5227444 Cpl. Marsh. A

Form 619.

ROYAL AIR FORCE.

Notebook for use in Schools.

91/3471. Wt. 3390. 900M. Bks. 8/42. J. D. & Co. Ltd.

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Checks + 6 Boost 2700 rpm.

QFE Barometric Pressure

Starting ✓ Check ✓ Indicator.
2/ Brake Pressure. 3/ Flap Gauge. 4/ DR Compass
5/ Idle cut off Switches. 6/ Check Supercharge Switch.
7/ Exhaust Muffs. 8/ Bomb Slips. Check leading
Edge hinge portions. 9/ Engine starting SO. S1. PO. P1.
When engine kick put idle cut off to ON if
engine fails to start idle off. Props to fine
Rad 60-65° oil 20-25° oil pressure builds up
Run up engines, Test interval, Check M to S gear
at 4 lbs. drops ½ lb. On take off if bomb
load flaps at 15° if light 10° flaps. Switch
on Pitot head, Do not take off with rad flaps
down. Check oxygen. Check that George has
clutch in ✓ Pressure gauge reads 60 lbs/in²
When feathering press feathering button ✓ Switch
off Idle cut off switch ✓ turn off master cock
Engineers. log

Capt _____ Total Fuel _____ Bomb load _____ All up Weight at Take off _____
Airscrew N° _____ Air Intake _____ Supercharger _____ Auto Controls _____
Pressure Head _____ controls Unlocked DR
Target _____ Track miles _____ Sydn N° _____ Date _____

Time	Height Ft	Air Speed	I.A.S. Airscrew 2L-0	Boost	R.P.M.	Oil Pressure PO	Oil Pressure P1	Oil Pressure S1	Oil Pressure SO	Oil TEMP °C PO	Oil TEMP °C P1	Oil TEMP °C S1	Oil TEMP °C SO	Coolant °C P0	Coolant °C P1	Coolant °C SO	Air Intake °C	Blower	Pitot Heat AUTO	Pitot Heat ON	Pitot Heat OFF	Oxygen	Remarks

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~~Fuel System~~ Engineers Checks

External
1/ Pitot Head cover.
2/ Leading Edge Secure
3/ Chocks in Position.
4/ Check Jury Struts.
5/ General check on couplings.
6/ Check oleo extension on unfamiliar machines.

Fuselage
7/ First aid. Stbd Side
8/ Marine distress signals. Port side
9/ Fire extinguisher & portable oxygen bottles
10/ Bomb slip covers & Escape hatches
11/ Check pyrotechnics
12/ Main oxygen cock. Root seat position
13/ Check emergency air Bottle-s. 1200 lbs
14/ Hydraulic accumulator 220 lbs/□" no pressure.
15/ Check oil reservoir - hydraulic system
16/ Fuel balance cock.
17/ Main fuse panel - negative earthing switches down
18/ Ground to Flight switch.

Eng Pod
19/ Turn on master switch.
20/ Check fuel contents with tail down chart.
21/ Check fuel pumps

Starting XX & XVII
1/ Select no 2 tank & put all fuel pumps on.
2/ Turn on master & ochs all engine
3/ Check brake pressure.
4/ Check T/c lever - locked down, flaps neutral, & bomb doors closed.
5/ Turn flaps indicator switch on & T/c warning light
6/ Hot & cold air lever to cold
7/ Airscrew to fine
8/ Supercharger on M gear.
9/ Boost cut out lever up
10/ Ground/Flight switch off
11/ Booster coil switch on.
12/ Start engines & check oil pressure after starting each engine.
13/ After starting - Turn off booster coil.
14/ Select No 1 tanks.
15/ Ground/Flight switch to flight.
16/ Wait for minimum temps & run up & test, checking both vacuum pumps.

Cross Checks
1/ Bomb doors closed
2/ H & C air to cold.
3/ Nav lights off.
4/ I R 9 normal & special switch - off.
5/ Auto main control switch off.
6/ Mixer Box to reheat position I.C.
7/ Auto controls, clutch IN, control out
8/ D.R. compass ON & to setting
9/ Set altimeter.
10/ Check T/c warning lights change over switch
11/ Load magneto switches on
12/ I F F switch off (Identification friend or foe).

Before Taxying

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13/ Oxygen regulator & oxygen test.
14/ T.R.9. Ground test.
15/ Check Dury struts removed

Taxi to take off position
1/ Put correct flaps degree down 15° light 25° heavy
2/ A/s fully fine friction nut tight
3/ Trimmers (centralised)
4/ Check Engineers panel Main selector cocks to no 1 tanks & all fuel pumps on.
5/ Pitot head heater on.
6/ Final Brake pressure check
7/ Turn into wind, Directional Gyro to zero.
8/ Turn all lights off
9/ Clear engines
10/ Check engine temperatures.

Override Switches:- Ton only be automatic or fully open.
Radiator flaps are to be open when the coolant temp reaches 90°C or oil 80°C this should keep the oil pressure between 70 & 80 lb/□"
Following is a guide.
Ground Running
Taxiing
Marshalling for T.O. } All engine Rad flaps open.
Take off & climb Inboard rad auto Outboard open.
Cruising — all automatic normally.
only open for any particular engine if necessary

Port Outboard — Alt generator for TR 1335 & Rear Turret Pump
Port Inboard — R A E compressor
1500 watt generator - general service
Pesco vacuum pump
General service hydraulic pump
Mid under turret pump if fitted
Stbd Inboard — Maywood compressor - P Bonk
1500 watt generator - general services
Pesco vacuum pump
Hydraulic pump general service
Front turret pump
Stbd Outboard — Mids upper turret pump

Lancaster III Merlin XXVIII Stromberg Carb.

Starting procedure Merlin XXVIII
1/ Note that pneumatic air pressure is 130 lbs/□" minimum
2/ Set the throttle lever to about 1" from the slow running stop I.E. 1000 to 1200 rpm.
3/ Close the master fuel cocks of all stationary engines turn main selector cocks to no 2 tanks & turn on tank fuel booster pumps.
4/ Put idle cut off switches to the I.C.O. position switch on booster coil & main ignition switches
5/ Turn on master fuel cock of engine to be started, prime in the normal manner, & press starter button

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6/ As soon as the engine fires on the doping fuel, ~~note~~ put the I.C.O. switch to the engine on position & the engine should then pick up on the carb

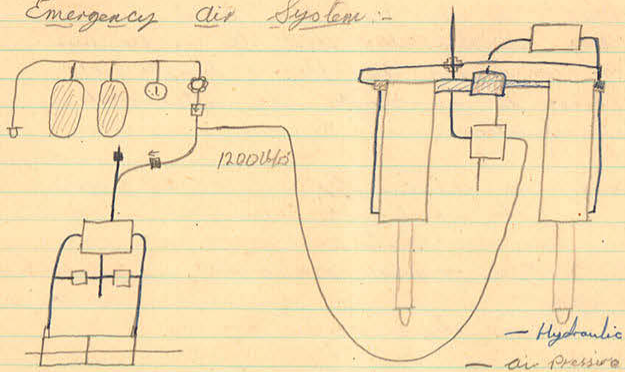
7/ If the engine fails to pick up immediately put the I.C.O. switch back to the I.C.O. position & carry on as in 6/

Note :- The fuel booster pumps must never be switched on with the fuel cock open & the engine stationary unless either the I.C.O switch is in the I.C.O position or the master fuel cocks are off, as flooding of the engine will result.

Pneumatic System :- The radiator shutters are automatically operated by means of a capillary & thermostatic switch which allows air to open or close the shutters. The shutters are opened at 115°C & closed at 107°C

If the services develope a leak the immediate action is to come down to M gear altitudes watch engine temperatures & do not make any steep climbs keep boost pressure down, for I.C.O. no action in air necessary.

Emergency air System :-



Controls

Rudder operated by pendulum type pedal fixed to geared shafts, the port pedal is connected to upper push-pull rod which is in five lengths. the auxiliary rod connected to upper push pull rod disappears into the tail-plane & is connected to a bell crank lever on to the other end of bell crank lever is connected two rods which go out board & are connected to two similar bellcrank levers which in turn are connected to actuating rods which are fixed to the king posts of Rudders.

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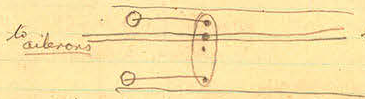
Elevators :- A arm from the control column has a lug attached to which the middle push-pull rod is connected + this goes underneath the tail plane to a single lug attachment which controls elevators.

Ailerons



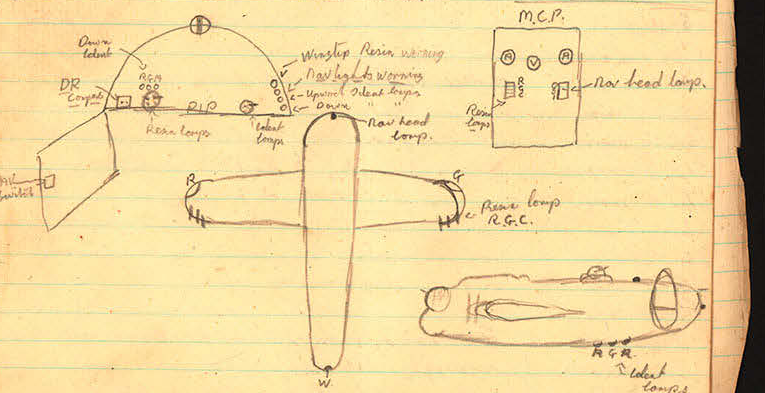
~~other wing to port aileron~~

~~Trimmers~~

Tommed Controls :-

Fuses :-

1/	5 amps.	Nav lights
2/	5 amps	Wing Tip recin lamps
3/	5 amps/10 amps.	Up + Down ident.
4	10 amps	D.R. Compass
(5/)	10 amps	Stromberg Idle cut-off Merlin XX VIII
(5/)	10 amps	Main feed to IFF Merlin XX
6/	5 amps.	1 pilots floodlight
7/	10 amps	Interior fuselage lights, Cockpit, Cabin. Sockets &c
8/	5 amps	Landing flap indicator
9/	10 amps	Camera.
10/	20 amps	Fire Extinguishers
11/	10 amps.	Pressure Head
12/	5 amps.	Auto Controls
13/	5 amps	U/c Indicator lamps.
14/	5 amps.	U/c Warning Buzzer.
15/	40 amps	Wireless operator.
16/	40 amps	
17	20 amps	Beam approach recievers (only on latest Mk)
18/	20 amps	Cowl gills for Mk II Hercules Lancaster only
19/		
20/		
21/		
22	20 amp	Landing lamp No 1 (Filament)
23	20 amp	" " No 2 (Filament)
24	20 amp	Pending
25	20 amp	Engine starting + Ignition Booster coil
26	10 amp	Supercharger Control. (Fuse for warning lamp superseded control is on Former F. in Nose)
27	10 amp	For Heated clothing excluding turrets.
28	20 amp	For Automatic Bombsight.
29	5 amp	Propeller anti icing Port.



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30/ 5 amp Propellor anti icing Starboard
31/ 5 amp Fuel contents meters & fuel warning lights
32/ 20 amp Supply to the rear turret
33/ 5 amp } Radiator Flap PO.
34/ 5 amp } P1.
35/ 5 amp } S1.
36/ 5 amp } SO.
37/ 5 amp Landing lamp motor No 1
38/ 5 amp Landing lamp motor No 2
39/ 20 amp Supply to Front turret
40/ 5 amp Worth oil dilution
41/ 10 amps Electric fuel pumps STB. No 3. (20 amp if rubometer type fitted)
42/ 10 amps PO } Propellor Feathering
43/ 10 amps P1 }
44/ 10 amps S1 }
45/ 10 amps SO }
46/ 10 amps Fuel pumps Port No 3 (20 amp if rubometer fitted)
47/ amps
48/ 5 amps Londex relay Start cut out.
49/ 10 amps } Electric fuel pump Pr 2 } 20 amps if rubometer fitted.
50/ 10 amps } P1 1 }
51/ 10 amps } ST 1 }
52/ 10 amps } ST 2 }
53
54
55
56

Fuses box on Former 24. 1/20 amp for Beam approach each P/C only
2/ 20 amp - supply to Mod upper
3/ 20 amp supply to Mod under if fitted
4/ 10 amp Intercom coll lights

Hydraulics:-

Bleeding after emergency air operation:-
Whenever the U/C & flaps have been lowered by compressed air, the following operations must be carefully carried out to ensure that all air has been removed from system
1/ Ensure that the air control cock has been returned to the off position & that the U/C lever is locked in the down position
2/ Jack up the P/C & open the bleeder plugs on the down side of U/C jacks & on the down side of flap jacks to release the compressed air
3/ Establish the cause of hydraulic failure & rectify it: after topping up oil in reservoir
4/ Connect test rig to ground test couplings & start up at its slowest speed.
5/ When a clear column of oil free of air issues from open bleeder plug on down side of U/C & flap jacks tighten & relock the plugs & build up to cut out pressure.
6/ Select flaps up & U/C up. Should oil issue from vent pipe of emergency air valves give the valve concerned a sharp tap with a hide faced hammer so that the valve returns to its normal position
7/ Fully raise & lower the flaps & U/C several times to ensure satisfactory operation & to remove all trapped air

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8) Finally disconnect ground test rig. Remove the lifting jacks from A/C & reinflate the air bottles to 1200 lbs/D". Top up reservoir.

Note:- If jacks are not available disconnect A/C rams from knuckle joint, fit jury strut & bleed as above.

Defects & Remedies

Automatic: Cut out. Defects which may cause trouble in this unit are as follows..

A. auto matic cut out alternating.

B. Failing to cut out at end of jack travel.

Causes of above A(1) - Leaking control valve

A(2) - Obstruction or local restriction in line

A(3) - Dirty Non return valve in cut out

A(4) - Incorrectly adjusted cut out.

B(1) - Defective jack piston

B(2) - Lack of oil

General Hydraulic Faults & Remedies.-

Loss of Pressure:-

1) All services inoperative thro failure of either the EDPs or emergency hand pump, replace pump concerned.

2) Internal leaks.:- A sluggish movement of all services due to excessive clearance in engine driven pumps which allows oil to leak from the pressure to the suction side of pump. Replace pumps concerned.

(B) Sluggish movement on a particular circuit due to oil leakage in control valve. Remove & hand test control valve.

(C) Sagging or returning of flaps, when the A/C is stationary or is flying, due to oil leakage in the flap jack or control box.

(D) If after thorough bleeding of the system, the time taken for any circuit to operate is excessive the jack in the defective circuit should be dismantled & inspected. The trouble would probably be caused by oil leakage passed the jack piston

External leaks:- The most likely places for such leaks to occur are at pipe connections, control valve operating shaft glands or jack piston rod glands. It is sometimes possible to cure such leaks by merely tightening the connection or gland nut concerned. If further tightening is impracticable or proves ineffective the unit or connection must be dismantled & inspected for damage.

Note: Tightening of the gland nut should not be resorted to unless permitted in the maintainance notes of unit concerned

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Air in System:
1/ Operation speed of U/C below normal
2/ Backlash of Flaps.
3/ Load on handpump very spongy.

Mechanical Defects:-
1/ Side load on jack piston rods due to misalignment
2/ Mechanical interference between two moving parts
3/ Presence of foreign matter between two moving parts.
4/ Increase of friction within the system, due to excessive tightening of gland nuts. etc.

Fire extinguishers
1/ Nose - port side.
2/ By pilots left elbow
3/ Forward face of Nav's table
4/ Behind front spar - starboard side
5/ Rear of mid upper - stbd side
6/ Roof - port side forward of rear turret

Tail oleo Pressure 650 lbs/in
U/C oleo Pressure 975 lbs/in".
Tyre Pressure Main wheels 43 lbs/in"
" " tail " 54 lbs/in"

Retraction Test U/C Up 18-20 seconds.
Down 20-22 seconds.
Flaps Up 8-10 seconds.
" Down 10-12 seconds.
Bomb doors Up + Down 6 seconds.
Emergency air U/C down 6 seconds.

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WITH HOT WATER FOR 5 MINS. PROTECTION FROM OTHER PARTS TIN'D BRASS GAUSE 80 MESH

RADIATER

A TYPE SOLDER 140°C GALLERY TYPE COPRO NICHOL
B " " 210°C TUBE. FLOW TEST 15 GALS PER M

1 AFTER REPAIR USE CAUSTIC SODA 2%
2 5% CHROMIC ACID .75% PHOSPORES SYRUP BY WEIGHT
3 WASH WITH WATER

PRESSURE TEST

FILL WITH WATER. (COLD) AND AD APPROPARE PRESSORE FOR ½ HOUR HOT WATER 10 MINS COLD WATER 5 MINS AFTER EACH TIME MESSURE TO SEE IF IN THE ALLOWED DISTORTION. O.K.

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COOLANTS

TYPES	COMPOSED OF	SG	BP	FP	FLASH POINT	MAX RUNNING TEMP
WATER	RAIN. DIST SOFT	1	100°C	.	—	APROX 90°G
ANTY FREZE	70% DIST RAIN 30% EG	1·044	~~104°C~~ 104°	-14°C		" "
HIGH TEMP COOLANT ↑ COLOURD ORANGE	97% EG 3% INHIBOTER	1·218	195°G	-14°C	118°CENC 124 OPEN	120°C

TO CONVERT F TO C =

F − 32 × 5/9 = C

C × 9/5 + 32 = F

A SMALL PRESURE REGULATING VALVE

THE PURPUSE IS TO REGULATE THE FUEL SUPLY TO THE CARB AT A PREDETERMD FIGURE IRRESPECTIVE OF THE DELIVERY PRESURE OF THE FUEL TANK. WHEN S/C IS EMPLOYED THE BALLANCE CONECTION PROVIDED ON THE DIAPHRAM COVER SHOULD BE CONECTED TO THE AIR INTAKE SO THAT THE FUEL PRESURE WILL BE REGULATED RELATIVE TO THE INTAKE PRESURE

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228
2150
1926

Total Track Miles 1800

Fuel required = $\frac{1800}{94} + 200 = 2115$

70
180

TAS OUT 200 TAS IN 180 2154

Time	Height	RPM	Boost	S/C	Fuel Used	Total Fuel Used	Fuel Left
20.00	TO	3000	+12	M	> 40	>40	2114
20.05	800	2650	+ 4	M	> 57	>97	2057
20.20	6000	2650	+ 4	M	> 57	154	2000
20.35	12,000	2650	+ 2	M	> 624	778	1376
23.35	10,000	2650	+ 2½	M	> 53	831	1323
23.50	7,000	2500	+ 4	M	> 108	909	1215
00.20	10,000	2000	+ 2	M	> 329	1238	886
02.50	10,000	2150	+ 2½	M	> 178	1416	608
03.50	8.000	1900	+ 2	M	> 39	1455	569
04.05	Landed at base						

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