PROPERTY OF Flt. Lieut. FIELD. 31ST SQDN.

Mobile Training Unit Notes. 2 NOV 50 – 9 NOV 50

The RB-36

PLUS – M.T.U. COURSE AT RAPID CITY.

Aeroplane General

1. Technical Orders relevant to the B-36 are:-

the 01-5EU Series.

01 = AIRCRAFT. 5 = CONSOLIDATED E = BOMBARDMENT U = TYPE – B36.

(a) 01-5EU D – Major modification. FOR RB-D+E
(b) 01-5EUD-1 – Pilots Handbook of flight operation.
(c) 01-5EUD-2 – Erection & maintenance.
(d) 01-5EUD-3 – Structural Repair.
(e) 01-5EUD-4 – Parts catalogue.
(f) 5 – NOT OUT YET.
(g) 01-5EUD-6 – Inspection & maintenance req^ments
(h) 01-5EU-7 – Winterisation check list.

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2 Short history of the B-36.

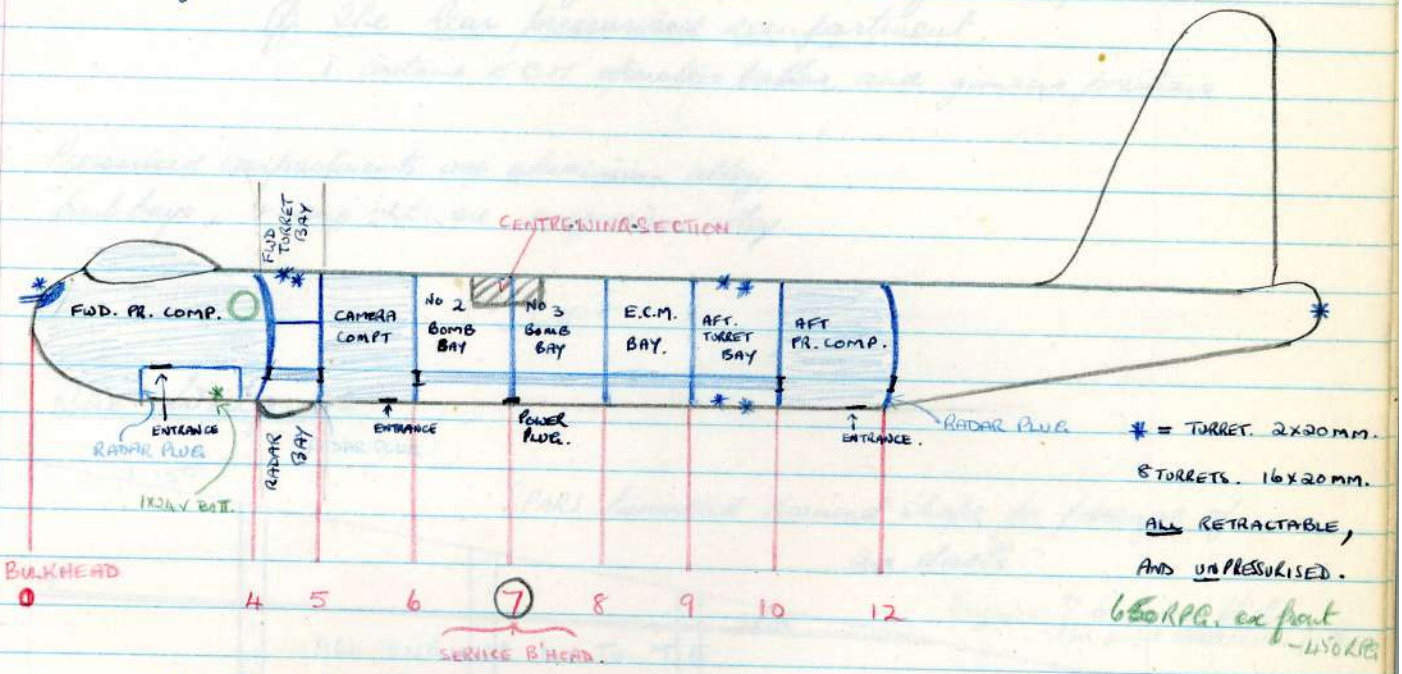
The first B-36 was numbered 44 (YR) – 92 (and number of contract) 001, an XB.
002 – a YB, modded, became an RB36-E – 42-13571.
003 – became the XC-99.
44-92 004 – 1st 36 off the line. Used by AMC for static tests. DEMOLISHED
005 – B36A – AMC instrumental experimental. [crew A-1]
006-025 – Air Force. modified, now RB36Es. which, with 002, makes a total of 21 RB36Es.
44-92026 } B36-Bs. being modded to B36Ds.
084 }
~~085 088 B36-Ds.~~
088-094 – RB36Ds.
49-2686 to
2702 – RB36Ds.
49-2703 to
2721 – RB-36Fs.
50-1098 to
1110 – RB-36Fs.

To date – 217 B-36s contracted for. $6¼ million cost

3. Dimensions.

SPAN	230'
LENGTH	167'
HEIGHT	46' 10"
U/C TRACK	46'
DIAMETER	12' 6".

4 The Fuselage.



* = TURRET. 2X20MM.
8 TURRETS. 16X20MM.
ALL RETRACTABLE,
AND UNPRESSURISED.

6 RPG. ex front
-450 RPG

(a). The forward pressurised compartment.

i Pilots & engineer upstairs, radio to rear, B & N on left, Radar and {weather obs front gunner} (usually 3rd pilot) on right.

ii Astro dome can be removed & fan substituted, also a door in forward turret for extra ventilation.

iii All pilots instruments are electric.

iv He has one boost guage - from #4., and has the master RPM control.

v. Nav lights can be set up to flash in code. - control on aisle stand.

vi Alarm bell & I.F.F. detonator are both ALIVE ALWAYS. 1X24V. DC. batt.

vii 3 bomb salvo switches - bomb: panel, pilots panel, & Radio man's panel.

(b) Photo compartment.

i Contains 14 cameras and 3 beds.

(c). Bomb bays 2 & 3.

i Bulkhead 7 - the service Bh:

ii Centre wing section - FRONT - hydraulic Systems
- REAR - main A.C. power panel.

iii Wing crawlways are in bomb bay 3.

iv) On the R.H. Side of bay 3 is the emergency flap system.
v) Bomb bays are strengthened by 'K' trusses - the main load-carriers
vi) Bomb doors are electrical with a hydraulic {manual / emergency} hand pump in the rear pr. comp - the left scanner's position.

(d) The E.C.M. bay
No details
(e) The Aft turret bay.
i has provision for the installation of a D.C. power unit.
(f) The Rear pressurised compartment.
i Contains ECM operators tables, and gunners positions.

Pressurised compartments are aluminium alloy,
bomb bays, ∧ wing LE: are magnesium alloy.

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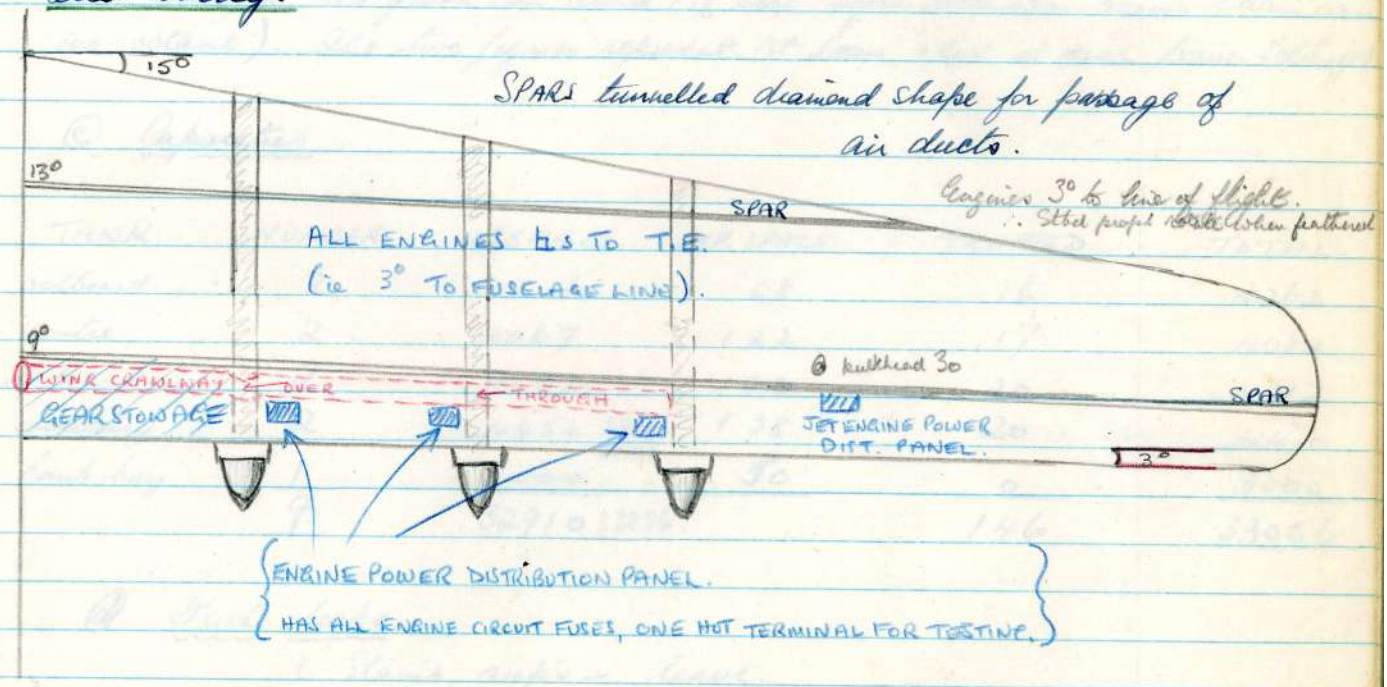
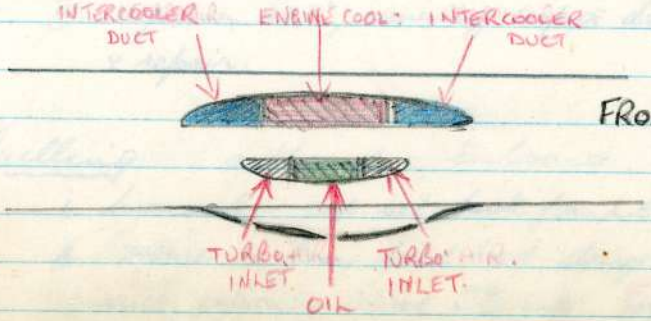
5. The Wing.

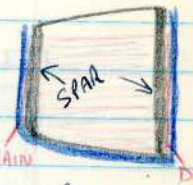




FRONT VIEW OF L.E. WITH AIR INTAKES.

6. The Fuel System.

@. i. There are 3 tanks in each wing - Rigid.
ii. with 2 auxiliaries in the centre wing section, and
iii. Provision for one bomb bay tank in #3 bay.



Tanks are integral - "wet wing". Spars are front & rear, wing surfaces are top & bottom, & wing bulkheads are ends
Self sealing pads are bolted to the sides & cemented to the bottoms of the outboard & centre wing tanks. NOT the inboard tanks. There is no self sealer on the top surface.
Main tanks are rigid (spar cut outs are Z-braced & panelled)
Auxiliary tanks are rubber-nylon cells in centre wing section. Has drain line. ½".
All have drain plugs where Self Sealer is used - not otherwise.
Vapor return from carb: to tank reaches 5-7 GPH.

B. Fuel. AN-F-48. MIL-F-5572

first line	115/145 GRADE.	PURPLE.	80 - Red.
alternate	100/130 GRADE.	GREEN.	91/98 - blue.

(as an example, 115 grade can stand 15% more before detonation occurs than can iso-octane). The two figures represent: 1st lean & 2nd at Rich power settings.

© Capacities

TANK	NUMBER	USEABLE	EXP. SPACE	TRAPPED	TOTAL
outboard	2	2246	68	16	2262
centre	2	4067	122	17	4084
inboard	2	4192	126	20	4212
RW + LW auxiliary	2	4450 4860 4880	138	20	4470 4888 4900
bomb bay	1	3000	90	0	3000
	9	32910 33896.		146	33056

@ Fuel leaks

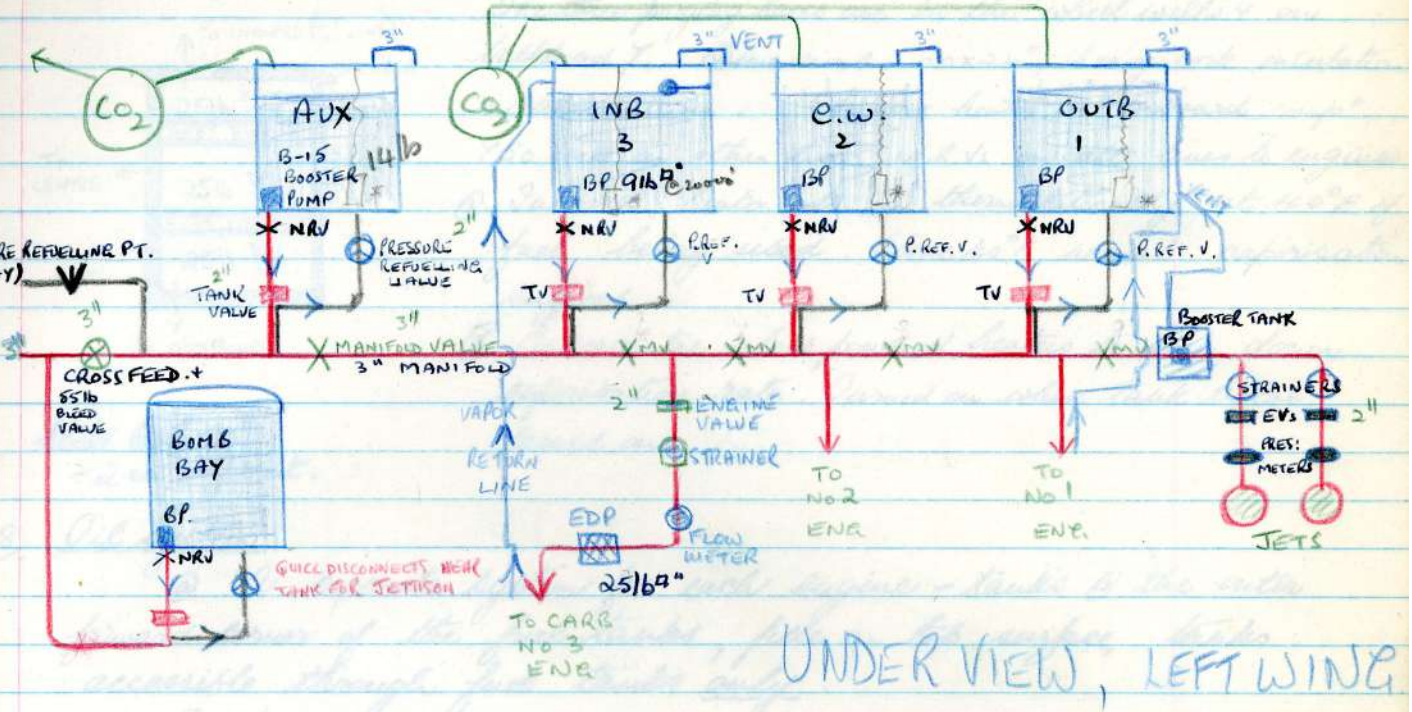
i. Stains, seeps - leave.
ii. seeps up to 2x3" - Unsat major.
iii. seeps over 2x3", running seeps & dripping leak - ground aircraft. & repair.

© Refuelling outboard - inboard.

i. Manual - cap set back from L.E. leaving exp. space.
ii. Pressure - from direct lead-storage-dispersal-tank. Ball cock ensures expansion space +0 -50 gals. 100 16 D". 500-600 GPH.
All tanks from one point in System.

fuel system continued.

* Potassium dichromate corrosion resistant in each tank



UNDER VIEW, LEFT WING

Flow:— TANK – B. PUMP – NRV – TANK VALVE – MANIFOLD VALVE – ENGINE VALVE – STRAINER – FLOWMETER – EDP – CARBURETTOR

Tank valves – 28v D.C. Can be manually operated. Other valves identical.

Two manifold valves either side of no 3 tank to cut off manifold line in case of damage – it is exposed in the wheel well.

CLOSING DOWN – ALL BUT M.V.s OFF.

Any pressure above 55 lb p.s.i. in manifold (due to temp changes etc) is vented to # 4 tank via a relief line. | Also there's a relief valve in each strainer, and one in the X feed cock. but these are only of small capacity.

Fuel is used from the centre outwards. – keeps the load in the lifting area.

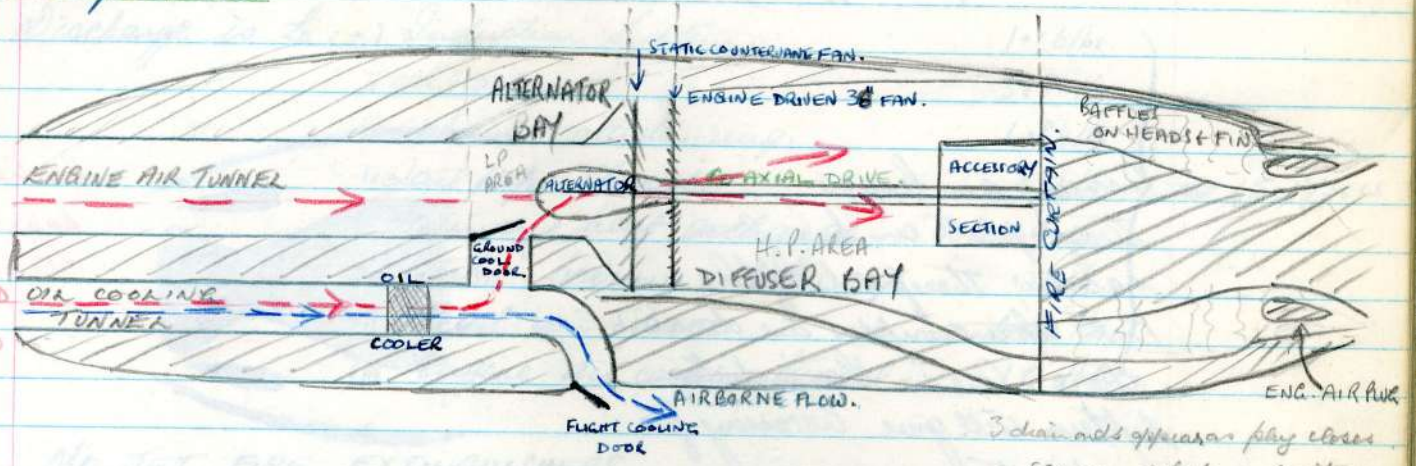
The B-15 booster pumps in the tanks, at 9 lb p.s.i. (14 at MSL pressure) pass 2000 g.p.h. each.
they act as (i) boosters, (ii) transfer pumps, (iii) furnish fuel to the EDP (25 lb p.s.i.)

Warning. – never empty any tank below 1000 gallons if the use of the jets is contemplated. Always have 2 tanks in use when jet operating.

If any juice in outboards at altitude over 10 hrs – transfer to inboard (after landing) to ensure use on next flight.

The oil cooler is of 22" diameter..
The thermostatic control maintains 82–86°C by manipulation of the ground or flight cooling doors. 115V AC accessible from crawlway.
98°C is highest temperature allowed – a manual lever on the thermostatic control with 'cool' + 'hot' position will make a few degrees difference.
Make RPM 1000 until 40°C oil exceeded.

9 Respiration.



3 drain outlets appear on play closes – scanner reports on position.

A switch on the left main gear closes the ground, opens the flight door as soleight comes off leg. tho' its primary duty is to complete retraction circuit – safety factor.
CHECK:– Pull out circuit breaker marked "landing gear central" on pilot's panel. The flight door should open, ground door should close.
N.B. The cooling fan is two speed, & under the Engineers' control.

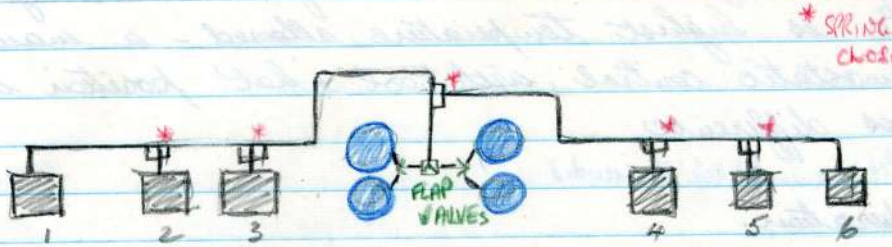
10 Fire extinguisher system. Edison Fire detection System

Methyl Bromide. odourless, colourless & toxic. ∴ Phenolacetic acid added to give stale urine smell. 1/1000 fatal. 2½ times as effective as CO_2.
The engine must be cleaned, wiped & dried out, preferably within 5 hrs to cut down corrosion.
Two shot system. – four bottles, two each wing root, discharged two at a time. ea bottle weighs 35lbs only, fully charged. Great wt. saving factor.
Bottle servicing – 16lb methyl bromide, under 400 16° nitrogen at 70°F.
Allowance 20 16° loss, then remove & replace. Allow for temperature – 16° = 11 16° change of pressure. Use 1° = 1 16.
The bottles are released by 28V. D.C. spike & diaphragm System.
The lines are mag. alloy to two way directional valve, then stainless steel. Aluminium & mech. bro: are dangerous mixtures.
The wing systems are connected by a valve in the aft. of bomb bay tunnel.
Any accidental discharge goes to the outboard engines. No!

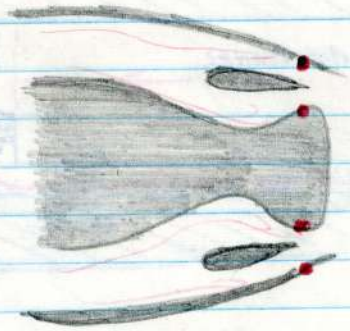
File1952

when doing a quick check on the notes on the page facing 1952 “fire extinguisher system” there was one line he had written. “A safety plug will blow if temp reaches 220-240 degrees F “.

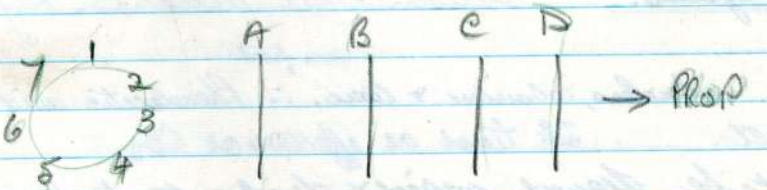
The firing switch also sets up the control valves so that the fuel is directed to the desired engine.



Accessory air leaves through plate on base of nacelle, therefore 6 of the 8 or 15 thermocouples are down there. One in the induction system will give accessory fire indication.



Position of engine thermocouples



stub ducts from diffuser bay lead into shroud just above primary ht. exchg. cools exhaust pipes over engine.
ducts below primary ht exchangers cool that area down to turbine.

Operation :- The engineer holds down the Selector switch for 5 seconds which allows all valves to position correctly & charge & fire. Edison sensitive relay transmits excess temps to warning lights may take 15 secs to operate.

A purging plug is added to aid pipe clearance after discharge. 200lb air for 10 minutes is needed. - Select engine by engineers selector switch.

Discharge is to :- i Induction System. 1·13 lbs
ii oil coolers. 3·8 lbs
iii exhaust collector ring. 1·84 lbs
iv tail pipe shroud ·23 lb
v Primary heat exchanger ·9 lb
vi turbo bearing & cooler cap. ·29 lb
vii dead air space 6·82 lbs
viii Engine air cooling tunnel 10 lbs
} FOR 15-17 SECS.

NO JET FIRE EXTINGUISHERS.

detection. - Jets - Fenwal system, accessory sect; entrance cone; rear compression; tail pipe.
Recip: - Edison. Junction box on Engines power distribution panel. 2 sensitive relays
{sensitive relay actuates slave relay which actuates light - slave 28v DC.}
- accessory (13 pts) & engine (14 pts). or 15 pts

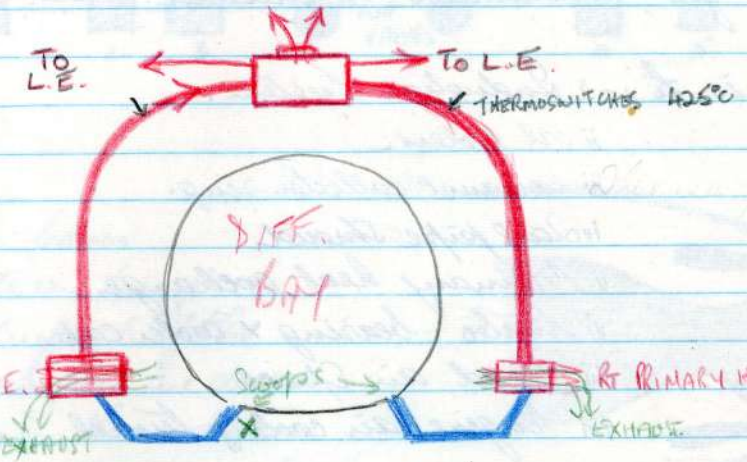
De-icing can cause temperature bulbs to give false indication

II. Turbo-superchargers.

Two on each engine, but the engineer can go into Single Turbo operation, right turbo only, by operating a two-position switch. GIVES 5" RISE IN MANIFOLD
Below 1600 B.H.P.
Cabin pressure is taken from the right turbo.
There is an intercooler between turbo & carb:.
A flapper valve on the carb: deck prevents pressure escaping thro the left turbo when in single turbo condition.

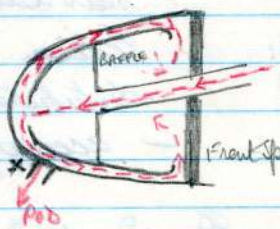
Primary heat exchangers on the lines from collector ring to turbo provide hot clean air from diffuser bay for cabin heating and wing anti icing.
Air from diffuser bay heated in shrouds over exhausts from 2 & 5 banks provides hot air for prop: anti icing. Vented through prop. tips. Stainless steel. 2" space
28v actuates butterfly valves. This makes prop hub too hot, so cool air led from diffuser bay to hub. One switch, all props.

DUMP VALVE TOP OF NACELLE



actuator either blocks dump opening or link to L.E.

The left PH Exchanger is cut off by scoop at X when single turbo operation is commenced - automatic - tied into waste gate.



Wing L.E. SECTION.

dumped into compressor area etc.

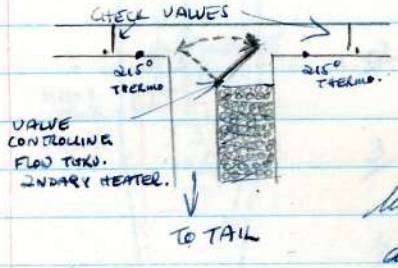
POD PRE HEAT SWITCH OPENS ACTUATOR AT X.

Turn wing anti icing on full before opening pre-heat.

Pre heated carburetter air can be taken from the engine bay & the turbo inlets shut off. In this case, cabin pressurisation is automatically "out" to prevent entrance of engine fumes.
A dump valve on the top of the nacelle is used for venting unwanted hot air out. Temperature is taken at this point. 425°C

12. Wing Anti-icing
Engines 1, 2, 5 & 6 provide the hot air, via primary heat exchanger. & the engineer has control selectors. Intended to be anti- not de-icing switch on when ice is expected.
Hot air is led into the L.E. from the primary heat exchanger & thermostatically controlled at below 180°F. At the tip, some the air is ducted back to the pod nacelle accessory section & dumped overboard, then back to the nacelles & vented overboard.
Props - One switch for all. Never turn on below 50 mph.

13 Cabin Heating & Tail anti-icing
Engines 3 & 4 onboard provide heat, thermostatically controlled at 215°C.
The lines lead from engine - E.C.M. bay, here a Sndary heat exchanger, under the engineer's control is placed in the System

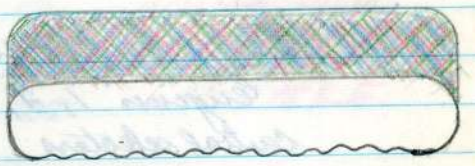


Maximum cabin temp:. 105°C when pressurised. Utmost care needed in valve operation to avoid overheating. Over 20000', 80°C is the maximum.
Unpressurised, 120° is allowed if same is being used for anti icing.
Vacuum relief valves are incorporated on all lines to prevent collapse while not in use.

14 Cabin Pressurisation
From the right turbo of all engines, just below the R.H. intercooler
A limited flow nozzle - ① Prevents surge
② Allows 14 lbs flow/min. - turbos each put out 16 lbs (volume) 160 lb volume/min.
IE 52 lbs MIN TOTAL MAX.
Orechanging check valve ③ Prevents back flow of pressure.

Also a controllable check valve is installed to prevent wing to wing back flow.
Fresh air can be pushed thru the System by a booster fan mounted on the Sndary heat exchanger, from a fresh air intake.
Pressure & cabin heating lines become one at Sndary H.E.

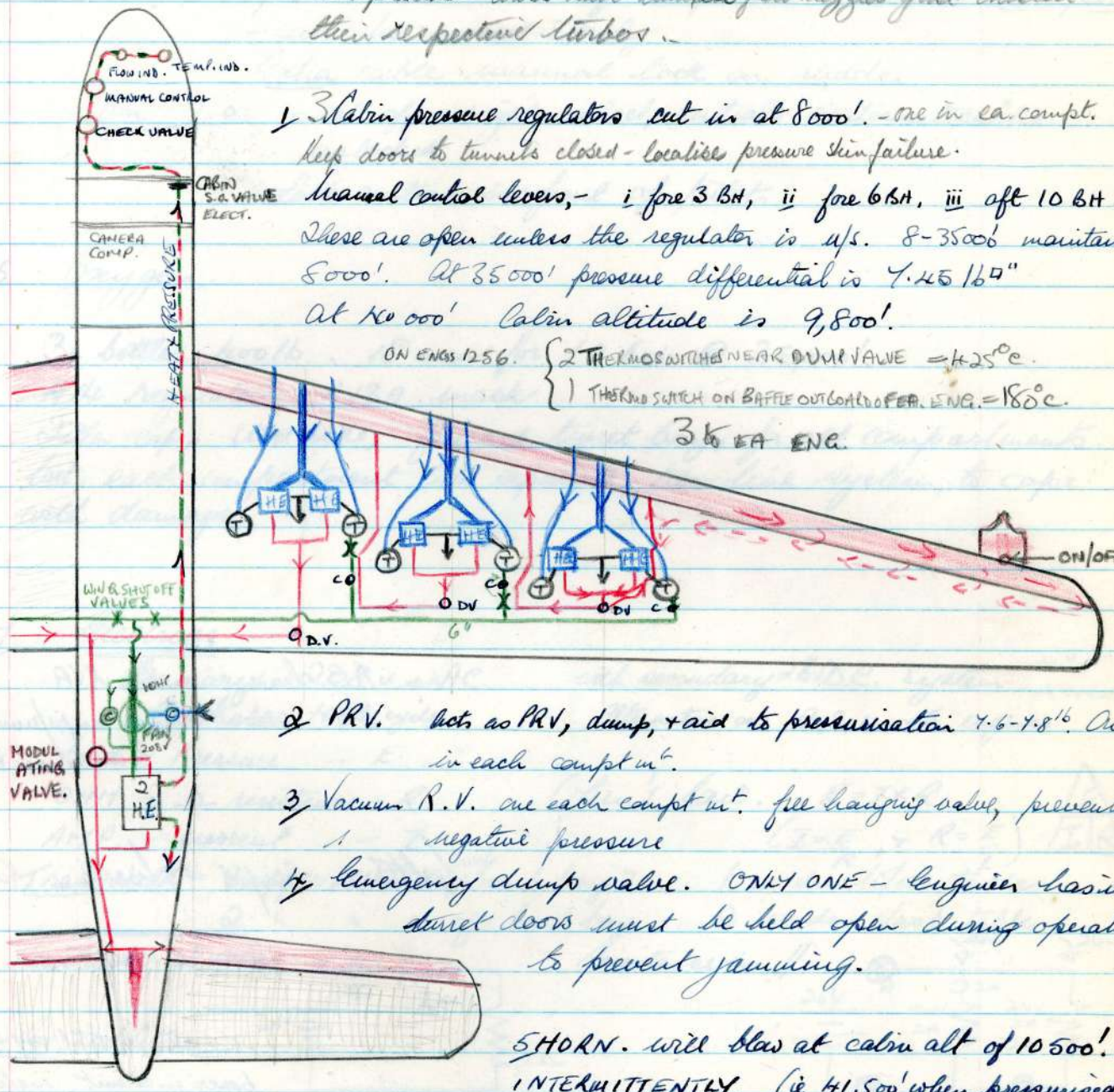
PRESS ALTITUDE	CABIN ALTITUDE
SEA LEVEL - 8000'	SEA LEVEL - 8000'
8 - 35000'	8000'
35,000' UP	CONSTANT PRESSURE DIFFERENTIAL OF 7.45 PSI
36000'	8,400'
38000'	9,100'
40000'	9,800'
42000'	10,500'
44000'	11,000'
45000'	11,300'



Heat without pressure — use booster fan,
or — open dump valve or vent door.

at the reading 30 minutes after T.O. due to an automatic mixing valve. If this fails, a portable heater is carried.
Cold air from before Secondary Heater ducted with warm duct. within 4°C.
+ Tabs, if mix. valve fails.

All pressure lines have limited flow nozzles just outside their respective turbos.



1 3 Cabin pressure regulators cut in at 8000'. - one in ea. compt. Keep doors to tunnels closed - localise pressure skin failure.
Manual control levers, - i fore 3 BH, ii fore 6 BH, iii aft 10 BH.
These are open unless the regulator is u/s. 8-35000' maintains 8000'. At 35000' pressure differential is 7.45 lb"
At 40 000' Cabin altitude is 9,800'.

ON ENGS 1256. { 2 THERMOSWITCHES NEAR DUMP VALVE = 425°C.
1 THERMO SWITCH ON BAFFLE OUTBOARD OF EA. ENG. = 180°C.

2 PRV. Acts as PRV, dump, + aid to pressurisation 7.6-7.8 lb. One in each compt^t.
3 Vacuum R.V. one each compt^t. flap hanging valve, prevents negative pressure
4 Emergency dump valve. ONLY ONE - Engineer has it. Barrel doors must be held open during operation to prevent jamming.

5 HORN. will blow at cabin alt of 10500' INTERMITTENTLY. (ie 41,500' when pressurised) In each compt^t. Can be cut out.

15 Controls.

Dual cables throughout. Elevator + rudder automatically maintained by spring cylinders.
All control surfaces metal covered.
A. Ailerons. Servo + trim tab in one. Servo controls ailerons. Electric trim tabs.
B. Elevators + Rudder separate servo + trim tabs. Inboard tabs are Servos.
All controls spring loaded to give stick load. Elevators ~~spring~~ counter balanced neutral, + trims (at "rear end") manual.

max A.C. load. 40 KVA

v D.C. 4 50 amps/unit

8 units ∴ 400 A

Volts × Amps = Watts KW = 1000 W.

$K.VA = \sqrt{KW^2 + KVAR^2}$

KVAR is total apparent power in circuit, including all factors. magnetic fields around the lines etc.

locks – electrical.

Hydraulic cylinder + reservoir (serviced according to temperature) a piston with small bleed. Electric switch allows hyd: pressure to each side of the piston. ∴ Castors damped – can be moved slowly

Extra cable manual lock or rudder.

On T.O. – wt off right wheel, castors automatically unlocked.

Lock castor in front of pilots.

16 Oxygen.

30 bottles 400lb. 18 men for 10 hrs @ 35,000'.

A14 regulator, A13A mask.

Filler cap, stbd side, forward turret bay, for all compartments. but, each compartment has separate, two line system, to cope with damage.

17 Electrics

Primary 208 v. AC. with secondary 28 v D.C. System. 24 V, 17 A/H NAR BATTERY. 4 TX RECTIFIERS.

3 phase 400 cycle. Alternators on 2, 3, 4, 5 engines.

VOLT. – Pressure – E.

OHM – Ω resistance – R.

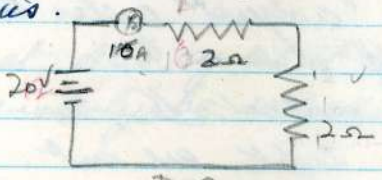
AMP. – current – I.

Ohm's law. $E = I \times R$. $\left(I = \frac{E}{R}, \text{ or } R = \frac{E}{I}\right)$.

Transmitters – 3 upper R.H. Side, fwd bomb bay. 1 under W/Ops table.

2 " " aft bomb bay. 2 under Navs table.

Resistance in series.



Res: additive

Resistance in //.

Total R, in // circuit, is recip: of sum of recip: resistances.

ie. $12 + 24 \quad \frac{1}{12} + \frac{1}{24} = \frac{3}{24}$ ie $\frac{24}{3} = 8\ \Omega$.

VOLTAGE depends on:- (i) Speed of generator. (ii) Field Strength (iii) No. of windings.

The Alternators. (4 in all).–

Rotary electro-magnets in stationary coils.. EMs excited by a DC generator mounted on the same drive. The D.C. strength is controllable ∴ the A.C. output is controllable. Coil + plunger controls D.C.