA stabilizes near 790 (±10) torr after 2 min.
790 98 PaSA 786 SA Purge Flow 99
✓ ✓ 34) Snoop trap fittings
✓ ✓ 35) >= 10 min. after lamp on record values in first row of table below

20110818 → 17:00 / 1 / 1.2 / 13 / 0.03 / 4.0 / 5.0 / 4.5

UTC	O2d	CO2n	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn	PaSAn
20110817 → 19:39	NA	0.9	1.4	NA	NA	12.9	NA	.025	4.9	5.5	3.9
Values → 19:52	586	0.8	2	9.8	-1	4.5	11	0.03	5.1	4.6	4.5
nominal	500+	0.7	2.0	±10	±10	±10	±20	0.05	5.0	5.0	5.0

20110818 17:16 values / 584 / 0.6 / 1.8 / 15.5 / -6.6 / 3.3 / 23 / .03 / 5.2 / 5.5 / 5.9 / 20110817 19:39

✓ ✓ 36) Enable changeover valve (uncheck disable) UTC = [redacted] 17:02 20110818
✓ ✓ 37) >= 10 min. after change-over enable, record values in table above
X X 38) Disable changeover
✓ X 39) If necessary, toggle changeover to get SP to Cell
✓ X 40) Click Close WT 248 valve

C. 45-min before take-off

X ✓ 1) WT 248 valve to Auto (uncheck close)
X X 2) Enable changeover (uncheck disable)
✓ ✓ 3) Adjust / record program parameters (initially set to a, 15, 3.0, 3, 2)
9 15 30 3 2 Flag a Cal Interval 15 Cal Period 30 LTf 3 WTf 2
✓ ✓ 4) Click Start button on main screen UTC = 17:18:47 20110817 19 53 50
✓ ✓ 5) Note cryo temperature Cryo = -78.8
✓ ✓ 6) After 3rd Cal cycle (39 min after clicking start, sequence: WT-HS-LS-LT-SA-LS-HS-SA-HS-LS-WT) set Cal Interval to 50 and WTfreq to 4
Door Closed @ 17:50:58 ✓ 7) Immediately before runway, switch 3-way valve to inlet UTC = 18:02:06
✓ ✓ 8) Note time of wheels up UTC = 18:02:42
✓ ✓ 9) Close Inlet Purge cylinder green valve and manual Inlet Purge on/off valve 18:06:45

LP wanders down as cabin T decreases between 17:40 and 17:48

Date 110818 Campaign HIPPOS Flight RF04

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 and add any action items to AO2_TODO_YYMMDD_GV.doc

✓ 1) At high point of first ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = 19:00:15 - 19:01:15

✓ 2) At high point of first ascent, check all 3 bulkhead nuts. If any finger loose, tighten 1/8 turn with wrench and recheck. None were loose.

X 3) At high point of last ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = ___:___:___

✓ 4) On final descent, open Line Purge cylinder green valve and on/off valve
↳ @ 22:00:15

Adjust cal schedule as necessary with a goal of sampling at least some portion of every level low and high leg, avoiding overlapping cals at same altitude on the way up and down above 29 kft, and avoiding any cals on northernmost and southernmost profile (keeping in mind 45 second inlet delay):

III. Postflight

1) Note time of wheels down UTC = 22:11:58
2) As soon as off runway, switch inlet 3-way to line purge UTC = 22:12:50
3) Note cryo temperature Cryo = -78.1
4) Click Stop button → Door opened @ 22:16:40 (20:50:05)
5) Close manual VAC valve
6) **Close all 4 cal cylinder green valves**
7) Close cylinder box lid
8) Wait 5 to 10 minutes after touchdown
9) **Close Line Purge cylinder green valve** and manual Line Purge on/off valve
10) Cylinder box Power breaker off
11) Pump box Pump 2 breaker off
12) Pump box Pump 1 breaker off
13) Pump box Power breaker off
14) Close program and Visual Basic
15) Copy data (*.mr, *.hr, *.txt) to laptop and then data and notes, etc. to pen drive
16) Shut down AO2 PC
17) Shut down laptop
18) After green "SP to Cell" light has gone out, O_2 box Power breaker off
19) Rack power switch off
20) Pull trap, jumper quick-connects, and install stopper
21) Open trap and remove glass beads
22) ftp *.mr, *.hr, hgcyllog.txt, and AO2_*_Notes.txt files for this flight to the ao2raw directory on catalog.eol.ucar.edu (or email if ftp does not work)
23) email a scan of this checksheet to BBS (or fax if scanner not available)

Date 110819 Campaign HIPPOS Flight RF05 From PANC To PANC

NCAR Airborne Oxygen Instrument (AO2) Checklist V. 2011.08.15

I. Preflight

A. Day(s) before flight

Date = 110818

- ✓ 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) Power rack, O_2 box, Cylinder box, laptop, vnc, start program, and record pressures
  PaWT 852 PaSP 761 PLi840 22 TMan 19 UTC = 16 : 49 on 110819
- ✓ 4) Crack and close green valves, then record cylinder pressures
  LS 1970 HS 1990 LP 1150 UTC = ? : __ 110819
  LT 1520 WT 1350 CylT2 ? 20 ?
- ✓ 5) Log each hi-side cylinder pressure in software (pressures must be logged at least once between flights)
- X 6) Stop program, close Visual Basic and vnc, shut down Windows, power down O_2 and Cylinder box, power down laptop and rack

B. 2-hours before take-off

Instrument Operator JDB

- ✓ 1) Rack power switch on
- ✓ 2) O_2 box Power breaker on
- ✓ 3) Laptop power on
- ✓ 4) Pump box Power breaker on
- ✓ 5) Load dry-ice in dewar to within 0.5 inches of lid UTC = 16 : 30
- ✓ 6) Record hi-side cylinder pressures and changes overnight (P / Δ)
  LS 1970 / / HS 1980 / / LP 1090 / /
  LT 1520 / / WT 1350 / / CylT2 ____ / / (once inst. on)
  (Exceptional case bc RF05 is a repeat of aborted RF04 so no maint. occ.)
- ✓ 7) Open green knobs four ¼ turns and note any pressure changes (P / Δ)
  LS 1970 / 0 HS 1990 / +10 LP 1150 / +60
  LT 1520 / 0 WT 1350 / 0
- ✓ 8) Close cylinder box lid
- ✓ 9) Vnc into into AO2 (192.168.84.138)
- ✓ 10) Start AO2 program by clicking play in higold.vdp
- ✓ 11) Ensure that no USB errors are present in boxes at bottom of screen
- ✓ 12) Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times
  AO2 PC Time 16 : 50 : 09 , Rack laptop time 16 : 50 : 06
- ✓ 13) Cylinder box Power breaker on
- ✓ 14) Record instrument pressures and changes overnight (P / Δ)
  PaWT 852 / / PaSP 761 / / PLi840 22 / / TMan 19 / /
- ✓ 15) Pump box Pump 2 breaker on
- ✓ 16) Manual VAC valve open
- ✓ 17) Check that PaCO2 = 305 torr (± 5) and PaO2 = 85 torr (± 1). If not, adjust.
  PaCO2 303 PaO2 85
- ✓ 18) Click Initialize Cal Flow button

Date 110819 Campaign HIPPO5 Flight RF05

✓ 19) Ensure that flow starts through both lines (100 ± 10)
FlWT (to cell) 87 FlSP (to bypass) 84
✓ 20) Toggle changeover to check flows in other position
FlWT (to bypass) 86 FlSP (to cell) 86
X 21) If necessary, adjust HA-3 to match FlWT on bypass and cell to ±2 sccm
✓ 22) Check / adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr
✓ 23) Close cylinder box lid
✓ 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 = 16:55
✓ 27) If necessary, adjust PaO2 to keep signal below 9.5 V O_2 signal = 8.47
✓ 28) Open manual Line Purge on/off valve
✓ 29) Ensure inlet manual 3-way valve to Line Purge cylinder
✓ 30) Click Initialize Sample Flow button
✓ 31) Pump box Pump 1 breaker on
X 32) If necessary, adjust Line Purge regulator to 1 psig
✓ 33) Ensure that PaSA stabilizes near 790 (±10) torr after 2 min.
PaSA 787 SA Purge Flow ~~100~~ 96
✓ 34) Snoop trap fittings
✓ 35) >= 10 min. after lamp on record values in first row of table below

UTC	O2d	CO2n	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn	PaSAn
17:06	NA	.7	1.16	NA	NA	13.4	NA	0.029	5.7	5.2	4.1
17:17	571	0.9	1.16	15	-3.8	5.1	18.8	0.028	5.7	5.6	4.3
nominal	500+	0.7	2.0	±10	±10	±10	±20	0.05	5.0	5.0	5.0

✓ 36) Enable changeover valve (uncheck disable) UTC = 17:06
✓ 37) >= 10 min. after change-over enable, record values in table above
X 38) Disable changeover
X 39) If necessary, toggle changeover to get SP to Cell
X 40) Click Close WT 248 valve

C. 45-min before take-off

X 1) WT 248 valve to Auto (uncheck close)
X 2) Enable changeover (uncheck disable)
✓ 3) Adjust / record program parameters (initially set to a, 15, 3.0, 3, 2)
Flag a Cal Interval 15 Cal Period 3.0 LTf 3 WTf 2
✓ 4) Click Start button on main screen UTC = 17:08:04
✓ 5) Note cryo temperature Cryo = ~77.6
✓ 6) After 3rd Cal cycle (39 min after clicking start, sequence: WT-HS-LS-LT-SA-LS-HS-SA-HS-LS-WT) set Cal Interval to 50 and WTfreq to 4
✓ 7) Immediately before runway, switch 3-way valve to inlet UTC = 18:03:40
✓ 8) Note time of wheels up UTC = 18:04:15
✓ 9) Close Inlet Purge cylinder green valve and manual Inlet Purge on/off valve
↳ @ 18:11:15

Date 110819 Campaign HIPPO5 Flight RF05

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 and add any action items to AO2_TODO_YYMMDD_GV.doc

✓ 1) At high point of first ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = AO2 was in CA

✓ 2) At high point of first ascent, check all 3 bulkhead nuts. If any finger loose, tighten 1/8 turn with wrench and recheck. 18:52:30 - 53:30

✓ 3) At high point of last ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = 00:58:45 - 00:59:45

✓ 4) On final descent, open Line Purge cylinder green valve and on/off valve ~ 02:29:30?

1900:55 NOTHING LOOSE

01:10:00 - NO 100 RE fittings

Adjust cal schedule as necessary with a goal of sampling at least some portion of every level low and high leg, avoiding overlapping cals at same altitude on the way up and down above 29 kft, and avoiding any cals on northernmost and southernmost profile (keeping in mind 45 second inlet delay):

III. Postflight

✓ 1) Note time of wheels down UTC = 02:37:13

✓ 2) As soon as off runway, switch inlet 3-way to line purge UTC = 02:39:50

✓ 3) Note cryo temperature Cryo = -77.3

✓ 4) Click Stop button

✓ 5) Close manual VAC valve

✓ 6) **Close all 4 cal cylinder green valves**

✓ 7) Close cylinder box lid

✓ 8) Wait 5 to 10 minutes after touchdown

✓ 9) **Close Line Purge cylinder green valve** and manual Line Purge on/off valve

✓ 10) Cylinder box Power breaker off

✓ 11) Pump box Pump 2 breaker off

✓ 12) Pump box Pump 1 breaker off

✓ 13) Pump box Power breaker off

✓ 14) Close program and Visual Basic

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

✓ 16) Shut down AO2 PC

✓ 17) Shut down laptop

✓ 18) After green "SP to Cell" light has gone out, O_2 box Power breaker off

✓ 19) Rack power switch off

✓ 20) Pull trap, jumper quick-connects, and install stopper

✓ 21) Open trap and remove glass beads

✓ 22) ftp *.mr, *.hr, hgcyllog.txt, and AO2_*_Notes.txt files for this flight to the ao2raw directory on catalog.eol.ucar.edu (or email if ftp does not work)

✓ 23) email a scan of this checksheet to BBS (or fax if scanner not available)

Date 110822 Campaign HIPPO5 Flight RF06 From PANC To PHKO

Anchorage to Kona

NCAR Airborne Oxygen Instrument (AO2) Checklist V. 2011.08.15

I. Preflight

A. Day(s) before flight Date = 110821

✓ 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) Power rack, O_2 box, Cylinder box, laptop, vnc, start program, and record pressures

PaWT 840 PaSP 747 PLi840 24.1 TMan 21.5 UTC = 18:40

✓ 4) Crack and close green valves, then record cylinder pressures

LS 1920 HS 1955 LP 1118 UTC = 18:43

LT 1500 WT 1120 CylT2 14.2

✓ 5) Log each hi-side cylinder pressure in software (pressures must be logged at least once between flights)

✓ 6) Stop program, close Visual Basic and vnc, shut down Windows, power down O_2 and Cylinder box, power down laptop and rack

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

✓ 1) Rack power switch on

✓ 2) O_2 box Power breaker on

✓ 3) Laptop power on

✓ 4) Pump box Power breaker on

✓ 5) Load dry-ice in dewar to within 0.5 inches of lid UTC = 16:15

✓ 6) Record hi-side cylinder pressures and changes overnight (P / Δ)

LS 1960/40 HS 1990/35 LP 1120/ +10

LT 1520/20 WT 1120 / 0 CylT2 18 / -3.5 (once inst. on)

✓ 7) Open green knobs four ¼ turns and note any pressure changes (P / Δ)

LS 1960/ 0 HS 1995/ +5 LP 1120/ 0

LT 1520/ 0 WT 1120/ 0

✓ 8) Close cylinder box lid

✓ 9) Vnc into into AO2 (192.168.84.138)

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

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

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

AO2 PC Time 16 : 28 : 04 , Rack laptop time 16 : 28 : 01

✓ 13) Cylinder box Power breaker on

✓ 14) Record instrument pressures and changes overnight (P / Δ)

PaWT 840/ 0 PaSP 741 / -6 PLi840 27 / -2.9 TMan 18/ -3.5

✓ 15) Pump box Pump 2 breaker on

✓ 16) Manual VAC valve open

✓ 17) Check that PaCO2 = 305 torr (± 5) and PaO2 = 85 torr (± 1). If not, adjust.

PaCO2 303 PaO2 84

✓ 18) Click Initialize Cal Flow button

Date 110822 Campaign HIPPOS Flight RF06

19) Ensure that flow starts through both lines (100 ± 10)
FlWT (to cell) 89 FlSP (to bypass) 84
20) Toggle changeover to check flows in other position
FlWT (to bypass) 87 FlSP (to cell) 86
21) If necessary, adjust HA-3 to match FlWT on bypass and cell to ±2 sccm
22) Check / adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr
23) Close cylinder box lid
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 = 16 : 35
27) If necessary, adjust PaO2 to keep signal below 9.5 V O_2 signal = 8.1
28) Open manual Line Purge on/off valve
29) Ensure inlet manual 3-way valve to Line Purge cylinder
30) Click Initialize Sample Flow button
31) Pump box Pump 1 breaker on
32) If necessary, adjust Line Purge regulator to 1 psig
33) Ensure that PaSA stabilizes near 790 (±10) torr after 2 min.
PaSA 791 SA Purge Flow 99
34) Snoop trap fittings
35) >= 10 min. after lamp on record values in first row of table below

UTC	O2d	CO2n	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn	PaSAn
16 :45	NA	0.8	1.2	NA	NA	14	NA	0.026	5.5	5.6	3.3
16 :56	591	0.8	2	21	−6	8	28	0.02	6.1	5.4	3.4
nominal	500+	0.7	2.0	±10	±10	±10	±20	0.05	5.0	5.0	5.0

36) Enable changeover valve (uncheck disable) UTC = 16 : 46
37) >= 10 min. after change-over enable, record values in table above
38) Disable changeover
39) If necessary, toggle changeover to get SP to Cell
40) Click Close WT 248 valve

Note: All cylinders seem to leak up much less from point 1→2 (after opening green valves) than in the port.

C. 45-min before take-off

1) WT 248 valve to Auto (uncheck close)
2) Enable changeover (uncheck disable)
3) Adjust / record program parameters (initially set to a, 15, 3.0, 3, 2)
Flag a Cal Interval 15 Cal Period 30 LTf 3 WTf 2 25
4) Click Start button on main screen UTC = 17 : 17 : ~~55~~
5) Note cryo temperature Cryo = −78.7
6) After 3rd Cal cycle (39 min after clicking start, sequence: WT-HS-LS-LT-SA-LS-HS-SA-HS-LS-WT) set Cal Interval to 50 and WTfreq to 4
7) Immediately before runway, switch 3-way valve to inlet UTC = 18 : 13 : 48
8) Note time of wheels up UTC = 18 : 11 : 13
9) Close Inlet Purge cylinder green valve and manual Inlet Purge on/off valve

WAIT UNTIL AFTER TAKE-OFF TO SWITCH TO LP

Delayed on ground

@ UTC 18:13:50

Date 110822 Campaign HIPPOS Flight RF06

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 and add any action items to AO2_TODO_YYMMDD_GV.doc

✓ 1) At high point of first ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = 19:00:00 - 19:01:00

✓ 2) At high point of first ascent, check all 3 bulkhead nuts. If any finger loose, tighten 1/8 turn with wrench and recheck. UTC 19:01:40

✓ 3) At high point of last ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = 01:13:30 - 01:14:30

✓ 4) On final descent, open Line Purge cylinder green valve and on/off valve ~ 01:53

Leak test AO2 inlet filter and upper manifold Tried but did so just before a cal and didn't have time & before plane descended (somewhere around 01:00?)

Adjust cal schedule as necessary with a goal of sampling at least some portion of every level low and high leg, avoiding overlapping cals at same altitude on the way up and down above 29 kft, and avoiding any cals on northernmost and southernmost profile (keeping in mind 45 second inlet delay):

III. Postflight

✓ 1) Note time of wheels down UTC = 01:58:00 ~

✓ 2) As soon as off runway, switch inlet 3-way to line purge UTC = 01:59:36

✓ 3) Note cryo temperature Cryo = -77.3

✓ 4) Click Stop button

✓ 5) Close manual VAC valve

✓ 6) **Close all 4 cal cylinder green valves**

✓ 7) Close cylinder box lid

✓ 8) Wait 5 to 10 minutes after touchdown

✓ 9) **Close Line Purge cylinder green valve** and manual Line Purge on/off valve

✓ 10) Cylinder box Power breaker off

✓ 11) Pump box Pump 2 breaker off

✓ 12) Pump box Pump 1 breaker off

✓ 13) Pump box Power breaker off

✓ 14) Close program and Visual Basic

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

✓ 16) Shut down AO2 PC

✓ 17) Shut down laptop

✓ 18) After green "SP to Cell" light has gone out, O_2 box Power breaker off

✓ 19) Rack power switch off

✓ 20) Pull trap, jumper quick-connects, and install stopper

✓ 21) Open trap and remove glass beads

✓ 22) ftp *.mr, *.hr, hgcyllog.txt, and AO2_*_Notes.txt files for this flight to the ao2raw directory on catalog.eol.ucar.edu (or email if ftp does not work)

✓ 23) email a scan of this checksheet to BBS (or fax if scanner not available)

Date 110824 Campaign HIPPOS Flight RF07 From PHKO To _____

NCAR Airborne Oxygen Instrument (AO2) Checklist V. 2011.08.15

I. Preflight

A. Day(s) before flight Date = 110823

- ✓ 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) Power rack, O_2 box, Cylinder box, laptop, vnc, start program, and record pressures
  PaWT 868 PaSP 761 PLi840 23.8 TMan 22 UTC = 20:45
- ✓ 4) Crack and close green valves, then record cylinder pressures
  LS 1955 HS 1990 LP 1080 UTC = 20:48
  LT 1545 WT 950 CylT2 21
- ✓ 5) Log each hi-side cylinder pressure in software (pressures must be logged at least once between flights)
- ✓ 6) Stop program, close Visual Basic and vnc, shut down Windows, power down O_2 and Cylinder box, power down laptop and rack

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

- ✓ 1) Rack power switch on
- ✓ 2) O_2 box Power breaker on
- ✓ 3) Laptop power on
- ✓ 4) Pump box Power breaker on
- ✓ 5) Load dry-ice in dewar to within 0.5 inches of lid UTC = 18:15
- ✓ 6) Record hi-side cylinder pressures and changes overnight (P / Δ)
  LS 2000 / +45 HS 2035 / +45 LP 1150 / +50
  LT 1590 / +45 WT 960 / +10 CylT2 26 / +5 (once inst. on)
- ✓ 7) Open green knobs four ¼ turns and note any pressure changes (P / Δ)
  LS 2000 / 0 HS 2035 / 0 LP 1130 / 0
  LT 1590 / 0 WT 960 / 0
- ✓ 8) Close cylinder box lid
- ✓ 9) Vnc into into AO2 (192.168.84.138)
- ✓ 10) Start AO2 program by clicking play in higold.vdp
- ✓ 11) Ensure that no USB errors are present in boxes at bottom of screen
- ✓ 12) Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times
  AO2 PC Time 18:27:47, Rack laptop time 18:27:50
- ✓ 13) Cylinder box Power breaker on
- ✓ 14) Record instrument pressures and changes overnight (P / Δ)
  PaWT 888 / +20 PaSP 776 / +15 PLi840 28 / +9.7 TMan 28 / +6
- ✓ 15) Pump box Pump 2 breaker on
- ✓ 16) Manual VAC valve open
- ✓ 17) Check that PaCO2 = 305 torr (± 5) and PaO2 = 85 torr (± 1). If not, adjust.
  PaCO2 310 PaO2 83
- ✓ 18) Click Initialize Cal Flow button

1:00:00 Error -200478: Measurements Spec Opened cannot be performed when there are no channels in the Restarted program - now no errors

Date 110824 Campaign HIPPO5 Flight RF07

19) Ensure that flow starts through both lines (100 ± 10)
FlWT (to cell) 104 FlSP (to bypass) 96
20) Toggle changeover to check flows in other position
FlWT (to bypass) 103 FlSP (to cell) 96
21) If necessary, adjust HA-3 to match FlWT on bypass and cell to ±2 sccm
22) Check / adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr
23) Close cylinder box lid
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 = 18 : 34
27) If necessary, adjust PaO2 to keep signal below 9.5 V O_2 signal = 7.52
28) Open manual Line Purge on/off valve
29) Ensure inlet manual 3-way valve to Line Purge cylinder
30) Click Initialize Sample Flow button
31) Pump box Pump 1 breaker on
32) If necessary, adjust Line Purge regulator to 1 psig
33) Ensure that PaSA stabilizes near 790 (±10) torr after 2 min.
PaSA 790 SA Purge Flow 95
34) Snoop trap fittings
35) >= 10 min. after lamp on record values in first row of table below

won't come on after 3 more tries

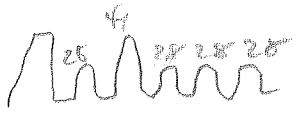
UTC	O2d	CO2n	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn	PaSAn
18 : 49	NA	0.7	1.2	NA	NA	4.6	NA	0.03	5.6	5.1	5.2
19 : 01	610	0.7	1.9	14	-12	1.2	25	0.03	5.1	5.3	3.7
nominal	500+	0.7	2.0	±10	±10	±10	±20	0.05	5.0	5.0	5.0

36) Enable changeover valve (uncheck disable) UTC = 18:50
37) >= 10 min. after change-over enable, record values in table above
38) Disable changeover
39) If necessary, toggle changeover to get SP to Cell
40) Click Close WT 248 valve

C. 45-min before take-off

1) WT 248 valve to Auto (uncheck close)
2) Enable changeover (uncheck disable)
3) Adjust / record program parameters (initially set to a, 15, 3.0, 3, 2)
Flag a Cal Interval 15 Cal Period 3.0 LTf 3 WTf 2
4) Click Start button on main screen UTC = 19 : 23 : 40
5) Note cryo temperature Cryo = -78.8
6) After 3rd Cal cycle (39 min after clicking start, sequence: WT-HS-LS-LT-SA-LS-HS-SA-HS-LS-WT) set Cal Interval to 50 and WTfreq to 4
7) Immediately before runway, switch 3-way valve to inlet UTC = 20:03:30
8) Note time of wheels up UTC = 20:00:00
9) Close Inlet Purge cylinder green valve and manual Inlet Purge on/off valve
10) switch WT freq to 4 after cal at top of first ascent.

slightly late starting, so only 2 cals before takeoff



Date 110824 Campaign HIPPO5 Flight 07

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 and add any action items to AO2_TODO_YYMMDD_GV.doc

→ orig at alt for ~6 mins, and cal held to finish and get some sample

X 1) At high point of first ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = __ : 20 : __

__ 2) At high point of first ascent, check all 3 bulkhead nuts. If any finger loose, tighten 1/8 turn with wrench and recheck.

✓ 3) At high point of last ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = 23 : 20 : 00 - 23 : 21 : c

✓ 4) On final descent, open Line Purge cylinder green valve and on/off valve

Adjust cal schedule as necessary with a goal of sampling at least some portion of every level low and high leg, avoiding overlapping cals at same altitude on the way up and down above 29 kft, and avoiding any cals on northernmost and southernmost profile (keeping in mind 45 second inlet delay):

III. Postflight

__ 1) Note time of wheels down UTC = 04:22:27

__ 2) As soon as off runway, switch inlet 3-way to line purge UTC = 04 : 04 : 00

__ 3) Note cryo temperature Cryo = -77.8

00:51 ✓ ✓ 4) Click Stop button ✓ 04:02

✓ ✓ 5) Close manual VAC valve ✓

✓ **6) Close all 4 cal cylinder green valves**

✓ 7) Close cylinder box lid

__ 8) Wait 5 to 10 minutes after touchdown

__ **9) Close Line Purge cylinder green valve** and manual Line Purge on/off valve

✓ __ 10) Cylinder box Power breaker off

✓ __ 11) Pump box Pump 2 breaker off

✓ __ 12) Pump box Pump 1 breaker off

✓ __ 13) Pump box Power breaker off

__ 14) Close program and Visual Basic

✓ __ 15) Copy data (*.mr, *.hr, *.txt) to laptop and then data and notes, etc. to pen drive

✓ 16) Shut down AO2 PC

✓ 17) Shut down laptop

✓ ✓ 18) After green "SP to Cell" light has gone out, O_2 box Power breaker off

X 19) Rack power switch off

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

21) Open trap and remove glass beads

__ 22) ftp *.mr, *.hr, hgcyllog.txt, and AO2_*_Notes.txt files for this flight to the ao2raw directory on catalog.eol.ucar.edu (or email if ftp does not work)

__ 23) email a scan of this checksheet to BBS (or fax if scanner not available)

Date 110827 Campaign HIPPO5 Flight RF08 From NCAR To NZCH

NCAR Airborne Oxygen Instrument (AO2) Checklist V. 2011.08.15

I. Preflight

A. Day(s) before flight Date = 110826

- ✓ 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) Power rack, O_2 box, Cylinder box, laptop, vnc, start program, and record pressures
  PaWT 856 PaSP 758 PLi840 31 TMan 21 UTC = 18:47
- ✓ 4) Crack and close green valves, then record cylinder pressures
  LS 1935 HS 1965 LP 1080 UTC = 18:49
  LT 1520 WT 780 CylT2 22
- ✓ 5) Log each hi-side cylinder pressure in software (pressures must be logged at least once between flights)
- ✓ 6) Stop program, close Visual Basic and vnc, shut down Windows, power down O_2 and Cylinder box, power down laptop and rack

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

- ✓ 1) Rack power switch on
- ✓ 2) O_2 box Power breaker on
- ✓ 3) Laptop power on
- ✓ 4) Pump box Power breaker on
- ✓ 5) Load dry-ice in dewar to within 0.5 inches of lid UTC = 18:20
- ✓ 6) Record hi-side cylinder pressures and changes overnight (P / Δ)
  LS 1935 / 0 HS 1960 -5 LP 1040 -40
  LT 1530 / -10 WT 720 / -60 CylT2 22 / 0 (once inst. on)
  (ran WT on Maint Dcj)
- ✓ 7) Open green knobs four ¼ turns and note any pressure changes (P / Δ)
  LS 1950 / +15 HS 1970 / +10 LP 1060 / +20
  LT 1535 / +5 WT 720 / 0
- ✓ 8) Close cylinder box lid
- ✓ 9) Vnc into into AO2 (192.168.84.138)
- ✓ 10) Start AO2 program by clicking play in higold.vdp
- ✓ 11) Ensure that no USB errors are present in boxes at bottom of screen
- ✓ 12) Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times
  AO2 PC Time 18:31:21 , Rack laptop time 18:31:24
- ✓ 13) Cylinder box Power breaker on
- ✓ 14) Record instrument pressures and changes overnight (P / Δ)
  PaWT 854 / ___ PaSP 777 / ___ PLi840 27 / ___ TMan 22 / +1
- ✓ 15) Pump box Pump 2 breaker on
- ✓ 16) Manual VAC valve open
- ✓ 17) Check that PaCO2 = 305 torr (± 5) and PaO2 = 85 torr (± 1). If not, adjust.
  PaCO2 306 PaO2 84
- ✓ 18) Click Initialize Cal Flow button

Date 110827 Campaign MIPPOS Flight RF08

19) Ensure that flow starts through both lines (100 ± 10)
FlWT (to cell) 95 FlSP (to bypass) 91

96/89 95/90 20) Toggle changeover to check flows in other position
FlWT (to bypass) 95 FlSP (to cell) 92

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

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

23) Close cylinder box lid

24) Return to WT selected when done checking regulators

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

7.59 26) Light lamp and ensure that it comes on UTC = 18:35

27) If necessary, adjust PaO2 to keep signal below 9.5 V O_2 signal = 7.51

28) Open manual Line Purge on/off valve

29) Ensure inlet manual 3-way valve to Line Purge cylinder

30) Click Initialize Sample Flow button

31) Pump box Pump 1 breaker on

32) If necessary, adjust Line Purge regulator to 1 psig

33) Ensure that PaSA stabilizes near 790 (±10) torr after 2 min.
PaSA 790 SA Purge Flow 97

34) Snoop trap fittings

35) >= 10 min. after lamp on record values in first row of table below

UTC	O2d	CO2n	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn	PaSAn
18:46	NA	0.76	1.2	NA	NA	13.5	NA	.026	5.4	5.7	2.2
18:56	581	0.7	1.5	19	-7	5.9	25	0.025	5.6	4.7	4.8
nominal	500+	0.7	2.0	±10	±10	±10	±20	0.05	5.0	5.0	5.0

36) Enable changeover valve (uncheck disable) UTC = 18:46

37) >= 10 min. after change-over enable, record values in table above

38) Disable changeover

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

40) Click Close WT 248 valve

C. 45-min before take-off

1) WT 248 valve to Auto (uncheck close)

2) Enable changeover (uncheck disable)

3) Adjust / record program parameters (initially set to a, 15, 3.0, 3, 2)
Flag a Cal Interval 15 Cal Period 3.0 LTf 3 WTf 2

4) Click Start button on main screen UTC = 19:12:29

5) Note cryo temperature Cryo = -78

6) After 3rd Cal cycle (39 min after clicking start, sequence: WT-HS-LS-LT-SA-LS-HS-SA-HS-LS-WT) set Cal Interval to 50 and WTfreq to 4

7) Immediately before runway, switch 3-way valve to inlet UTC = 20:52:18

8) Note time of wheels up UTC = 20:53:01

9) Close Inlet Purge cylinder green valve and manual Inlet Purge on/off valve
↳ 20:58:30

Date 110827 Campaign HIPPO5 Flight RF08

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 and add any action items to AO2_TODO_YYMMDD_GV.doc

✓ 1) At high point of first ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = 21:38:30 - 39:30

03:15:40 ✓ 2) At high point of first ascent, check all 3 bulkhead nuts. If any finger loose, tighten 1/8 turn with wrench and recheck.

No sign of loose nuts

22 3100-3200 ✓ Breath Teflon inlet fitting and manifold @ cyl/pump box

✗ 3) At high point of last ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = __ : __ : __

✓ 4) On final descent, open Line Purge cylinder green valve and on/off valve 03:48:45

Adjust cal schedule as necessary with a goal of sampling at least some portion of every level low and high leg, avoiding overlapping cals at same altitude on the way up and down above 29 kft, and avoiding any cals on northernmost and southernmost profile (keeping in mind 45 second inlet delay):

III. Postflight

✓ 1) Note time of wheels down UTC = 04:03:39

✓ 2) As soon as off runway, switch inlet 3-way to line purge UTC = 04:04:58

✓ 3) Note cryo temperature Cryo = -77.5

✓ 4) Click Stop button

✓ 5) Close manual VAC valve

✓ 6) **Close all 4 cal cylinder green valves**

✓ 7) Close cylinder box lid

✓ 8) Wait 5 to 10 minutes after touchdown

✓ 9) **Close Line Purge cylinder green valve** and manual Line Purge on/off valve

✓ 10) Cylinder box Power breaker off

✓ 11) Pump box Pump 2 breaker off

✓ 12) Pump box Pump 1 breaker off

✓ 13) Pump box Power breaker off

✓ 14) Close program and Visual Basic

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

✓ 16) Shut down AO2 PC

✓ 17) Shut down laptop

✓ 18) After green "SP to Cell" light has gone out, O_2 box Power breaker off

✓ 19) Rack power switch off

✓ 20) Pull trap, jumper quick-connects, and install stopper

✓ 21) Open trap and remove glass beads

✓ 22) ftp *.mr, *.hr, hgcyllog.txt, and AO2_*_Notes.txt files for this flight to the ao2raw directory on catalog.eol.ucar.edu (or email if ftp does not work)

__ 23) email a scan of this checksheet to BBS (or fax if scanner not available)

Date 110830 (28) Campaign HIPPO 5 Flight RF09 From CHC To CHC

NCAR Airborne Oxygen Instrument (AO2) Checklist V. 2011.08.15

I. Preflight

A. Day(s) before flight

Date = 110830 (28) 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) Power rack, O_2 box, Cylinder box, laptop, vnc, start program, and record pressures

PaWT 839 PaSP 757 PLi840 27 TMan 13 UTC = 21 : 36

✓ 4) Crack and close green valves, then record cylinder pressures

LS 1820 HS 1860 LP 970 990 UTC = 21 : 39

LT 1460 WT 510 CylT2 12.2

✓ 5) Log each hi-side cylinder pressure in software (pressures must be logged at least once between flights)

__ 6) Stop program, close Visual Basic and vnc, shut down Windows, power down O_2 and Cylinder box, power down laptop and rack

B. 2-hours before take-off

Instrument Operator BBS/ASM

✓ 1) Rack power switch on

✓ 2) O_2 box Power breaker on

✓ 3) Laptop power on

✓ 4) Pump box Power breaker on

✓ 5) Load dry-ice in dewar to within 0.5 inches of lid UTC = 26 : 20

✓ 6) Record hi-side cylinder pressures and changes overnight (P / Δ)

LS 1810 / -10 HS 1860 / 0 LP 980 / -10

LT 1470 / +10 WT 470 / -40 CylT2 12.1 / -0.1 (once inst. on)

Ran some working tanks yesterday after reading P

✓ 7) Open green knobs four ¼ turns and note any pressure changes (P / Δ)

LS 1820 / +10 HS 1860 / 0 LP 990 / +10

LT 1470 / 0 WT 480 / +10

✓ 8) Close cylinder box lid

✓ 9) Vnc into into AO2 (192.168.84.138)

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

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

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

AO2 PC Time 20 : 48 : 00 , Rack laptop time 20 : 48 : 01

✓ 13) Cylinder box Power breaker on

✓ 14) Record instrument pressures and changes overnight (P / Δ)

PaWT 800 / -39 PaSP 792 / +35 PLi840 37 / +10 TMan 19 / +6

✓ 15) Pump box Pump 2 breaker on

✓ 16) Manual VAC valve open

✓ 17) Check that PaCO2 = 305 torr (± 5) and PaO2 = 85 torr (± 1). If not, adjust.

PaCO2 306 PaO2 85

✓ 18) Click Initialize Cal Flow button

Date 110829 Campaign HIPPO 5 Flight RF09

EDT

90

✓ ✓ 19) Ensure that flow starts through both lines (~~100~~ ± 10)
FlWT (to cell) 86 FlSP (to bypass) 82

X ✓ 20) Toggle changeover to check flows in other position
FlWT (to bypass) 82 FlSP (to cell) 86

X ✓ 21) If necessary, adjust HA-3 to match FlWT on bypass and cell to ±2 sccm

X ✓ 22) Check / adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr

X ✓ 23) Close cylinder box lid

X ✓ 24) Return to WT selected when done checking regulators

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

X X 26) Light lamp and ensure that it comes on was on UTC = __ : __

X ✓ 27) If necessary, adjust PaO2 to keep signal below 9.5 V O_2 signal = 9.1

X ✓ 28) Open manual Line Purge on/off valve

X ✓ 29) Ensure inlet manual 3-way valve to Line Purge cylinder

✓ ✓ 30) Click Initialize Sample Flow button

X ✓ 31) Pump box Pump 1 breaker on

X ✓ 32) If necessary, adjust Line Purge regulator to 1 psig

✓ 33) Ensure that PaSA stabilizes near 790 (±10) torr after 2 min.
PaSA 788 SA Purge Flow 95

X ✓ 34) Snoop trap fittings

X ✓ 35) >= 10 min. after lamp on record values in first row of table below

UTC	O2d	CO2n	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn	PaSAn
21:08	NA	0.7	1.0	NA	NA	0.8	NA	0.02	6.0	5.6	3.0
21:22	585	0.9	2.6	+8	-8	-1	17	0.025	5.0	5.5	3.3
nominal	500+	0.7	2.0	±10	±10	±10	±20	0.05	5.0	5.0	5.0

played w/ PaO2 b/c flow seemed low @320 ~0.8 SLPM 1.0... set back to 3.0 & started

✓ 36) Enable changeover valve (uncheck disable) UTC = 21 : 18

__ 37) >= 10 min. after change-over enable, record values in table above

X 38) Disable changeover

X 39) If necessary, toggle changeover to get SP to Cell

X 40) Click Close WT 248 valve

C. 45-min before take-off

X 1) WT 248 valve to Auto (uncheck close)

X 2) Enable changeover (uncheck disable)

✓ 3) Adjust / record program parameters (initially set to a, 15, 3.0, 3, 2)
Flag a Cal Interval 15 Cal Period 3.0 LTf 3 WTf 2

✓ 4) Click Start button on main screen UTC = 21 : 18 : 40

✓ 5) Note cryo temperature Cryo = -77.5

✓ 6) After 3rd Cal cycle (39 min after clicking start, sequence: WT-HS-LS-LT-SA-LS-HS-SA-HS-LS-WT) set Cal Interval to 50 and WTfreq to 4

✓ 7) Immediately before runway, switch 3-way valve to inlet UTC = 22 : 14 : 40

✓ 8) Note time of wheels up UTC = 22 : 16 : 08

✓ 9) Close Inlet Purge cylinder green valve and manual Inlet Purge on/off valve

Date 110829 Campaign HIPPO 5 Flight RF09

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 and add any action items to AO2_TODO_YYMMDD_GV.doc

doing HIMIL test instead (see notebook)

X 1) At high point of first ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = __ : __ : __

✓ 2) At high point of first ascent, check all 3 bulkhead nuts. If any finger loose, tighten 1/8 turn with wrench and recheck. Tight

✓ 3) At high point of last ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = 05 : 21 : 25 → 30

crashed over midnight → see NOTES.txt

X 4) On final descent, open Line Purge cylinder green valve and on/off valve BT on filters 05:24:00 → 30

Adjust cal schedule as necessary with a goal of sampling at least some portion of every level low and high leg, avoiding overlapping cals at same altitude on the way up and down above 29 kft, and avoiding any cals on northernmost and southernmost profile (keeping in mind 45 second inlet delay): BT on cylinders 05:26:00 → 3

III. Postflight

✓ 1) Note time of wheels down UTC = 7 : 08 : __

✓ 2) As soon as off runway, switch inlet 3-way to line purge UTC = 7 : 08 : 37

✓ 3) Note cryo temperature Cryo = -76.4

✓ 4) Click Stop button

✓ 5) Close manual VAC valve

✓ 6) **Close all 4 cal cylinder green valves**

✓ 7) Close cylinder box lid

✓ 8) Wait 5 to 10 minutes after touchdown

✓ 9) **Close Line Purge cylinder green valve** and manual Line Purge on/off valve

✓ 10) Cylinder box Power breaker off

✓ 11) Pump box Pump 2 breaker off

✓ 12) Pump box Pump 1 breaker off

✓ 13) Pump box Power breaker off

✓ 14) Close program and Visual Basic

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

✓ 16) Shut down AO2 PC

✓ 17) Shut down laptop

✓ 18) After green "SP to Cell" light has gone out, O_2 box Power breaker off

X 19) Rack power switch off

✓ 20) Pull trap, jumper quick-connects, and install stopper

✓ 21) Open trap and remove glass beads

✓ 22) ftp *.mr, *.hr, hgcyllog.txt, and AO2_*_Notes.txt files for this flight to the ao2raw directory on catalog.eol.ucar.edu (or email if ftp does not work)

__ 23) email a scan of this checksheet to BBS (or fax if scanner not available)

POWER DROP @ 7:13:0

Date 110831 Campaign HIPPO 5 Flight RF10 From NZCH To NCR6-

NCAR Airborne Oxygen Instrument (AO2) Checklist V. 2011.08.15

I. Preflight

A. Day(s) before flight Date = 110831

- ✓ 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) Power rack, O_2 box, Cylinder box, laptop, vnc, start program, and record pressures
  PaWT 839 PaSP 717 PLi840 41 TMan 15 UTC = 21 : 48
- ✓ 4) Crack and close green valves, then record cylinder pressures
  LS 1770 HS 1810 LP 970 UTC = 21 : 50
  LT 1410 WT 245 CylT2 —
- ✓ 5) Log each hi-side cylinder pressure in software (pressures must be logged at least once between flights)
- ✓ 6) Stop program, close Visual Basic and vnc, shut down Windows, power down O_2 and Cylinder box, power down laptop and rack

OK30054 H.Side: 193 L.side: 12 23:00 switched new OK30054 W cylinder in and snoo Replaced rgl ferrole; ran LSP

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

- ✓ 1) Rack power switch on
- ✓ 2) O_2 box Power breaker on
- ✓ 3) Laptop power on
- ✓ 4) Pump box Power breaker on
- ✓ 5) Load dry-ice in dewar to within 0.5 inches of lid UTC = 20 : 40 up
- ✓ 6) Record hi-side cylinder pressures and changes overnight (P / Δ)
  LS 1770 / 0 HS 1820 / +10 LP 970 / 0
  LT 1430 / +20 WT 1810 / -60 CylT2 9.8 / ___ (once inst. on)
- ✓ 7) Open green knobs four ¼ turns and note any pressure changes (P / Δ)
  LS 1770 / 0 HS 1820 / 0 LP 960 / -10
  LT 1430 / ? WT 1940 / +70 ← Snooped
- ___ 8) Close cylinder box lid
- ✓ 9) Vnc into into AO2 (192.168.84.138)
- ✓ 10) Start AO2 program by clicking play in higold.vdp
- ✓ 11) Ensure that no USB errors are present in boxes at bottom of screen
- ✓ 12) Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times
  AO2 PC Time 8 : 40 : 00, Rack laptop time 8 : 40 : 61
- ✓ 13) Cylinder box Power breaker on
- ✓ 14) Record instrument pressures and changes overnight (P / Δ)
  PaWT 1412 / — PaSP 720 / +3 PLi840 504 / +9 TMan 15.24 —
- ✓ 15) Pump box Pump 2 breaker on
- ✓ 16) Manual VAC valve open
- ✓ 17) Check that PaCO2 = 305 torr (± 5) and PaO2 = 85 torr (± 1). If not, adjust.
  PaCO2 ____ PaO2 84
- ✓ 18) Click Initialize Cal Flow button

00 34:00

loaded in software

Date 110901 Campaign HIPPO 5 Flight RF10

✓ 19) Ensure that flow starts through both lines (100 ± 10)
FlWT (to cell) 87 FlSP (to bypass) 83 88 87

✓ 20) Toggle changeover to check flows in other position
FlWT (to bypass) 83 FlSP (to cell) 89 86 88

✓ 21) If necessary, adjust HA-3 to match FlWT on bypass and cell to ±2 sccm

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

✓ 23) Close cylinder box lid

✓ 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 = 21 : 12

✓ 27) If necessary, adjust PaO2 to keep signal below 9.5 V O_2 signal = 8.43

✓ 28) Open manual Line Purge on/off valve

✓ 29) Ensure inlet manual 3-way valve to Line Purge cylinder

✓ 30) Click Initialize Sample Flow button

✓ 31) Pump box Pump 1 breaker on

✓ 32) If necessary, adjust Line Purge regulator to 1 psig

✓ 33) Ensure that PaSA stabilizes near 790 (±10) torr after 2 min.
PaSA 786 SA Purge Flow 99

✓ 34) Snoop trap fittings

✓ 35) >= 10 min. after lamp on record values in first row of table below

UTC	O2d	CO2n	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn	PaSAn
21 : 20	NA	0.77	1.78	NA	NA	18	NA	0.029	5.6	5.2	26
21 : 20	593	0.84	2.7	14.8	-3.2	5.6	18.1	0.03	5.9	5.8	4.8
nominal	500+	0.7	2.0	±10	±10	±10	±20	0.05	5.0	5.0	5.0

✓ 36) Enable changeover valve (uncheck disable) UTC = 21 : 20

✓ 37) >= 10 min. after change-over enable, record values in table above

✓ 38) Disable changeover

✓ 39) If necessary, toggle changeover to get SP to Cell

✓ 40) Click Close WT 248 valve

C. 45-min before take-off

✓ 1) WT 248 valve to Auto (uncheck close)

✓ 2) Enable changeover (uncheck disable)

✓ 3) Adjust / record program parameters (initially set to a, 15, 3.0, 3, 2)
Flag a Cal Interval 15 Cal Period 3.0 LTf 3 WTf 2

✓ 4) Click Start button on main screen UTC = 21 : 30 : 30

✓ 5) Note cryo temperature Cryo = -78

6) After 3rd Cal cycle (39 min after clicking start, sequence: WT-HS-LS-LT-SA-LS-HS-SA-HS-LS-WT) set Cal Interval to 50 and WTfreq to 4 ONLY 2

✓ 7) Immediately before runway, switch 3-way valve to inlet UTC = 21 : 56 : 40

✓ 8) Note time of wheels up UTC = 21 : 59 19

✓ 9) Close Inlet Purge cylinder green valve and manual Inlet Purge on/off valve

Main Control @ 21:53:36 to get full ascent.

Force cal @ ~ 22:05 w/ WT

Date 140101 Campaign HIPPO 5 Flight RF10

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 and add any action items to AO2_TODO_YYMMDD_GV.doc

went into HS cal @ 22:23
Man control Back to SA
LT purge off Auto @ 23:12

✓ 1) At high point of first ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = 21:31:30

✓ 2) At high point of first ascent, check all 3 bulkhead nuts. If any finger loose, tighten 1/8 turn with wrench and recheck. Tight

✓ 3) At high point of last ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = 03:23:06 - 52

✓ 4) On final descent, open Line Purge cylinder green valve and on/off valve

Adjust cal schedule as necessary with a goal of sampling at least some portion of every level low and high leg, avoiding overlapping cals at same altitude on the way up and down above 29 kft, and avoiding any cals on northernmost and southernmost profile (keeping in mind 45 second inlet delay):

III. Postflight

✓ 1) Note time of wheels down UTC = 04:04:26
✓ 2) As soon as off runway, switch inlet 3-way to line purge UTC = 04:05:23
✓ 3) Note cryo temperature Cryo = -78.3
✓ 4) Click Stop button
✓ 5) Close manual VAC valve
✓ 6) **Close all 4 cal cylinder green valves**
✓ 7) Close cylinder box lid
✓ 8) Wait 5 to 10 minutes after touchdown
✓ 9) **Close Line Purge cylinder green valve** and manual Line Purge on/off valve
✓ 10) Cylinder box Power breaker off
✓ 11) Pump box Pump 2 breaker off
✓ 12) Pump box Pump 1 breaker off
✓ 13) Pump box Power breaker off
✓ 14) Close program and Visual Basic
✓ 15) Copy data (*.mr, *.hr, *.txt) to laptop and then data and notes, etc. to pen drive
✓ 16) Shut down AO2 PC
✓ 17) Shut down laptop
✓ 18) After green "SP to Cell" light has gone out, O_2 box Power breaker off
✓ 19) Rack power switch off
✓ 20) Pull trap, jumper quick-connects, and install stopper
✓ 21) Open trap and remove glass beads
__ 22) ftp *.mr, *.hr, hgcyllog.txt, and AO2_*_Notes.txt files for this flight to the ao2raw directory on catalog.eol.ucar.edu (or email if ftp does not work)
__ 23) email a scan of this checksheet to BBS (or fax if scanner not available)

Date 110901 Campaign HIPPO 5 Flight RF11 From NCRG To PHKO

NCAR Airborne Oxygen Instrument (AO2) Checklist V. 2011.08.15

I. Preflight

A. Day(s) before flight Date = 110901

- ✓ 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) Power rack, O_2 box, Cylinder box, laptop, vnc, start program, and record pressures
  PaWT 823 PaSP 784 PLi840 25.1 TMan 19.5 UTC = 20 : 52
- ✓ 4) Crack and close green valves, then record cylinder pressures
  LS 1800 HS 1830 LP 930 UTC = 20 : 56
  LT 1470 WT 1830 CylT2 17.1
- ✓ 5) Log each hi-side cylinder pressure in software (pressures must be logged at least once between flights)
- ✓ 6) Stop program, close Visual Basic and vnc, shut down Windows, power down O_2 and Cylinder box, power down laptop and rack

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

- ✓ 1) Rack power switch on
- ✓ 2) O_2 box Power breaker on
- ✓ 3) Laptop power on
- ✓ 4) Pump box Power breaker on
- ✓ 5) Load dry-ice in dewar to within 0.5 inches of lid UTC = 18 : 51
- ✓ 6) Record hi-side cylinder pressures and changes overnight (P / Δ)
  LS 1850 +50 HS 1880 / +50 LP 960 / +30
  LT 1500 / +30 WT 1860 / +30 CylT2 22.5 / +5.4 (once inst. on)
- ✓ 7) Open green knobs four ¼ turns and note any pressure changes (P / Δ)
  LS 1860 / +10 HS 1880 / 0 LP 970 / +10
  LT 1500 / 0 WT 1890 / +10
- ✓ 8) Close cylinder box lid
- ✓ 9) Vnc into into AO2 (192.168.84.138)
- ✓ 10) Start AO2 program by clicking play in higold.vdp
- ✓ 11) Ensure that no USB errors are present in boxes at bottom of screen
- ✓ 12) Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times
  AO2 PC Time 18 : 40 : 66 , Rack laptop time 18 : 40 : 00
- ✓ 13) Cylinder box Power breaker on
- ✓ 14) Record instrument pressures and changes overnight (P / Δ)
  PaWT 906 / +83 PaSP 800 / +16 PLi840 29.8 / +4.7 TMan 24.9 / +5.4
- ✓ 15) Pump box Pump 2 breaker on
- ✓ 16) Manual VAC valve open
- ✓ 17) Check that PaCO2 = 305 torr (± 5) and PaO2 = 85 torr (± 1). If not, adjust.
  PaCO2 304 PaO2 83
- ✓ 18) Click Initialize Cal Flow button

Date 110903 Campaign HIPPO 5 Flight RF01

✓ 19) Ensure that flow starts through both lines (100 ± 10)
FlWT (to cell) 93.0 - 98.3 FlSP (to bypass) 89.9-93.9

✓ 20) Toggle changeover to check flows in other position
FlWT (to bypass) 92.9-96.4 FlSP (to cell) 91.8-96.2

X 21) If necessary, adjust HA-3 to match FlWT on bypass and cell to ±2 sccm

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

✓ 23) Close cylinder box lid

✓ 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 = 19 : 05

✓ 27) If necessary, adjust PaO2 to keep signal below 9.5 V O_2 signal = 8.0

✓ 28) Open manual Line Purge on/off valve

✓ 29) Ensure inlet manual 3-way valve to Line Purge cylinder

✓ 30) Click Initialize Sample Flow button

✓ 31) Pump box Pump 1 breaker on

✓ 32) If necessary, adjust Line Purge regulator to 1 psig

✓ 33) Ensure that PaSA stabilizes near 790 (±10) torr after 2 min.
PaSA 790 SA Purge Flow 102

✓ 34) Snoop trap fittings

✓ 35) >= 10 min. after lamp on record values in first row of table below

UTC	O2d	CO2n	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn	PaSAn
19 : 15	NA	0.9	1.6	NA	NA	11.1	NA	0.06	8.4	8.0	3.9
19 : 31	390	0.6	1.7	17	-10	1.4	27.7	0.03	5.7	6.7	4.5
nominal	500+	0.7	2.0	±10	±10	±10	±20	0.05	5.0	5.0	5.0

After cal start

✓ 36) Enable changeover valve (uncheck disable) UTC = 19 : 16

✓ 37) >= 10 min. after change-over enable, record values in table above

X 38) Disable changeover

X 39) If necessary, toggle changeover to get SP to Cell

X 40) Click Close WT 248 valve

C. 45-min before take-off

X 1) WT 248 valve to Auto (uncheck close)

X 2) Enable changeover (uncheck disable)

✓ 3) Adjust / record program parameters (initially set to a, 15, 3.0, 3, 2)
Flag a Cal Interval 15 Cal Period 3.0 LTf 3 WTf 2

✓ 4) Click Start button on main screen UTC = 19 : 18 : 00

✓ 5) Note cryo temperature Cryo = -78

✓ 6) After 3rd Cal cycle (39 min after clicking start, sequence: WT-HS-LS-LT-SA-LS-HS-SA-HS-LS-WT) set Cal Interval to 50 and WTfreq to 4

✓ 7) Immediately before runway, switch 3-way valve to inlet UTC = 19 : 58 : __

✓ 8) Note time of wheels up UTC = 19 : 59 : 53

✓ 9) Close Inlet Purge cylinder green valve and manual Inlet Purge on/off valve

Date 110903 Campaign HIPPO 5 Flight RF11

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 and add any action items to AO2_TODO_YYMMDD_GV.doc

✓ 1) At high point of last ascent, while sampling air, conduct 30-second breath test on inlet fittings last UTC (start) = 03 : 57 : 00 - 45

✓ 2) At high point of last ascent, check all 3 bulkhead nuts. If any finger loose, tighten 1/8 turn with wrench and recheck. Tight

X 3) At high point of last ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = __ : __ : __

✓ 4) On final descent, open Line Purge cylinder green valve and on/off valve

Adjust cal schedule as necessary with a goal of sampling at least some portion of every level low and high leg, avoiding overlapping cals at same altitude on the way up and down above 29 kft, and avoiding any cals on northernmost and southernmost profile (keeping in mind 45 second inlet delay):

III. Postflight

✓ 1) Note time of wheels down UTC = 04 : 36 : 48

✓ 2) As soon as off runway, switch inlet 3-way to line purge UTC = 04 : 37 : 59

✓ 3) Note cryo temperature Cryo = -78.8

✓ 4) Click Stop button

✓ 5) Close manual VAC valve

✓ 6) **Close all 4 cal cylinder green valves**

✓ 7) Close cylinder box lid

✓ 8) Wait 5 to 10 minutes after touchdown

✓ 9) **Close Line Purge cylinder green valve** and manual Line Purge on/off valve

✓ 10) Cylinder box Power breaker off

✓ 11) Pump box Pump 2 breaker off

✓ 12) Pump box Pump 1 breaker off

✓ 13) Pump box Power breaker off

✓ 14) Close program and Visual Basic

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

✓ 16) Shut down AO2 PC

✓ 17) Shut down laptop

__ 18) After green "SP to Cell" light has gone out, O_2 box Power breaker off

X 19) Rack power switch off

✓ 20) Pull trap, jumper quick-connects, and install stopper

✓ 21) Open trap and remove glass beads

__ 22) ftp *.mr, *.hr, hgcyllog.txt, and AO2_*_Notes.txt files for this flight to the ao2raw directory on catalog.eol.ucar.edu (or email if ftp does not work)

__ 23) email a scan of this checksheet to BBS (or fax if scanner not available)

Date 110905 Campaign HIPPO 5 Flight RF12 From PHKO To PANC

NCAR Airborne Oxygen Instrument (AO2) Checklist V. 2011.08.15

I. Preflight

A. Day(s) before flight Date = 110905

- ✓ 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) Power rack, O_2 box, Cylinder box, laptop, vnc, start program, and record pressures
  PaWT 827 PaSP 795 PLi840 23.3 TMan 22.0 UTC = 20:15
- ✓ 4) Crack and close green valves, then record cylinder pressures
  LS 1830 HS 1860 LP 910 UTC = 20:13
  LT 1500 WT 1700 CylT2 24.9
- ✓ 5) Log each hi-side cylinder pressure in software (pressures must be logged at least once between flights)
- ✓ 6) Stop program, close Visual Basic and vnc, shut down Windows, power down O_2 and Cylinder box, power down laptop and rack

B. 2-hours before take-off Instrument Operator [illegible]

- X 1) Rack power switch on
- ✓ 2) O_2 box Power breaker on
- ✓ 3) Laptop power on
- ✓ 4) Pump box Power breaker on
- ✓ 5) Load dry-ice in dewar to within 0.5 inches of lid UTC = 18:40
- ✓ 6) Record hi-side cylinder pressures and changes overnight (P / Δ)
  LS 1850 / 0 HS 1830 / -30 LP 950 / +40 +24.7 -0.2
  LT 1510 / +10 WT 1660 / -40 CylT2 ~~25.6~~ / ~~+0.1~~ (once inst. on)
- ✓ 7) Open green knobs four ¼ turns and note any pressure changes (P / Δ)
  LS 1850 / 0 HS 1860 / +30 LP 950 / 0
  LT 1510 / 0 WT 1710 +50
- 8) Close cylinder box lid
- ✓ 9) Vnc into into AO2 (192.168.84.138)
- ✓ 10) Start AO2 program by clicking play in higold.vdp
- ✓ 11) Ensure that no USB errors are present in boxes at bottom of screen
- ✓ 12) Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times
  AO2 PC Time 6 : 46 : 00, Rack laptop time 6 : 46 : 01
- ✓ 13) Cylinder box Power breaker on
- ✓ 14) Record instrument pressures and changes overnight (P / Δ)
  PaWT 822 / -5 PaSP 809 / +14 PLi840 27.2 / +3.9 TMan 25.9 +3.9
- ✓ 15) Pump box Pump 2 breaker on
- 16) Manual VAC valve open
- ✓ 17) Check that PaCO2 = 305 torr (± 5) and PaO2 = 85 torr (± 1). If not, adjust.
  PaCO2 306 PaO2 84
- ✓ 18) Click Initialize Cal Flow button

Date 1/09/06 Campaign HIPPO 5 Flight RF12

✓ 19) Ensure that flow starts through both lines (100 ± 10)
FlWT (to cell) 97.9-100.7 FlSP (to bypass) 91.1-94.1 95.1

✓ 20) Toggle changeover to check flows in other position 95.5-98.3
FlWT (to bypass) ~~93.1-97.2~~ FlSP (to cell) 93.9-97.4

✓ 21) If necessary, adjust HA-3 to match FlWT on bypass and cell to ±2 sccm

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

✓ 23) Close cylinder box lid

✓ 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 = 19 : 13

✓ 27) If necessary, adjust PaO2 to keep signal below 9.5 V O_2 signal = 7.68

✓ 28) Open manual Line Purge on/off valve

✓ 29) Ensure inlet manual 3-way valve to Line Purge cylinder

✓ 30) Click Initialize Sample Flow button

✓ 31) Pump box Pump 1 breaker on

✓ 32) If necessary, adjust Line Purge regulator to 1 psig

✓ 33) Ensure that PaSA stabilizes near 790 (±10) torr after 2 min.
PaSA 788 SA Purge Flow 99

✓ 34) Snoop trap fittings

✓ 35) >= 10 min. after lamp on record values in first row of table below

UTC	O2d	CO2n	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn	PaSAn
19:23	NA	0.93	1.7	NA	NA	13.2	NA	0.023	5.34	5.09	4.57
19:45	431	0.63	1.9	15.1	-11.4	1.3	26.5	0.027	5.87	5.2	4.3
nominal	500+	0.7	2.0	±10	±10	±10	±20	0.05	5.0	5.0	5.0

✓ 36) Enable changeover valve (uncheck disable) UTC = 19 : 23

✓ 37) >= 10 min. after change-over enable, record values in table above

✓ 38) Disable changeover

✓ 39) If necessary, toggle changeover to get SP to Cell

✓ 40) Click Close WT 248 valve

C. 45-min before take-off

✓ 1) WT 248 valve to Auto (uncheck close)

✓ 2) Enable changeover (uncheck disable)

✓ 3) Adjust / record program parameters (initially set to a, 15, 3.0, 3, 2)
Flag a Cal Interval 15 Cal Period 3.0 LTf 3 WTf 2

✓ 4) Click Start button on main screen UTC = 19 : 24 : __

✓ 5) Note cryo temperature Cryo = -76.9

✓ 6) After 3rd Cal cycle (39 min after clicking start, sequence: WT-HS-LS-LT-SA-LS-HS-SA-HS-LS-WT) set Cal Interval to 50 and WTfreq to 4

✓ 7) Immediately before runway, switch 3-way valve to inlet UTC = 20 : 48 : 25

✓ 8) Note time of wheels up UTC = 20 : 51 : 11

✓ 9) Close Inlet Purge cylinder green valve and manual Inlet Purge on/off valve

Date 110906 Campaign HIPPO 5 Flight RF12

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 and add any action items to AO2_TODO_YYMMDD_GV.doc

✓ 1) At high point of first ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = 21 : 23 : 15
✓ 2) At high point of first ascent, check all 3 bulkhead nuts. If any finger loose, tighten 1/8 turn with wrench and recheck.
✓ 3) At high point of last ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = 03 : 53 : 00 - 30
✓ 4) On final descent, open Line Purge cylinder green valve and on/off valve

Breath by filter & Cyl Box 03:51:00
03:51:30
03:52:00
finish w/ Y2m by Cyl box open

Adjust cal schedule as necessary with a goal of sampling at least some portion of every level low and high leg, avoiding overlapping cals at same altitude on the way up and down above 29 kft, and avoiding any cals on northernmost and southernmost profile (keeping in mind 45 second inlet delay):

III. Postflight

__ 1) Note time of wheels down UTC = __ : __ : __
✓ 2) As soon as off runway, switch inlet 3-way to line purge UTC = 04 : 58 : 40
✓ 3) Note cryo temperature Cryo = -49
✓ 4) Click Stop button
✓ 5) Close manual VAC valve
✓ 6) **Close all 4 cal cylinder green valves**
✓ 7) Close cylinder box lid
✓ 8) Wait 5 to 10 minutes after touchdown
✓ 9) **Close Line Purge cylinder green valve** and manual Line Purge on/off valve
✓ 10) Cylinder box Power breaker off
✓ 11) Pump box Pump 2 breaker off
✓ 12) Pump box Pump 1 breaker off
✓ 13) Pump box Power breaker off
✓ 14) Close program and Visual Basic
✓ 15) Copy data (*.mr, *.hr, *.txt) to laptop and then data and notes, etc. to pen drive
✓ 16) Shut down AO2 PC
✓ 17) Shut down laptop
__ 18) After green "SP to Cell" light has gone out, O_2 box Power breaker off
✓ 19) Rack power switch off
✓ 20) Pull trap, jumper quick-connects, and install stopper
✓ 21) Open trap and remove glass beads
✓ 22) ftp *.mr, *.hr, hgcyllog.txt, and AO2_*_Notes.txt files for this flight to the ao2raw directory on catalog.eol.ucar.edu (or email if ftp does not work)
__ 23) email a scan of this checksheet to BBS (or fax if scanner not available)

Date 110907 Campaign HIPPO 5 Flight RF13 From PANC To PANC

NCAR Airborne Oxygen Instrument (AO2) Checklist V. 2011.08.15

I. Preflight

A. Day(s) before flight

Date = 110907

- ✓ 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) Power rack, O_2 box, Cylinder box, laptop, vnc, start program, and record pressures
  PaWT 822 PaSP 789 PLi840 20.6 TMan 19.5 UTC = 21 : 07
- ✓ 4) Crack and close green valves, then record cylinder pressures
  LS 1720 HS 1750 LP 900 UTC = 21 : 11
  LT 1420 WT 1420 CylT2 13.0
- ✓ 5) Log each hi-side cylinder pressure in software (pressures must be logged at least once between flights)
- ✓ 6) Stop program, close Visual Basic and vnc, shut down Windows, power down O_2 and Cylinder box, power down laptop and rack

B. 2-hours before take-off

Instrument Operator KSW

- ✓ 1) Rack power switch on
- ✓ 2) O_2 box Power breaker on
- ✓ 3) Laptop power on
- ✓ 4) Pump box Power breaker on
- ✓ 5) Load dry-ice in dewar to within 0.5 inches of lid UTC = 15 : 45
- ✓ 6) Record hi-side cylinder pressures and changes overnight (P / Δ)
  LS 1720 / 0 HS 1766 / +10 LP 700 / 0
  LT 1420 / 0 WT 1420 / 0 CylT2 ____ / ____ (once inst. on)
- ✓ 7) Open green knobs four ¼ turns and note any pressure changes (P / Δ)
  LS 1720 0 HS 1770 / +10 LP 900 / 0
  LT 1420 / 0 WT 1420 / 0
- ✓ 8) Close cylinder box lid
- ✓ 9) Vnc into into AO2 (192.168.84.138)
- ✓ 10) Start AO2 program by clicking play in higold.vdp
- ✓ 11) Ensure that no USB errors are present in boxes at bottom of screen
- ✓ 12) Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times
  AO2 PC Time 03 : 21 : 00, Rack laptop time 03 : 21 : 00
- ✓ 13) Cylinder box Power breaker on
- ✓ 14) Record instrument pressures and changes overnight (P / Δ)
  PaWT 814 / -8 PaSP 787 / -2 PLi840 25.2 / +4.6 TMan 15.6 / -3.9
- ✓ 15) Pump box Pump 2 breaker on
- ✓ 16) Manual VAC valve open
- ✓ 17) Check that PaCO2 = 305 torr (± 5) and PaO2 = 85 torr (± 1). If not, adjust.
  PaCO2 303 PaO2 85
- ✓ 18) Click Initialize Cal Flow button

Date 110908 Campaign HIPPO 5 Flight RF13

✓ 19) Ensure that flow starts through both lines (100 ± 10)
FlWT (to cell) 84 FlSP (to bypass) 82
✓ 20) Toggle changeover to check flows in other position
FlWT (to bypass) 82 FlSP (to cell) 84
✓ 21) If necessary, adjust HA-3 to match FlWT on bypass and cell to ±2 sccm
✓ 22) Check / adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr
✓ 23) Close cylinder box lid
✓ 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 = 15:29
✓ 27) If necessary, adjust PaO2 to keep signal below 9.5 V O_2 signal = 8.2
✓ 28) Open manual Line Purge on/off valve
✓ 29) Ensure inlet manual 3-way valve to Line Purge cylinder
✓ 30) Click Initialize Sample Flow button
✓ 31) Pump box Pump 1 breaker on
✓ 32) If necessary, adjust Line Purge regulator to 1 psig
✓ 33) Ensure that PaSA stabilizes near 790 (±10) torr after 2 min.
PaSA 785 SA Purge Flow 89
✓ 34) Snoop trap fittings
✓ 35) >= 10 min. after lamp on record values in first row of table below

UTC	O2d	CO2n	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn	PaSAn
15:55	NA	0.64	1.2	NA	NA	9.0	NA	0.03	4.8	6.4	3.1
16:09	575	0.8	2.0	10.9	-9	-0.5	20	0.02	5.2	4.7	5.8
nominal	500+	0.7	2.0	±10	±10	±10	±20	0.05	5.0	5.0	5.0

✓ 36) Enable changeover valve (uncheck disable) UTC = 15:56
✓ 37) >= 10 min. after change-over enable, record values in table above
✓ 38) Disable changeover
✓ 39) If necessary, toggle changeover to get SP to Cell
✓ 40) Click Close WT 248 valve

C. 45-min before take-off

✓ 1) WT 248 valve to Auto (uncheck close)
✓ 2) Enable changeover (uncheck disable)
✓ 3) Adjust / record program parameters (initially set to a, 15, 3.0, 3, 2) 4th Cal
Flag a Cal Interval 15 Cal Period 3.0 LTf 3 WTf 2
✓ 4) Click Start button on main screen UTC = 16:10:50 Started so
✓ 5) Note cryo temperature Cryo = -77
✓ 6) After 3rd Cal cycle (39 min after clicking start, sequence: WT-HS-LS-LT- Went to
SA-LS-HS-SA-HS-LS-WT) set Cal Interval to 50 and WTfreq to 4 Map, timer to
✓ 7) Immediately before runway, switch 3-way valve to inlet UTC = 17:05:58 35 min
✓ 8) Note time of wheels up UTC = 17:07:38 for Auto
✓ 9) Close Inlet Purge cylinder green valve and manual Inlet Purge on/off valve

Date 110908 Campaign HIPPO 5 Flight RF13

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 and add any action items to AO2_TODO_YYMMDD_GV.doc

__ 1) At high point of first ascent, while sampling air, conduct 30-second breath test on inlet fittings last UTC (start) = __ : __ : __

✓ 2) At high point of ~~first~~ ascent, check all 3 bulkhead nuts. If any finger loose, tighten 1/8 turn with wrench and recheck.

✓ 3) At high point of last ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = 23 : 48 : 00 - 40

✓ 4) On final descent, open Line Purge cylinder green valve and on/off valve

Adjust cal schedule as necessary with a goal of sampling at least some portion of every level low and high leg, avoiding overlapping cals at same altitude on the way up and down above 29 kft, and avoiding any cals on northernmost and southernmost profile (keeping in mind 45 second inlet delay):

III. Postflight

✓ 1) Note time of wheels down UTC = 01 : 33 : 47

✓ 2) As soon as off runway, switch inlet 3-way to line purge UTC = 01 : 35 : 20

✓ 3) Note cryo temperature Cryo = -62

✓ 4) Click Stop button

✓ 5) Close manual VAC valve

✓ 6) **Close all 4 cal cylinder green valves**

✓ 7) Close cylinder box lid

✓ 8) Wait 5 to 10 minutes after touchdown

✓ 9) **Close Line Purge cylinder green valve** and manual Line Purge on/off valve

✓ 10) Cylinder box Power breaker off

✓ 11) Pump box Pump 2 breaker off

✓ 12) Pump box Pump 1 breaker off

✓ 13) Pump box Power breaker off

✓ 14) Close program and Visual Basic

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

✓ 16) Shut down AO2 PC

✓ 17) Shut down laptop

✓ 18) After green "SP to Cell" light has gone out, O_2 box Power breaker off

✓ 19) Rack power switch off

✓ 20) Pull trap, jumper quick-connects, and install stopper

✓ 21) Open trap and remove glass beads

__ 22) ftp *.mr, *.hr, hgcyllog.txt, and AO2_*_Notes.txt files for this flight to the ao2raw directory on catalog.eol.ucar.edu (or email if ftp does not work)

__ 23) email a scan of this checksheet to BBS (or fax if scanner not available)

Date 110908 Campaign HIPPO 5 Flight FF01 From PANC To PBJC

NCAR Airborne Oxygen Instrument (AO2) Checklist V. 2011.08.15

I. Preflight

A. Day(s) before flight

Date = 110908

- ✓ 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) Power rack, O_2 box, Cylinder box, laptop, vnc, start program, and record pressures
  PaWT ____ PaSP ____ PLi840 ____ TMan ____ UTC = __ : __
- ✓ 4) Crack and close green valves, then record cylinder pressures
  LS 1710 HS 1740 LP 870 UTC = 1 : 38
  LT 1420 WT 1220 CylT2 ____
- ✓ 5) Log each hi-side cylinder pressure in software (pressures must be logged at least once between flights)
- ✓ 6) Stop program, close Visual Basic and vnc, shut down Windows, power down O_2 and Cylinder box, power down laptop and rack

B. 2-hours before take-off

Instrument Operator KBW

- X 1) Rack power switch on
- ✓ 2) O_2 box Power breaker on
- ✓ 3) Laptop power on
- ✓ 4) Pump box Power breaker on
- ✓ 5) Load dry-ice in dewar to within 0.5 inches of lid — UTC = 15 : 24
- ✓ 6) Record hi-side cylinder pressures and changes overnight (P / Δ)
  LS 1708 / -10 HS 1710 / -30 LP ____ / ____
  LT 1390 / -30 WT 1210 / -10 CylT2 12.9 / ____ (once inst. on)
- ✓ 7) Open green knobs four ¼ turns and note any pressure changes (P / Δ)
  LS 1400 / 0 HS 1720 / +10 LP ____ / ____
  LT 1400 / +10 WT 1210 / 0
- X 8) Close cylinder box lid
- ✓ 9) Vnc into into AO2 (192.168.84.138)
- ✓ 10) Start AO2 program by clicking play in higold.vdp
- ✓ 11) Ensure that no USB errors are present in boxes at bottom of screen
- ✓ 12) Check that NTP time sync is working on AO2 and laptop, >5-min after first sync, record times
  AO2 PC Time 03 : 29 : 45 , Rack laptop time 03 : 29 : 45
- ✓ 13) Cylinder box Power breaker on
- ✓ 14) Record instrument pressures and changes overnight (P / Δ)
  PaWT 843 ____ PaSP 794 / ____ PLi840 24.6 / ____ TMan 19.2 / ____
- ✓ 15) Pump box Pump 2 breaker on
- ✓ 16) Manual VAC valve open
- ✓ 17) Check that PaCO2 = 305 torr (± 5) and PaO2 = 85 torr (± 1). If not, adjust.
  PaCO2 303 PaO2 83
- ✓ 18) Click Initialize Cal Flow button

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✓ 19) Ensure that flow starts through both lines (100 ± 10)
FlWT (to cell) 88 FlSP (to bypass) 86
✓ 20) Toggle changeover to check flows in other position
FlWT (to bypass) 86 FlSP (to cell) 89
X 21) If necessary, adjust HA-3 to match FlWT on bypass and cell to ±2 sccm
✓ 22) Check / adjust regulator pressures for all 4 gases to PaSP of 785 +/- 5 torr
✓ 23) Close cylinder box lid
✓ 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 = 15 :36
X 27) If necessary, adjust PaO2 to keep signal below 9.5 V O_2 signal = 8.5
X 28) Open manual Line Purge on/off valve
X 29) Ensure inlet manual 3-way valve to Line Purge cylinder
✓ 30) Click Initialize Sample Flow button
✓ 31) Pump box Pump 1 breaker on
X 32) If necessary, adjust Line Purge regulator to 1 psig
✓ 33) Ensure that PaSA stabilizes near 790 (±10) torr after 2 min.
PaSA 785 SA Purge Flow 99
✓ 34) Snoop trap fittings
✓ 35) >= 10 min. after lamp on record values in first row of table below

UTC	O2d	CO2n	O2n	SPm	WTm	Totm	mΔ	PdO2n	PdSPn	PdWTn	PaSAn
15:49	NA	0.8	1.2	NA	NA	9.0	NA	0.04	4.7	5.9	3.8
:											
nominal	500+	0.7	2.0	±10	±10	±10	±20	0.05	5.0	5.0	5.0

✓ 36) Enable changeover valve (uncheck disable) UTC = 15 :50
__ 37) >= 10 min. after change-over enable, record values in table above
X 38) Disable changeover
X 39) If necessary, toggle changeover to get SP to Cell
X 40) Click Close WT 248 valve

C. 45-min before take-off

CHH RAWDFF

X 1) WT 248 valve to Auto (uncheck close)
X 2) Enable changeover (uncheck disable)
✓ 3) Adjust / record program parameters (initially set to a, 15, 3.0, 3, 2)
Flag a Cal Interval 2 Cal Period 3.0 LTf 3 WTf 2
✓ 4) Click Start button on main screen UTC = 15 : 30 : 45
✓ 5) Note cryo temperature Cryo = -77.1
__ 6) After 3rd Cal cycle (39 min after clicking start, sequence: WT-HS-LS-LT-SA-LS-HS-SA-HS-LS-WT) set Cal Interval to 50 and WTfreq to 4
X 7) Immediately before runway, switch 3-way valve to inlet UTC = __ : __ : __
__ 8) Note time of wheels up UTC = 16 : 11 : 09
X 9) Close Inlet Purge cylinder green valve and manual Inlet Purge on/off valve

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To QCLS inlet @ 17:06:30
AO2 inlet @ 17:16:30
QCLS @ 18:00:00

II. During Flight

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

Breathing on 3 way @ 18:08:00 - 09:00

Record flight notes in text file AO2_YYYYMMDD_RF##_Notes.txt and add any action items to AO2_TODO_YYMMDD_GV.doc

@ Onion from 18:12:00 - 18:12:40

__ 1) At high point of first ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = __ : __ : __ @ QCLS hmm

__ 2) At high point of first ascent, check all 3 bulkhead nuts. If any finger loose, tighten 1/8 turn with wrench and recheck. from 18:15:00 - 18:15:45

__ 3) At high point of last ascent, while sampling air, conduct 30-second breath test on inlet fittings UTC (start) = __ : __ : __

__ 4) On final descent, open Line Purge cylinder green valve and on/off valve Back @ 3 way

Adjust cal schedule as necessary with a goal of sampling at least some portion of every level low and high leg, avoiding overlapping cals at same altitude on the way up and down above 29 kft, and avoiding any cals on northernmost and southernmost profile (keeping in mind 45 second inlet delay): from 18:18:00 to 18:18:40

Tighten 1/8" ~ 1½ flats
¼" ~ ½ flat @ ~18:19:

III. Postflight

Breath test @ 18:35:00 Dry ice on 3-way @ 18:37

✓ 1) Note time of wheels down UTC = 20:35:40
X 2) As soon as off runway, switch inlet 3-way to line purge UTC = __ : __ :
✓ 3) Note cryo temperature Cryo = -78
✓ 4) Click Stop button
✓ 5) Close manual VAC valve To AO2 inlet @ 18:50:00
✓ 6) **Close all 4 cal cylinder green valves** To QCLS @ 19:10:00
✓ 7) Close cylinder box lid
✓ 8) Wait 5 to 10 minutes after touchdown AO2 @ 18:18:00
✓ 9) **Close Line Purge cylinder green valve** and manual Line Purge on/off valve 20
✓ 10) Cylinder box Power breaker off QCLS @ 20:33:00
✓ 11) Pump box Pump 2 breaker off AO2 @ 20:40:00
✓ 12) Pump box Pump 1 breaker off
✓ 13) Pump box Power breaker off
✓ 14) Close program and Visual Basic
✓ 15) Copy data (*.mr, *.hr, *.txt) to laptop and then data and notes, etc. to pen drive
✓ 16) Shut down AO2 PC
✓ 17) Shut down laptop
✓ 18) After green "SP to Cell" light has gone out, O_2 box Power breaker off
✓ 19) Rack power switch off
✓ 20) Pull trap, jumper quick-connects, and install stopper
✓ 21) Open trap and remove glass beads
__ 22) ftp *.mr, *.hr, hgcyllog.txt, and AO2_*_Notes.txt files for this flight to the ao2raw directory on catalog.eol.ucar.edu (or email if ftp does not work)
__ 23) email a scan of this checksheet to BBS (or fax if scanner not available)