F/O

ROSSER

NO. 14. COURSE CREW 109

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Lancaster

British

MK's I II III

Merlin 20 22 24

Herc VI or XVI

Packard Merlin 28 & 38

Canadian

Mk X

Packard Merlin 38

A.U.W. 65,000 – 56,000 lbs. Max 67,000 lbs.

Fuel load 2,154 gals ± 800 gals auxiliary (2,400 tanks in bomb bay)

Bomb load Up to 13,000 lbs.

Range approx 2.000 miles with max. fuel.

Speeds: Cruising 160-200 m.p.h.
All out 230-250 m.p.h. indicated.

D.R. COMPASS

P.4 Disadvantages: Turning errors. Changes of deviation – Combined Pendant.

D.R.C. Remote Repeater 6. True Courses. { Bomb Sight, A.P.I., H.2.S.

1. On entering aircraft
Note 'A' Error

2. V.S.C. at Zero

Switch to setting after engines started. Switch to Normal tacking out. Switch off when stationary in dispersal with engines running as Gyro will topple.

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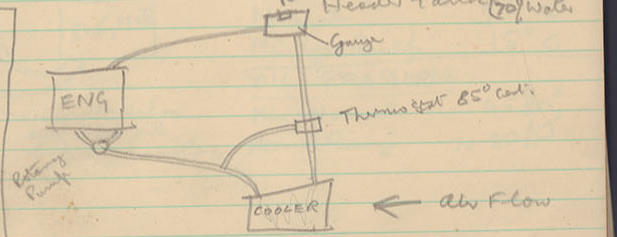
MERLIN 20

American - Stromberg Carb. (Mk III ~~& IV~~)

12 Cylinder.

COOLANT SYSTEM

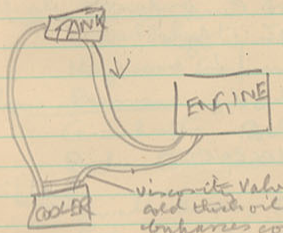
Coolant 135
Climb 125
Cruise 105
Pump 60



Max Coolant Temp 135° for 5 mins — Min 60° Take Off 125°

MERLIN 20

Lubrication



OIL TEMPS.

Combat (5 mins)	105° C
Normal	90° C
Min. before Pump Up	15° C

OIL PRESSURES

Min. Normal	45 lbs/□"
Normal Running	70-80 lbs/□"

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PESCO PUMP

Port Supply
Var. Pump (4½–5)
Blind Flying Panel

Stbd Supply
Var. Pump (6–8)
Bomb Sight

NORMAL — EMERGENCY

Merlin 20

Lubrication Contd

High Pressure 60–80 lbs □"
Crankshaft Journals
Heywood Compressor. Prop to fine pitch if C.S.U. fails.

Low Pressure 6–10 lbs □"
Camshafts. Rockers. S/c gearing.
Reduction Gearing.

Splash
Small Ends. Pistons. Cylinder Walls.
Reduction gear jets.

Scavenge
Worms butterflies
S/c change gearing.

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Merlin 20

General Notes

The 'Basic single piece block' on the Merlin 20 has been improved on late marks to obviate coolant leaks, and resultant danger of fire - Merlin 28 has the 'Improved Split Block'.

MKs 20, 22, 24 have S.U. Carburettors.
MK X have Stromberg " "

MK. 24 with cut-out produces + 18 Boost.
MK. 22, 28, 38 + 14 Boost
MK. 20 — + 12 Boost.

Lancaster rated altitude is 10000 feet, with exception of MK I with Merlin 24 which gives 9.500.

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Lancaster

Dinghy – Q Type in Stbd wing.
Immersion switch in Stbd Inner nacelle.
Line from nose to tail – three positions for operating dinghy – pilot cockpit – W/Op seat – rear door.

Escape – Bomb doors hatch, Pilots hatch overhead, rear door.

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Fuel System

During Run up Pulsometer pump switches are left off to test E.D.P's.

CINATEX TEST to be carried out over 21000 feet with engines at 2650 Revs +7 Boost.

Use of Pulsometer Pumps

1. Able On for Take Off
2. " " " Landing
3. On for changing tanks
4. Cross feed (Pump on for tank in use).
5. Over 17000' – pump for tanks on.
6. Violent evasive action.

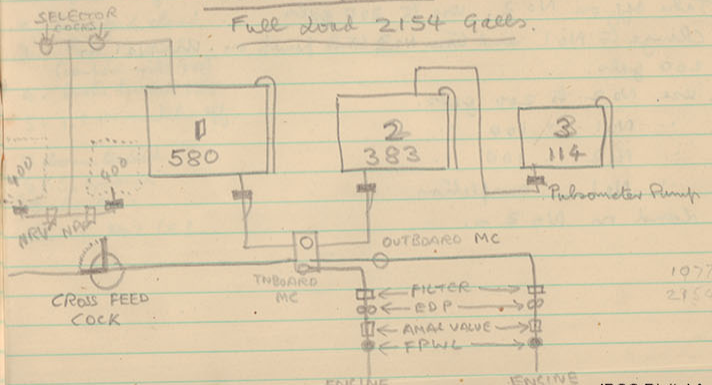
JETTISON

1. Down to 80 gallons in each No 1 tank.
1. Warn Crew
2. Bring Rear Gunner forward (if necessary)
3. 15° Flap
4. Operate Jettison
5. Do not jettison below 2000 feet

LANCASTER

FUEL SYSTEM

Full load 2154 Galls.



1977
2154

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Fuel System

Sequence for using 2154 galls.

1. Take off on No 2. Use to 200 gals.
2. Change to No 1 and turn No 3 tank pump on. Use No 1 to 200 gals.
3. Use No 2 to 200 gals.
4. " No 1 " 100 "
5. " No 2 " 100 "
6. " No 1 " completion
7 Land on No 2's.

Airmanship – Entering A/C.

1. G.F.S. to ground
2. Cross feed closed
3. Fuel Contents (compare with 700)
4. Brake Pressure 150
5. I.C.O. switches off.

U down locked
G.F.S. ground
Brake on.
Start on No 2 tanks.

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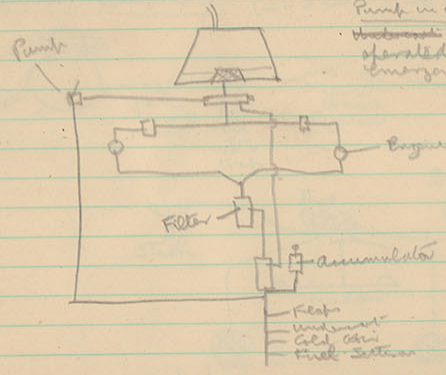
HYDRAULICS

Tank & pump rear of front spar.

Pump in each inboard engine

~~Undercut~~ Flaps cannot be operated without u/c by emergency air.



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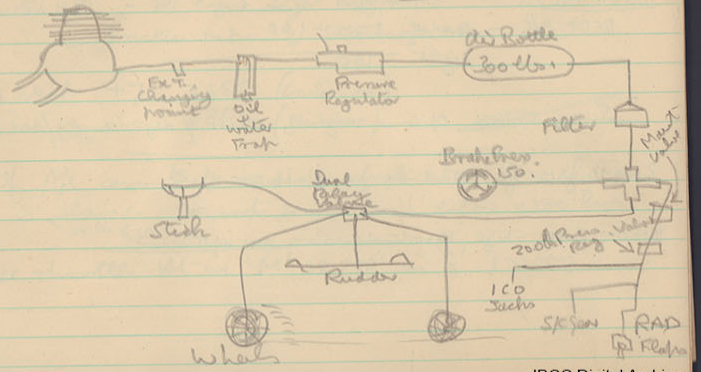
PNEUMATIC SYSTEM

Haywood Compressor (300 lbs) Stbd Inner Engine



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ENGINE HANDLING

MAX. RANGE.

		UPTO 15,000'	OVER 15,000 in 'S'
BEST A/S	– Loaded	170	– 160
	Light	160	

Optimum angle of attack 9 degs. (demeaks) (best drag).

Best Heights for Max. Range 8–16.000 feet

Below 3.000 – high Boost low Revs for optimum.

POWER ENGINE HANDLING (High Boost low Revs).

Brake H.P. – Actual h/p on brakes

Indicated H.P. – H/P Engine ought to develope.

1. Friction h.p. 2. Supercharger h.p.

Max Weak +7 2650 (Continuous)
1800 (Minimum)

If A/S cannot be maintained at 2500 Revs change to 'S' Blower. Do not cruise in 'S' below 2300 Revs.
at loss of 3lb Boost

Full throttle Ht in 'M' 10.000' in 'S' 17.000'

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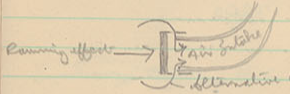
ICING

1. 'Gapped' ice guard on air intake.
3. Fall in Boost indicates icing up of ice-guard – ½ lbs boost through loss of 'ramming' effect.



GEORGE MK VIII

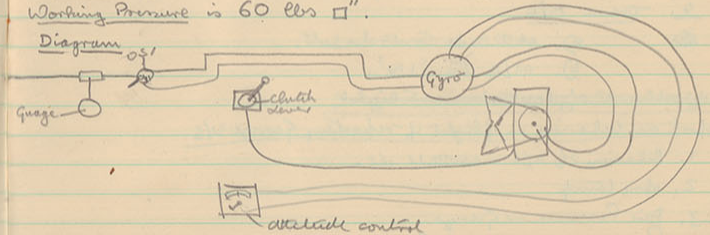
Advantages over Mk IV.

1. Properly banked turns. 2. Less equipment, better production, simplified.
3. Will fly by D.R. Compass and turn to anything set on same.

Disadvantage I Will not operate with bomb sight also in use.

Working Pressure is 60 lbs □".

Diagram



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George Contd.

To Engage

1. Clutches IN. (Move controls through full travel) } On ground.
2. Check pressure – 60 lbs □".
3. Main Cock to 'Spin'. (10 mins).
4. Trim A/c.
   a). Attitude Control-set.
   b). M/c to 'IN'.

~~Adjustment of Controls in Flight.~~

Report on behaviour in flight if reporting George U/S.

1. Behaviour of a/c – attitude etc.
2. Air temp.
3. Air Pressure on George.
4. Pressure at 'Spin' & Pressure @ Cock.

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HYDROMATIC PROPS. 2.000 – 1800.

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Main use of Pulsometer pumps to build fuel pressures at 17,000 ft and over and for assisting starting up.
Pulsometer pumps for Nos 1 & 2 tanks ON for take-off.
" " ON for Cross feed.
F.P.W.I. indicates when fuel pressure at the carburettor falls below 6 lb/in" on MK I and 10 lb/in" on MK X.
Fuel contents gauge switch must be ON during flights.
Oil Tanks - 37½ gallons 4½ air space in each engine tank.

HYDRAULICS

Starboard Outer - Mid Upper turret
" Inner - Front turret
Port Outer - Tail turret
" Inner - Mid Under turret

Two pumps (one on each inner), hand pump as alternative, charge small accumulator and aperail
Undercarriage, Flaps, Bomb Doors, Carb air intake shutters
Fuel Jettisoning

Pneumatics

Heywood Compressor on Star Inner charges air bottle to 300 lb/in". Operates Wheel brakes, Rad Shutters, Supercharger rams, Idle Cut-off rams.

Electrical

1,500 Watt generator on each inboard engine (for alternator may be fitted to each outboard engine to supply special radio equipment.
Bomb Doors Emergency compressed air bottle in bomb aimer compartment. Pilot selects open, B/A pulls pin. Enough air for 3 or 4 operations.

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Lancaster — General Notes

MK I — SU carbs — Merlin 20, 22, 24 — No I.C.O.'s

MK II — SU carb — Here VI & XVI

MK III — Stromberg Carbs — Merlin 28 & 38

Vapour Vent System — III & X only

Vent. pipe from each carburettor fitted to No 2 tanks allowing vapour and fuel to return to the tanks. Carburettor is designed to work full of fuel and requires vent to carry away petrol vapour and dissolved air. It also assists in re-establishing flows of fuel to carbs when pipe-lines and pumps are dry due to a tank emptying.

Electric fuel booster pumps.

Link I fitted with immersed pumps in all tanks originally.

Pulsometer pump fitted to Mk III & Thurston to X

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Notebook for use in Schools.

91/5769. Wt. 6631. 500M Bks. 11/43. C.W.S. Ltd.

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