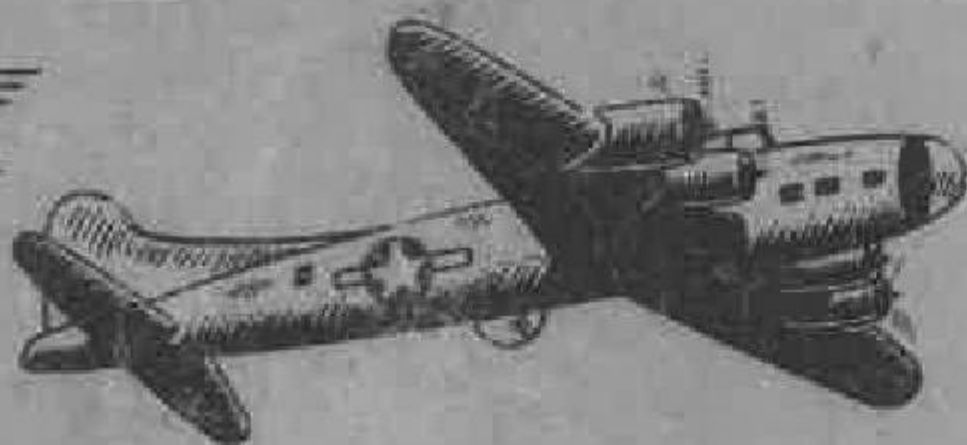


MECHANIC'S NOTE BOOK

B-17-F AIRPLANE



AMARILLO ARMY AIR FIELD

AMARILLO, TEXAS

Put. Stanley
Stanley
C. F. Innick
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A.S.N. U.S. F.F.A. 4.
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G-9174

FOREWORD

TO: All Concerned:


This notebook has been prepared for the field use of graduates of this school. It is to be used as a handy reference to existing technical orders and to certain technical data that is of particular value to the airplane mechanic. IT IS NOT INTENDED THAT THE NOTEBOOK SHOULD REPLACE TECHNICAL ORDERS OR THE TECHNICAL ORDER INDEX. Technical Order 00-1 (Technical Order Index) which is issued monthly, is the foundation of all Technical Order Files and a thorough knowledge of its use is necessary for adequate maintenance of Army Air Forces equipment. A constant check should be made of technical order files and the technical order index so that any changes or revisions may be entered in the notebook on the pages specifically provided for that purpose.

No material has been included that is either secret or confidential. It is requested that the mechanic be permitted to retain the notebook in his possession at all times and that he be permitted to carry it into any theater, unless orders in force in a particular theater of operations specifically prohibit the mechanic from carrying documents of this nature.

Recognition is given to the following instructors, Amarillo Army Air Field, for their assistance in compiling the information contained in this notebook: H.E. Johanson, E.R. Stensaas, M.C. Simpson, C.F. Maase, A. Bloom, F.J. Vodvarka, B.M. Farnell, E.P. Shelton, R.D. Landreth, D. Kravitz, J.W. Dain, W.W. Gibson, J.P. Loughlin, V.J. Vana, P.I. Stone, S. Appleton, and R.M. Thompson, Jr.

By order of Colonel RALEY:

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Adjutant.

~~CONFIDENTIAL~~

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Amarillo Army Air Field
Army Air Forces Western Technical Training Command

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1. TECHNICAL ORDER REFERENCES (NUMERICAL)

T.O. No.

- 00-20A The AAF Visual Inspection System for Airplanes.
- 00-25-4 Aircraft Maintenance Procedure and Overhaul of Engines.
- 00-25-5 Procedure to be Followed in Case of Fires During Flight.
- 01-1-1 Cleaning of Aeronautical Equipment.
- 01-1-2 Anti-corrosion Treatment of Airplanes Operating in Salt Water.
- 01-1-8 Ventilation of Airplanes in Hot Weather.
- 01-1-26 Replacement of Frayed Control Cables.
- 01-1-50 Towing, Mooring and Handling of Airplanes.
- 01-1-58 Installation, Inspection and Reworking of Rubber Engine Mount Bushings (Tightening of Radial Engine Mount Bolts).
- 01-1-109 Precautions Against Fouling Controls.
- 01-20EF-1 Operation and Flight Instructions - B-17F Airplane.
- 01-20EF-2 Handbook of Erection and Maintenance Instructions - Model B-17F Bombardment Airplane.
- 01-20E -3 Handbook of Instructions for Structural Repair for B-17F Airplane.
- 02-1-7 Detonation in Aircraft Engines.
- 02-1-29 Ground Operation Instructions for Aircraft Engines.
- 02-1-34 Tightening Crankshaft and Propeller Shaft Thrust Bearing Nuts.
- 02-35GC-1 Operating Instructions, R-1820-65 and -97 Aircraft Engines.
- 02-35GC-3 Overhaul Instructions, R-1820-65 and -97 Aircraft Engines.
- 03-1-2 Safety Belts.
- 03-1-4 Overhaul of Accessory Pumps.

T.O. No.	
03-1-15	Failure, Inspection and Repair of Self-Sealing Fuel and Oil Tanks.
03-1-15A	Failure, Inspection and Repair of Self-Sealing Fuel and Oil Tanks.
03-5-1	Battery Circuit Solenoid Switches, Handbook of Instructions, Types B-1 and C-1.
03-5-4	Cleaning and Polishing Landing Lamp Reflectors.
03-5-9	Booster Coil Handbook, Types A-1 and C-1.
03-5AA-1	Handbook of Instructions, Aircraft Engine Generators and Control Boxes.
03-5AA-3	Generator Control Panels and Control Box - Types B-1 and B-2.
03-5AB-2	Generator Control Panels, Types A-1 and A-2.
03-5AB-5	Handbook of Instructions with Parts Catalog - Aircraft Generators, Types M-2 and O-1.
03-5AD-1	Handbook of Instructions for Type P-1 Engine Driven Generator.
03-5AD-2	Generator Voltage Regulator, Handbook of Instructions (Models 3GBD2B4 and 3GBD2B11).
03-5C-2	Solenoid Switches (Eclipse) - Handbook of Instructions.
03-5CA-1	Aircraft Engine Starters and Starter Motors (Eclipse), Handbook of Instructions.
03-5CA-2	Electric Starters, Direct Cranking (Eclipse Type E-160) - Handbook of Instructions.
03-5CA-3	Aircraft Engine Starters and Starter Motors (Eclipse), Handbook of Instructions.
03-5CA-5	Electric Starters, Direct Cranking (Eclipse type 397), Handbook of Instructions.

T.O. No.	
03-5CC-1	Retracting Mechanism Motors (Eclipse), Handbook of Instructions.
03-5CC-2	Retracting Mechanism Motors (Electric Specialty Company).
03-5CC-3	Retracting Mechanism Motors (Electric Development Company).
03-5E-1	Spark Plugs--Use and Reconditioning.
03-5F-1	Dynamotor - Aircraft Instruments.
03-5F-2	Alternator, Type KA-215; Regulator, Type XC-78; Dynamotor, Type AF-2.
03-5G-1	Fluorescent Lighting System - Inverters, Auxiliary Boxes and Lamp Assemblies.
03-10-13	Operation and Inspection of Fuel Cock Controls.
03-10-15	Operating Fuel Systems.
03-10-22	Fuel Cocks (Pesco)
03-10-26	Repair Instructions--Self-Sealing Fuel Cells.
03-10D-2	Supercharger Regulator, Type A-7 - Preliminary Handbook of Instructions.
03-10DA-2	Operation and Service Instructions With Parts Catalog - Turbine Driven Superchargers.
03-10EA-1	Fuel Pumps - Engine Driven (Pesco), Handbook of Instructions with Parts Catalog.
03-10EC-1	Engine Driven Fuel Pumps, Handbook of Instructions with Parts Catalog.
03-10ED-1	Handbook of Instructions with Parts Catalog for the Engine Driven Fuel Pumps - Types G-6, G-9, and F-10.
03-15-3	Inspection of Oil Dilution Valve and Linkage.
03-15-4	Repair and Cleaning of Oil Temperature Regulators.
03-15-10	Cleaning of Oil System and Accessories.

T.O. No.	
03-20CA-2	Service and Overhaul Instructions with Parts Catalog, Constant Speed Propeller Governors and Controls - Hydromatic Constant Speed Propeller Governors and Controls (Hamilton).
03-20CC-1	Operation and Flight Instructions, Hamilton Hydromatic Controllable Propeller.
03-20CC-2	Service and Overhaul Instructions with Parts Catalog, Hydromatic Controllable Propeller, Full Feathering (Hamilton).
03-25A-1	Inspection and Lubrication of Anti-Friction Bearings.
03-25A-3	Streamline Tail or Nose Wheels, Smooth Contour Auxiliary Wheels (Hayes) - Handbook of Instructions with Parts Catalog.
03-25AA-1	Vacuum Pumps, Engine Driven - Handbook of Instructions with Parts Catalog.
03-25E-1	Air-Oil Shock Absorber Struts.
03-30CC-3	Engine Driven Gear Type Oil Pumps - Handbook of Instructions with Parts Catalog.
03-35-1	Icing of Aircraft.
03-35A-3	Anti-Icer Pumps, Propeller (Pesco).
03-35B-1	Maintenance and Inspection of De-Icer Shoes.
03-45-1	Fire Extinguishers - Installation and Inspection - One Quart Pump Type.
03-45B-1	Fire Extinguisher - Type A-2.
03-45C-1	Fire Extinguishers - Type A-11, A-12 and A-13.
03-50-1	Use of Oxygen.
03-50-2	Charging of Oxygen Cylinders (Equalizer Method).
03-50-3	Use and Maintenance of Purifiers.

T.O. No.	
03-50A-1	Oxygen Regulators, Type A-6, A-8, A-8A, A-9 and A-9A - Handbook of Instruction with Parts Catalog.
03-55A-2	CO ₂ Inflation Equipment - Instructions for inflation Cylinder and Valve Assembly - Type A-2 Raft - Walter Kidde.
04-10-1	Inflation and Use of Aircraft Tires and Inner Tubes (Pressures).
04-10-2	Maintenance and Inspection - Tires, Tubes and Wheel Rims.
05-1-15	Autosyn Instruments.
05-1-16	Identification of Aircraft Thermometers.
05-1-17	Marking of Aircraft Instruments.
05-10-2	Service and Overhaul Instructions - Airspeed Indicators.
05-15-2	Service and Overhaul Instructions - Magnetic Type Compasses.
05-20-2	Bank and Turn Indicators (Pioneer) - Handbook of Instructions with Parts Catalog.
05-20-3	Flight Indicators, Types C-1, C-3, C-4, C-5 and C-7 - Handbook of Instructions with Parts Catalog.
05-20-4	Turn Indicators (Sperry) - Handbook of Instructions with Parts Catalog.
05-20-17	Rate of Climb Indicators, Type A-6 (Pioneer) - Handbook of Instructions with Parts Catalog.
05-20-26	Rate of Climb Indicator, Type A-6 (Kollsman)
05-25BB-2	Service and Overhaul Instructions - Type B-3 Driftmeter.
05-30-1	Operation and Service Instructions - Altimeter Assemblies.
05-35-4	Aircraft Sextant, Type A-5 and A-7 (Pioneer)

T.O. No.	
05-36-7	Aircraft Sextants, Types A-6, A-6A and A-8.
05-40-3	Thermocouple Thermometers, Types B-6, B-7, B-8, B-9 and B-11.
05-40-9	Thermometers, Free Air, Types C-3, C-5, C-6 and C-13. Handbook of Instructions with Assembly Parts List.
05-40-12	Service Instructions - Thermometers, Resistance Type.
05-50-1	Pitot Static Airspeed Tubes, Handbook of Instructions.
05-65A-1	Handbook - Electrically Operated Fuel Level Gages.
05-70-1	Manifold Pressure Gage, Types D-1 and D-2.
05-75-1	Engine Gage Units, Types B-1, B-2 and B-7 - Handbook of Instructions with Parts Catalog.
05-80-1	Suction Gages, Type F - Handbook of Instructions with Parts Catalog.
06-1-2	Fluids for Hydraulic Equipment.
06-10-1	Aircraft Engine Lubrication Oils - Grades and Use.
08-5-1	Shielding and Bonding of Aircraft.
08-10-33	Interphone Equipment RC-36 (Identifying Order).
16-20-2	Maintenance and Inspection of CO ₂ Cylinders.
19-1-18	Hydraulic Airplane Jack - Airplane Hoisting Precautions.

2. TECHNICAL ORDER REFERENCES (ALPHABETICAL)

T.O. No.

- 03-1-4 Accessory Pumps - Overhaul of.
- 01-20EF-1 Airplane, B-17F - Flight and Operation Instructions.
- 01-20EF-2 Airplane, B-17F - Erection and Maintenance Instructions.
- 05-1-16 Airspeed Indicators - Service and Overhaul Instructions.
- 05-50-1 Airspeed Tubes, Pitot Static - Handbook of Instructions.
- 03-5F-2 Alternator, Engine Driven, Type KA-215; Regulator, Type XC-78; Dynamotor, Battery Operated, Type AF-2.
- 05-30-1 Altimeter Assemblies - Operation and Service Instructions.
- 01-1-2 Anti-corrosion Treatment of Airplanes Operating in Salt Water.
- 03-35A-3 Anti-icer Pumps, Propeller (Pesco).
- 05-1-15 Autosyn Instruments.
- 05-20-2 Bank and Turn Indicators (Pioneer) - Handbook of Instructions with Parts Catalog.
- 03-5B-1 Batteries, Storage, Aircraft - Handbook of Instructions.
- 03-25A-1 Bearings, Anti-friction - Inspection and Lubrication of.
- 03-1-2 Belts, Safety.
- 01-1-58 Bolts, Radial Engine Mount, Tightening of - Bushings, Rubber, Engine Mount - Installation, Inspection, and Reworking of.
- 03-5-9 Booster coil - Types A-1 and C-1 - Handbook.
- 08-5-1 Bonding and Shielding of Aircraft.
- 01-1-58 Bushings, Rubber, Engine Mount - Installation, Inspection, and Reworking of (Tightening of Radial Engine Mount Bolts).

T.O. No.	
01-1-26	Cables, Control, Frayed - Replacement of.
01-1-1	Cleaning of Aeronautical Equipment.
03-10-22	Cocks, Fuel (Pesco).
16-20-2	CO ₂ Cylinders - Maintenance and Inspection.
00-55A-2	CO ₂ Inflation Equipment - Instructions for Inflation Cylinder and Valve Assembly - Type A-2 Raft - Walter Kidde.
03-5-9	Coil, Booster - Types A-1 and C-1 - Handbook.
05-15-2	Compasses, Magnetic Type - Service and Overhaul Instructions.
01-1-26	Control Cables, Frayed - Replacement of.
03-5AA-3	Control Panels, Generator and Control Box - Types B-1 and B-2.
01-1-109	Controls, Fouling of, Precautions Against.
03-10-13	Controls, Fuel Cock - Operation and Inspection of.
03-5AB-2	Control Panels, Generator, Types A-1 and A-2.
03-5AA-1	Control Boxes and Generators, Engine Aircraft - Handbook of Instruction.
02-1-34	Crankshaft and Propeller Shaft Thrust Bearing Nuts - Tightening of.
16-20-2	Cylinders, CO ₂ - Maintenance and Inspection.
03-50-2	Cylinders, Oxygen, Charging of (Equalizer Method).
03-35B-1	De-Icer Shoes - Maintenance and Inspection of.
02-1-7	Detonation in Aircraft Engines.
05-25BB-2	Driftmeter, Type B-3 - Service and Overhaul Instructions.

T.O. No.	
03-5F-2	Dynamotor, Battery Operated, Type AF-2; Regulator Type XC-78; Alternator, Engine Driven, Type KA-215.
03-5F-1	Dynamotor, Instruments, Aircraft.
00-25-5	Emergency Procedure - Procedure to be Followed in Case of Fires During Flight.
02-1-7	Engines, Aircraft, Detonation in Engine.
02-1-29	Engines, Aircraft, Ground Operations, - Instructions for.
05-75-1	Engine Gage Units, Types B-1, B-2 and B-7 - Handbook of Instructions with Parts Catalog.
00-25-4	Engines, Aircraft - Maintenance Procedure and Overhaul of.
02-35GC-1	Engine, Model R-1820-65 and -97- Operation and Flight Instruction.
02-35GC-3	Engine, Model R-1820-65 and -97- Overhaul Instructions.
03-5CA-3	Engine, Starters and Starter Motors (Eclipse), Aircraft - Handbook of Instructions.
00-1-1	Equipment, Aeronautical, Cleaning of.
03-45-1	Fire Extinguishers - One Quart Pump Type - Installation and Inspection.
03-45B-1	Fire Extinguisher - Type A-2.
03-45C-1	Fire Extinguishers - Types A-11, A-12, and A-13.
00-25-5	Fires - Procedure to be Followed in Case of Fires During Flight.
05-20-3	Flight Indicators, Types C-1, C-3, C-4, C-5 and C-7 - Handbook of Instructions with Parts Catalog.
01-20EF-1	Flight and Operation Instructions - B-17F Airplane.
06-1-2	Fluids for Hydraulic Equipment.

T.O. No.	
03-5G-1	Fluorescent Lighting System - Inverters, Auxiliary Boxes and Lamp Assemblies.
01-1-109	Fouled Controls, Precautions Against.
03-10-26	Fuel Cells, Self-Sealing - Repair Instructions.
03-10-13	Fuel Cock Controls, Operation and Inspection of.
03-10-22	Fuel Cocks (Pesco).
05-65A-1	Fuel Level Gages, Electrically Operated - Handbook.
03-10-15	Fuel Systems, Operating of.
03-10EA-1	Fuel Pumps, Engine Driven (Pesco) - Handbook of Instructions with Parts Catalog.
03-10EC-1	Fuel Pumps, Engine Driven - Handbook of Instructions with Parts Catalog.
03-10ED-1	Fuel Pumps, Engine Driven, Types G-6, G-9 and F-10 - Handbook of Instructions with Parts Catalog.
05-65A-1	Gages, Fuel Level, Electrically Operated - Handbook.
05-75-1	Gage Units, Engine, Types B-1, B-2 and B-7 - Handbook of Instructions with Parts Catalog.
03-5AB-5	Generators, Aircraft - Types M-2 and O-1 - Handbook of Instructions with Parts Catalog.
03-5AA-1	Generators and Control Boxes, Engine Aircraft - Handbook of Instructions.
03-5AA-3	Generator Control Panels and Control Box - Types B-1 and B-2.
03-5AB-2	Generator Control Panels - Types A-1 and A-2.
03-5AD-1	Generator, Engine Driven - Type P-1 - Handbook of Instructions.

T.O. No.	
03-5AD-2	Generator Voltage Regulator - Models 3GBD2B4 and 3GBD2B11 - Handbook of Instructions.
03-20CA-2	Governors and Controls, Constant Speed Propeller, Hydromatic Constant Speed.
19-1-18	Hoisting Precautions, Airplane - Hydraulic Airplane Jack.
01-1-8	Hot Weather Operation - Ventilation of Airplanes.
19-1-18	Hydraulic Airplane Jack - Airplane Hoisting Precautions.
06-1-2	Hydraulic Fluids for Hydraulic Equipment.
03-35-1	Icing of Aircraft.
00-20A	Inspection System, Airplanes, Visual, Army Air Forces.
05-1-15	Instruments, Autosyn.
08-10-33	Interphone Equipment, RC-36 (Identifying Order).
03-5-4	Lamp, Reflectors, Landing - Cleaning and Polishing of.
03-5G-1	Lighting System, Fluorescent - Inverters, Auxiliary Boxes and Lamp Assemblies.
05-15-2	Magnetic Type Compasses - Service and Overhaul Instructions.
01-20EP-2	Maintenance and Erection Instructions -B-17F Airplane.
05-70-1	Manifold Pressure Gage, Types D-2 and D-1.
01-1-50	Mooring, Towing and Handling of Airplane.
03-5CA-1	Motors, Starter and Starters, Engine, Aircraft (Eclipse)- Handbook of Instructions.
03-5CC-1	Motors, Retracting Mechanism (Eclipse) - Handbook of Instructions.

T.O. No.

03-500-2 Motors, Retracting Mechanism (Electric Specialty Co.)

03-500-3 Motor, Retracting Mechanism (Electric Development Co.)

01-20EF-1 Operation and Flight Instructions - B-17F Airplane.

03-15-3 Oil Dilution Valve and Linkage - Inspection of.

06-10-1 Oils, Lubrication, Aircraft Engine - Grades and Use.

03-3000-3 Oil Pumps, Gear Type, Engine Driven - Handbook of Instructions with Parts Catalog.

03-15-10 Oil System and Accessories - Cleaning of.

03-15-4 Oil Temperature Regulators - Repair and Cleaning of.

03-50-2 Oxygen Cylinders, Charging of (Equalizer Method).

03-50A-1 Oxygen Regulators, Types A-6, A-8, A-8A, A-9 and A-9A - Handbook of Instructions with Parts Catalog.

03-50-1 Oxygen, Use of.

05-50-1 Pitot Static Airspeed Tubes - Handbook of Instructions.

05-70-1 Pressure Gage, Manifold, Types D-1 and D-2.

02-1-34 Propeller and Crankshaft Thrust Bearing Nuts, Tightening of.

03-20CA-2 Propeller Governors and Controls, Constant Speed - Hydromatic Constant Speed.

03-20CA-2 Propeller Governors and Controls (Hamilton) - Service and Overhaul Instructions with Parts Catalog.

03-20CC-1 Propeller, Hamilton Hydromatic Controllable - Operation and Flight Instructions.

T.O. No.	
03-20CC-2	Propeller, Hydromatic Controllable, Full Feathering(Hamilton)-Service and Overhaul Instructions with Parts Catalog.
03-1-4	Pumps, Accessory - Overhaul of.
03-35A-3	Pumps, Anti-Icer, Propeller (Pesco).
03-10EA-1	Pumps, Fuel, Engine Driven (Pesco) - Handbook of Instructions with Parts Catalog.
03-10EC-1	Pumps, Fuel, Engine Driven - Handbook of Instructions with Parts Catalog.
03-10ED-1	Pumps, Fuel, Engine Driven, Types G-6, G-9 and F-10 - Handbook of Instructions with Parts Catalog.
03-30CC-3	Pumps, Oil, Gear Type, Engine Driven - Handbook of Instructions with Parts Catalog.
03-30AA-1	Pumps, Vacuum, Engine Driven - Handbook of Instructions with Parts Catalog.
03-50-3	Purifiers, Use and Maintenance of.
03-55A-2	Rafts, CO ₂ Inflation Equipment - Instructions, Assembly - Type A-2 - Walter Kidde.
05-20-17	Rate of Climb Indicators, Type A-6 (Pioneer) - Handbook of Instructions with Parts Catalog.
05-20-26	Rate of Climb Indicator, Type A-6 (Kollsman) - Handbook of Instructions with Parts Catalog.
03-5-4	Reflectors, Landing Lamp - Cleaning and Polishing of.
03-15-4	Regulators, Oil Temperature - Repair and Cleaning of.
03-50A-1	Regulators, Oxygen, Types A-6, A-8, A-8A, A-9 and A-9A - Handbook of Instructions with Parts Catalog.
03-10D-2	Regulator, Supercharger, Type A-7 - Preliminary handbook of Instruction.

T.O. No.	
03-5F-2	Regulator, Type XC-78; Alternator, Engine Driven, Type KA-215; Dynamo-motor, Battery Operated, Type AF-2.
03-5AD-2	Regulator, Voltage, Generator - Models 3GBD2B4 and 3GBD2B11 - Handbook of Instructions.
03-5CC-1	Retracting Mechanism Motors (Eclipse), Handbook of Instruction.
03-5CC-2	Retracting Mechanism Motors (Electric Specialty Co.)
03-5CC-3	Retracting Mechanism Motors (Electric Development Co.)
03-1-2	Safety Belts.
01-1-2	Salt Water Operation - Anti-Corrosion Treatment of Airplanes.
03-1-15	Self-Sealing Fuel and Oil Tanks - Failure, Inspection and Repair of.
03-1-15A	Self-Sealing Fuel and Oil Tanks - Failure, Inspection and Repair of.
03-10-26	Self-Sealing Fuel Cells - Repair Instructions.
05-35-4	Sextant, Aircraft, Types A-5 and A-7, (Pioneer).
05-35-7	Sextant, Aircraft, Types A-6, A-6A and A-8.
08-5-1	Shielding and Bonding of Aircraft.
03-25E-1	Shock Absorber Struts, Air-oil.
03-5C-2	Solenoid Switches (Eclipse) - Handbook of Instructions.
03-5-1	Solenoid Switches, Battery Circuit - Types B-1 and C-1 - Handbook of Instructions.
03-5E-1	Spark Plugs - Use and Reconditioning.
03-5CA-2	Starters, Electric, Direct Cranking (Eclipse Type E-160) - Handbook of Instructions.
03-5CA-1	Starters and Starter Motors, Engine, Aircraft (Eclipse) - Handbook of Instructions.

T.O. No.	
03-5CA-3	Starters and Starter Motors (Eclipse) Engine, Aircraft - Handbook of Instructions.
03-5CA-5	Starters, Electric, Direct Cranking (Eclipse), Type 397 - Handbook of Instructions.
03-5B-1	Storage Batteries, Aircraft - Handbook of Instructions.
03-25E-1	Struts, Shock Absorber, Air-oil.
01-20E -3	Structural Repair, Handbook of Instructions - B-17F Airplane.
05-80-1	Suction Gages, Type F - Handbook of Instructions with Parts Catalog.
03-10D-2	Supercharger Regulator, Type A-7 - Preliminary Handbook of Instructions.
03-10DA-3	Superchargers, Turbine Driven - Handbook of Overhaul Instructions with Parts Catalog.
03-5C-2	Switches, Solenoid (Eclipse) - Handbook of Instructions.
03-5-1	Switches, Solenoid, Battery Circuit - Types B-1 and C-1 - Handbook of Instructions.
03-25A-3	Tail Wheels, Streamline Tail or Nose, Smooth Contour Auxiliary Wheels (Hayes) - Handbook of Instruction with Parts Catalog.
03-1-15	Tanks, Fuel and Oil, Self-Sealing - Failure, Inspection and Repair of.
03-1-15A	Tanks, Fuel and Oil, Self-Sealing - Failure, Inspection and Repair of.
05-40-9	Thermometers, Free Air, Types C-3, C-5, C-6 and C-13 - Handbook of Instructions with Assembly Parts List.
05-1-16	Thermometers, Aircraft-Identification of.
05-40-3	Thermometers, Thermocouple, Types B-6, B-7, B-8, B-9 and B-11.
05-40-3	Thermocouple Thermometers, Types B-6, B-7, B-8, B-9 and B-11.

T.O. No.

05-40-12 Thermometers, Resistance Type - Service Instructions.

02-1-34 Thrust Bearing Nuts, Crankshaft and Propeller Shaft - Tightening of.

04-10-1 Tires and Inner Tubes (Pressures) - Aircraft - Inflation and Use of.

04-10-2 Tires, Tubes and Wheel Rims - Maintenance and Inspection of.

01-1-50 Towing, Mooring and Handling of Airplanes.

04-10-2 Tubes, Tires and Wheel Rims - Maintenance and Inspection of.

04-10-1 Tubes, Inner and Tires (Pressures), Aircraft - Inflation and Use of.

03-10DA-3 Turbine Driven Superchargers - Handbook of Overhaul Instructions with Parts Catalog.

05-20-2 Turn and Bank Indicators (Pioneer) - Handbook of Instructions with Parts Catalog.

05-20-4 Turn Indicators (Sperry) - Handbook of Instructions with Parts Catalog.

03-15-3 Valve, Oil Dilution, and Linkage - Inspection of.

03-30AA-1 Vacuum Pumps, Engine Driven - Handbook of Instructions with Parts Catalog.

01-1-8 Ventilation of Airplanes in Hot Weather

00-20A Visual Inspection System for Airplanes, Army Air Forces.

03-5AD-2 Voltage Regulator Generator - Models 3GBD2B4 and 3GBD2B11 - Handbook of Instructions.

04-10-2 Wheel Rims, Tires and Tubes - Maintenance and Inspection of.

03-25A-3 Wheels, Streamline Tail or Nose, Smooth Contour Auxiliary Wheels (Hayes) - Handbook of Instruction with Parts Catalog.

3. ARMY AIR FORCES PROPERTY CLASSES

NUMBER	NAME
00	Indexes and Maintenance Publications of a General Nature.
01	Airplanes and Maintenance Parts - General.
02	Engines and Maintenance Parts - General.
03	Aircraft Accessories.
04	Aircraft Hardware and Rubber Materials.
05	Aircraft Instruments and Laboratory Test Equipment.
06	Fuels and Lubricants.
07	Dopes, Paints and Related Materials.
08	Electrical Equipment and Supplies.
09	Gliders and Target Airplanes.
10	Photographic Equipment and Supplies.
11	Aircraft, Combat Materials.
12	Fuel and Lubricating Equipment and Supplies.
13	Clothing, Parachutes, Equipment and Supplies.
14	Hangars and Demountable Buildings.
16	Gas Cylinders.
17	Machinery, Shop Equipment and Tools.
18	Special Tools.
19	Flying Field and Hangar Equipment.
20	Woods.
23	Metal and Composition Materials.
24	Chemicals.
25	Office Equipment and Supplies.
29	Commercial Hardware and Miscellaneous Supplies.
30	Training Aids.

4. SPECIFICATIONS (AIRPLANE AND ENGINES)

AIRPLANE--

Over-all span	103 ft. 9.38 in.
Over-all length	74 ft. 8.90 in.
Over-all height, thrust line level	294.91 in.
Over-all height, at rest	229.00 in.
Height, propeller hub, with thrust line level	86.29 in.(inbd) 98.78 in.(outbd)
Height, propeller hub, taxi position (at tip of propeller dome)	101.40 in.(inbd) 111.00 in.(outbd)
Clearance, propeller tips, thrust line level	16.79 in.(inbd) 29.28 in.(outbd)

WING--

Airfoil section	
At root	NACA 0018
At tip	NACA 0010
Total area (including ailerons and flaps)	1277.5 sq ft (net)
Chord-root	228.00 in.
Chord-tip	106.70 in.
Incidence	3 1/2 deg. (in plane of wing)
Dihedral	4 1/2 deg.
Sweepback	8 deg, 9 min.

AILERONS--

Area aft of hinge center line (including tabs) (each)	60.2 sq.ft.
Area of balance (each)	9.3 sq.ft.
Total area (each)	69.5 sq.ft.
Area of trim tab (used on left side only)	380 sq.in.

FLAPS--

Total area	139.1 sq.ft.
Chord	34.0 in.
Span (each)	24 ft. 4.9 in. (true)

EMPENNAGE--**HORIZONTAL STABILIZER.**

Total area	283.5 sq.ft. (net)
Setting (fixed)	0 deg.
Chord-maximum (measured on fuselage center line)	134.4 in.
Span	43 ft.

ELEVATORS.

Area aft of hinge center line (including tabs)	80.5 sq.ft.
Area of balance	34.2 sq.ft.
Total area	114.7 sq.ft.
Area of trim tab	10.0 sq.ft.

VERTICAL STABILIZER.

Total area	170.6 sq.ft.
Setting (fixed)	0 deg.
Chord (maximum) (measured from leading edge, produced to trailing edge of rudder trim tab)	163.8 in.
Span	12.00 ft. 6.0 in.

RUDDER.

Area aft of hinge center line (including tabs)	27.70 sq.ft.
Area of balance	10.10 sq.ft.
Total area	37.80 sq.ft.
Area of trim tab	3.40 sq.ft.

LANDING GEAR.

Tread	253.52 in.
Axle center line aft of top of inboard propeller hub dome. (flight position)	136.84 in.

ENGINES.

Model	R-1820-97
Type	Single row, static radial, air cooled
Number of cylinders	9
Bore	6.125 in.
Stroke	6.875 in.
Piston displacement	1823 cu.in.
Compression ratio	6.70:1
Blower gear ratio	6.00:1
Blower diameter	11.0 in.
Rated speed power	2300 rpm
Rated power at sea level	1000 bhp/2300 rpm
Rated power at altitude (25,000 ft.)	1000 bhp/2300 rpm
Take-off power	1200 bhp/2500 rpm
Rotation of crankshaft (from anti-propeller end)	Clockwise
Rotation of propeller (from anti-propeller end)	Clockwise
Propeller reduction gear ratio	.5625 (16:9)
Propeller shaft spline size	SAE No. 50
Average weight of engine	1308 lb.
Over-all length of engine	48.22 in.
Position of center of gravity:	
Distance aft of thrust nut front face	14.76 in.
Distance forward of rear face of mounting bosses	7.38 in.
Distance above center line of crankshaft	0.26 in.
Diameter of mounting bolt circle	23.37 in.
Number of mounting bolts	9
Over-all diameter of engine	55 1/8 in.
Ignition	
Magneto type	American-Bosch SF-9LU-3
Rotation of magneto drive (from anti-propeller end)	Clockwise
Magneto drive shaft speed, ratio to crankshaft	1.125
Spark plug gap	.012 in.

Spark plug type	LS87, LS465 or C35S
Spark timing--on No. 1 cylinder	
Left magneto (rear plugs)	20 deg.BTC
Right magneto (front plugs)	20 deg.BTC
Valves and Timing.	
Intake opens	15 deg.BTC
Intake closes	44 deg.ABC
Exhaust opens	74 deg.BBC
Exhaust closes	25 deg.ATC
Intake remains open, crank- shaft degrees	239 deg.
Exhaust remains open, crank- shaft degrees	279 deg.
Valve lift	.562 in.
Valve rocker clearance--cold	.010 in.
Timing clearance	.075 in.
Running clearance	.075 in.
Fuel system.	
Carburetor ,type	Bendix Stromberg Injection PD12H2
Fuel:	
Specification	AN-VV-F-781
Octane	100
Lubrication system	
Oil consumption:	
Rated Power:	(1000 bhp/2300 rpm)- Maximum 13.5 qt/hr
Cruising--70% Rated Power:	(700 bhp/2000 rpm)- Maximum 7.55 qt/hr
Grade of oil desired in flight--	
Specification	AN-VV-0-446
Oil pump drive shaft speed, ratio to crankshaft	1.125:1
Rotation of oil pump drive shaft (facing drive)	Counterclockwise

5. ENGINE OPERATING DATA (100 OCTANE FUEL)

Sea Level to 25000 ft.	Horse Power	RPM	Mixture	M.P. in Hg.	Fuel Cons.
Take Off and Maxi- mum Emergency	1200	2500	Auto Rich	46.0	140 gal/hr.
Maximum Continuous	1000	2300	Auto Rich	38.0	110 gal/hr.
Maximum Cruising	750	2000	Auto Lean	33.0	62 gal/hr.
Desired Cruising	670	2000	Auto Lean	30.5	52 gal/hr.
Minimum Cruising	600	1940	Auto Lean	28.5	44 gal/hr.

Note: Do not exceed 30" M.P. or 2100 rpm for continuous cruising in Auto-lean.

Engine Speed.

Max. (ground) 2000 r.p.m. (2500 r.p.m. for 30 sec.)

Max. overspeed 2760 r.p.m.

Take-off (5 min.) 2500 r.p.m.

Cylinder head temp.

Maximum (take off or military rated power 5 min.)

260° C.

Maximum - ground

205° C.

Maximum - cruising

205° C.

Oil Temperature.

Desired 70° C

Maximum 88° C

Oil Pressure

Desired 75 lb/ sq. in.

Maximum 80 lb/sq. in.

6. ENGINE OPERATING DATA (91 OCTANE FUEL)

	Horse Power	RPM	Mixture	M.P. in Hg.
Take off or Maximum conditions of operation	1100	2500	Full Rich	43.5
Normal rated power	900	2300	Auto-Rich	37
Maximum Cruising	675	2020	Auto-Rich	31
Desired Cruising	450	1500	Auto-Lean	28

7. TUBING COLOR CODE

Fuel	Red
Oil	Yellow
Oxygen Distribution Lines	Green
Oxygen Filler	Green-Yellow-Green
Airspeed Pitot Pressure	Black
Airspeed Static Pressure	Black-green
Glycol <i>Practone</i>	White-black-white
Manifold Pressure	White-blue
Vacuum	White-green
Fluid, Anti-icer	White-red
Hydraulic Oil Pressure	Blue-yellow-blue
<i>Low</i> Air Pressure Max. 20 psi	Lt. blue-Lt. green
Alcohol	Yellow-white
Propeller Feathering	Blue-yellow-blue
CO ₂ Fire Extinguisher	Brown
De-Icer	Lt. Blue-Lt. Green

8. CABLE COLOR CODE

Aileron and aileron trim tab:

Left up and right down --- White

Left down and right up --- White-black

Aileron and aileron trim tab:

Up----- Yellow

Down----- Yellow-black

Rudder and rudder trim tab:

Right----- Green

Left----- Green-black

Surface control locks:

Lock----- Red

Unlock----- Black-red

Servo cables----- White-white

Carburetor air:

Cold----- White-green

Hot----- White-black-green

Manifold pressure control:

Increase----- White-blue

Decrease----- White-black-blue

Mixture controls:

Automatic rich ----- Brown
Fuel cut-off ----- Brown-black

Throttle:

Open ----- Black-black
Close ----- Black-red-black
Cold and hot air
distributors ----- Blue-blue-yellow

Emergency bomb release:

Release ----- Red-white-red
Reset ----- Red-white-white

Emergency bomb door:

Release ----- Red-green-red

Life raft ----- Blue-black-blue

Propeller pitch ----- White-yellow

9. CABLE RIGGING LOADS FOR VARIOUS TEMPERATURES

All cable tensions given on system and control drawings in this section are based on a temperature of 70° F. The chart shown below will be found useful for adjustment of cables in climates where the above figure is impossible to obtain.

For adjustment of cables in temperatures beyond the range of this chart, multiply the difference in degrees from 70° F. by the figure given in Column "A". Add or subtract the result (depending on higher or lower temperatures) from the original cable tension based on 70° F.

Example:

Temperature = 20° F.

Cable = 3/16 - 7 x 19 extra flex.

Cable tension at 70° F. = 160 lbs.

Difference between 20° and 70° F. = 50°
 50° x 2.062 (Col. "A") = 103.100
 103 subtracted from 160 lbs. = 57
 57 = cable tension at 20° F.

RIGGING LOAD--Lb.

CABLE SIZE	" A "	30°	40°	50°	60°	70°	80°	90°	100°	110°
	2.062	138	179	189	199	220	241	261	282	302
	2.062	78	98	119	139	160	181	201	222	242
3/16"	2.062	58	78	99	119	140	161	181	202	222
-7x19	2.062	48	68	89	109	130	151	171	192	212
EXTRA	2.062	8	28	49	69	90	111	131	152	172
FLEX	2.062		18	39	59	80	101	121	142	162
	2.062		3	24	44	65	86	106	127	147
	.462	42	46	51	55	60	65	69	74	78
3/32"	.462	32	36	41	45	50	55	59	64	68
-7x7	.462	22	26	31	35	40	45	49	54	58
EXTRA	.462	2	6	11	15	20	25	29	34	38
FLEX	.462			1	5	10	15	19	24	28

10. CABLE TENSION

Aileron cable $3/16''$ - 7 x 19 - tension 160 lbs.
plus or minus 10 lbs.

Rudder cable $3/16''$ - 7 x 19 - tension 140 lbs.
plus or minus 10 lbs.

Elevator cable $3/16''$ - 7 x 19 - tension 150 lbs.
plus or minus 10 lbs.

Cable tensions are based on a balanced temperature condition of 21° C. (70° F.).

Tail wheel and surface lock control cables
 $3/32''$ - 7 x 7, tension 50 lbs. plus or
minus 10 lbs.

11. ANGULAR MOTION OF MOVABLE SURFACES.

Aileron trim tab - $15^{\circ} \pm 2^{\circ}$ - 1 13-16''

Rudder trim tab - $22^{\circ} \pm 2^{\circ}$ - 3.81''

Elevator trim tab - $22^{\circ} \pm 2^{\circ}$ - 4 15/16'' approx.

12. TIRE PRESSURE CHECKS.

Gage - main landing gear 55 lbs. to 70 lbs.

Gage - tail wheel - up to 55 lbs.

Inflation marks - tangent to ground line.

Rim - main landing gear - 9'' from bottom of
rim to ground line.

Rim - tail wheel - 5 1/8'' from bottom of rim
to ground line.

Rolling surface - main landing wheel - 22.3'' Rad.

Rolling surface - tail wheel - 10 1/8'' Rad.

13. LUBRICATION

Pinned joints, exposed universals, door hinges
and latches, splines, etc. Lubricate with air-
craft instrument and machine gun oil, U.S. Army
Spec. 2-27.

Zerk fittings - use low temperature lubricating
grease, Spec. AN-G-3 (sparingly).

Retracting screws - Inspect mechanism for dirt
and other foreign matter in lubricant, and for
sufficient lubrication. Where necessary clean

thoroughly and apply a light coat of low temperature lubricating grease, Spec. AN-G-3.

Encased universals - Clean thoroughly and lubricate with low temperature lubricating grease, Spec. AN-G-3 to $1/3$ capacity.

Gear boxes - Inspect representative gear boxes for loss of and general deterioration of the lubricant and for evidence of moisture. When necessary clean and re-lubricate to $1/3$ capacity with low temperature lubricating grease, Spec. AN-G-3.

Wheel bearings - Clean thoroughly and re-lubricate to $1/3$ capacity with grease, Spec. 3560, medium grade. For other unsealed bearings use grease, Spec. AN-G-3.

Flexible shafting - Disassemble, clean thoroughly and if exposed to low temperatures apply a light coat of grease, Spec. AN-G-3. If exposed to high temperatures (in engine section) use grease, Spec. 3560 medium grade.

14. HYDRAULIC SYSTEM TUBING SPECIFICATIONS

Size O.D.	Wall Thickness	Material	Spec.	Location
1/4"	.035"	52S0 Alum. Alloy	57-187-3	From restrictor to emergency pressure warning switch and pressure gage.
3/8"	.035"	52S0 Alum. Alloy	57-187-3	From emergency relief valve to restrictor fitting in line to the emergency pressure gage. From cowl flap selector valve to pressure gage and to 1/2" line leading to brake metering valves, and to cowl flap cyl.
1/2"	.035"	Copper	WW-T-799	From flexible hose to shuttle valve
1/2"	.042"	52SQ Alum. Alloy	57-187-3	All other tubing.

15. HYDRAULIC SYSTEM PRESSURE SETTINGS

Unit	On	Off	Open
Relief valve (power pump)			1100 ± 50 PSI
Pressure reg. switch	600 ± 25 PSI	800 ± 25 PSI 200 ± 50 PSI	
Main system warning light	525 ± 25 PSI		
Relief valve (filter)			28-30 PSI
Relief valve (system)			875 ± 25 PSI
Relief valve (cowl flap)			1200 ± 25 PSI

HYDRAULIC SYSTEM PRESSURE SETTINGS (Cont.)

Unit	On	Off	Open
Relief valve (emergency)			875 ± 25 PSI
Emergency warning light	700 ± 25 PSI	725 ± 25 PSI	
Accumulator Air Charge - 350 PSI			
Brake metering valve-- Adjust so clearance is 15/16" to 1" between the metering valve crosshead and shoulder of the valve body.			

NOTE: Pressure test the system at 1200 PSI. Use fluid, hydraulic Spec. AN-VV-0-366 or AN-VV-0-366A - According to temperatures encountered.

16. OXYGEN SYSTEM TUBING SPECIFICATIONS AND PRESSURE SETTING

Size O.D.	Wall Thickness	Material	Spec.	Location
5/16"	.035"	5250 Aluminum Alloy	57-187-3	All tubing

NOTE: Relief valve opens 450 ± 50 PSI
 Warning light on - 100 PSI
 Normal operating pressure of System - 400 PSI

17. CO₂ FIRE EXTINGUISHER SYSTEM TUBING SPECIFICATIONS

Size O.D.	Wall Thickness	Material	Spec.	Location
1/4"	.035 "	52S0 Alum. Alloy	57-187-3	Overboard lines from bottles.
1/2"	.042 "	52S0 Alum. Alloy	57-187-3	All other tubing

NOTE: On airplane No. 42-29932 and subsequent model
the engine fire extinguisher system has been
eliminated.

18. DE-ICER SYSTEM TUBING SPECIFICATIONS

Size O.D.	Wall Thickness	Material	Location
1/4"	.032"	2S 1/2 H. Aluminum Alloy	From pressure gage to main pressure line.
1/2"	.035"	2S 1/2 H. Aluminum Alloy	Drain line from oil separator to crankcase. From Boeing oil separator overboard.
5/8"	.042"	2S 1/2 H. Aluminum Alloy	From distributor to in-board de-icer shoes.
3/4"	.049"	2S 1/2 H. Aluminum Alloy	From distributor valve to check valve. From distributor valve to No. 4 bulkhead. From manifold at empennage to rudder and stabilizer From manifold in wings to 5/8" non-kink hose.

19. DE-ICER SYSTEM PRESSURE SETTING

Unit	Open
Suction Relief Valve	4 ± .25" Mercury
Pressure Relief Valve in Suction Line	2 PSI
Pressure Relief Valve in Pressure Line	9 PSI
Pressure Relief Valve Boeing Oil Separator	8 PSI

20. HEATING SYSTEM TUBING AND FLUID SPECIFICATIONS

Size O.D.	Wall Thickness	Material	Spec.	Location
1/4"	.032"	52SO Alum. Alloy	57-187-3	Vent Line From Reservoir
3/8"	.032"	Corrosive Resistant Steel	AN-WW-T-858	Between Heaters
3/4"	.049"	52SO Alum. Alloy	57-187-3	From Reservoir To Fire Wall
1/2"	.042"	52SO Alum. Alloy	57-187-9	All other Tubing

NOTE: Flexible hose Part Number 39G1030-8-16 used on pressure side of pump to firewall. Relief valve setting - 300 PSI

CAUTION: Use only solution of 55 percent diethylene glycol and 45 percent ethylene glycol.

21. EQUIPMENT INSTALLED IN LIFE RAFTS

The following accessories listed will be installed in each Type A-2, A-3 and E-2 life rafts carried on aircraft.

Government furnished.

Quantity	Nomenclature
3	Dye (tins)
1	Flash light
1	Battery (flash light)
1	Compass and match container
1	Shade and camouflage cloth
1	Sail and water catching cloth
1	Emergency kit (fishing tackle)
9 pkgs.	Emergency subsistence rations (5 dinner, 4 breakfast)
1	Scout knife
7	Cans of water
1	Police whistle
1	First aid kit
1	Pyrotechnic pistol and 5 distress signals

NOTE: When the pyrotechnic items are placed in the signal kit container, the folds in the top of the container will be cemented down with two coats of cement. The sealing strip will then be cemented down across the opening edge with two coats of rubber cement.

Contractor furnished.

Quantity	Nomenclature
1	Sea anchor
3	Oars
1	Hand pump with hose
1	Repair kit
1	Bailing bucket
3	Wood plugs for bullet holes
1	Container
40 ft.	75 lb. test cotton cord

22. INSTRUMENT RANGES (SAFE OPERATING LIMITS.)

Instrument	Maximum	Minimum	Operating Range
Air speed indicator	300 M.P.H.		
Tachometer	2500 R.P.M.		1600-2000 R.P.M.
Manifold pressure	46" Hg.		28-34" Hg.
Fuel pressure			12-16 lbs./sq.in.
Oil pressure	80 lbs./sq.in.	70 lbs./sq.in.	70-80 lbs./sq.in.
Cylinder temperature	250° C		25-200° C
Oil temperature	88° C.	60° C.	60-80° C
Carb. air temperature			15-35° C
De-icing pressure			8-10 lbs./sq.in.
Hydraulic pressure			600-800 lbs./sq.in.
Suction gage	4.25" Hg.	3.75" Hg.	4-4.25" Hg.

23. PRESSURE GAGES (TYPE RANGE AND ZERO TOLERANCES)

Instruments	Type	Operating Range	Zero Tolerance
Oil Pressure (Autosyn)	B-9 A	70-80 lb./sq.in.	± 5 lb./sq.in.
Fuel Pressure (Autosyn)	C-14A	12-16 lb./sq.in.	± 4 lb./sq.in.
Manifold Pressure	D-8 A	28-34" Hg.	± 4" Hg. of atmospheric
De-icing Pressure	G-2	8-10 lb./sq.in.	± 3 lb./sq.in.
Hydraulic Pressure	E-3	600-800 lb./sq.in.	± 40 lb./sq.in.

24. THERMOMETERS (TYPE, RANGE AND TOLERANCES)

C = 5/9 (F-32°)

F = 9/5 C + 32°

Instrument	Type	Operating Range	Zero Tolerance
Oil Temperature	A-24	60-80°C*	± 2° C
Free Air Temp.	C-11 C-13A		Zero Zero
Carburetor Air Temperature	F-10	15-35°C.	± 2° C
Cylinder Head Temperature	B-11	25-200° C**	Zero

* Maximum permissible oil temperature is 88° C.

** Maximum permissible cylinder head temperature 250°C.

25. GYRO AND PITOT STATIC INSTRUMENTS, TYPE, TUBE SIZE AND TOLERANCE

All instruments use Parker 811 fittings for connections.

Instrument	Type	Size Tubing	Zero Tolerance
Airspeed	D-7	1/4" O.D.	± 2 mph
Rate of Climb	A-7	1/4" O.D.	Zero
Altimeter	C-12	1/4" O.D.	Zero
Bank and Turn	A-11	1/4" O.D.	±1/64"
Magnitude of Turn	AN-5735-1	3/8" O.D.	
Flight Indicator	AN-5736-1	3/8" O.D.	±1/64"
Suction Gage	F-4	1/4" O.D.	± .1" Hg.

26. SERVICING FUEL SYSTEM.

- | | |
|---------------------|---|
| a. Grade | 100 octane |
| b. Substitute grade | 91 octane (only in extreme emergencies) |
| c. When to service | Before storing aircraft for the night. |
| d. Quantity | B-17E without bombay tanks - 1710 gals.
B-17E with bombay tanks - 2490 gals.
B-17F with bombay tanks - 3570 gals. |

27. SERVICING SUPERCHARGER OIL SYSTEM

- | | |
|------------------------|--|
| a. Grade. | Above 15°F Spec. AN-VV-0-446
Grade 1065
Below 15°F Hydraulic fluid
Spec. AN-VV-0-366A |
| b. When To Service. | Same time that external oiling system is serviced. |
| c. Quantity. | Capacity of tanks 1 1/2 gals.
Fill tanks full. |
| d. When to Change oil. | Only when oil becomes dirty or when supercharger fails. |

28. SERVICING ENGINE OIL SYSTEM

Grade Designation	Commercial Grade	Air Temp.	Safe Max.	Safe Min.
Spec. AN-VV-0-466	Substitute	At ground	Oil in	Oil in
A.C. 1100	SAE 50	(20° to 80°F.	85°C(185°F)	10°C(50°F)
A.C. 1120	SAE 60	Above 4°C(40°F)	95°C(203°F)	20°C(68°F)

42.

When to service

Before storing aircraft at night.

Quantity

Fill tanks so that liquid oil shows in filler neck.

When to change oil

At engine change or at failure of engine.

29. GENERATOR BRUSH LENGTH AND BRUSH SPRING TENSION

Generator Type	Brush Length		Minimum Brush Spring Tension
	New	Minimum	
0-1, Leece-Neville	3/4"	1/2"	32-40 oz.
0-1, Delco-Remy	1-1/16"	3/4"	42-30 oz.
P-1, Delco-Remy	1-1/16"	3/4"	40-52 oz. (on spring arm)
P-1, General Electric		3/4"	16-24 oz.
P-1, Westinghouse		3/4"	26-36 oz.
P-2, Eclipse		3/4"	60-62 oz.

30. STARTER BRUSH LENGTH AND BRUSH SPRING TENSION

Type of Starter	Brush Length		Spring Tension
G-6 Eclipse	New 1/2"	Minimum 5/16"	Raised above brush box 1/8"
JH3R Jack and Heintz		1/16" of pigtail rivet	Tension 24-28 oz.

31. TORQUE VALUES. --STANDARD STUDS, BOLTS, SCREWS, AND CAPSCREWS

	Size	Driving Stud		Tightening Nut Screw or Capscrew	
		Min. In. Lb.	Max. In. Lb.	Min. In. Lb.	Max. In. Lb.
Button head Screw	10-32	-	-	20	25
Button head Screw	12-24	-	-	25	30
Studs, bolts screws, capscrews	10-32	-	-	35	40
Capscrews	12-24	-	-	45	50
Capscrews	1/4-28	50	70	80	85
Capscrews	5/16-24	100	150	160	175
Capscrews	3/8-24	200	275	225	250
Capscrews	7/16-20	300	425	350	375
Capscrews	1/2-20	500	700	550	600
Capscrews	9/16	750	975	825	875
Capscrews	5/8-18	1100	1400	1125	1200

32. TORQUE VALUES FOR SPECIAL APPLICATIONS

	Size	Driving Stud		Tightening Nut Screw or Capscrew	
		Min. In. Lb.	Max. In. Lb.	Min. In. Lb.	Max. In. Lb.
Cylinder hold-down stud	3/8-24	325	450	350	375
Cylinder hold-down capscrew	7/16-20	-	-	375	400
Cylinder hold-down stud	7/16-20	400	550	425	450
Rocker hub bolt	7/16-20	-	-	250	325
Rocker hub bolt	15/32-20	-	-	250	325
Rocker hub bolt	9/16-18	-	-	300	375
Spark plug	18 mm	-	-	300	360
Valve clear. Adjusting screw lock screw (with tapered head)				135	150
Propeller shaft thrust bearing nut.					600 ft lbs.

33. RIVET SPECIFICATIONS.

TYPE	ALUMINUM ALLOY	IDENTIFICATION	DRIVING PROCEDURE
A	2S	Plain head	Drive as received, do not heat treat.
AD	A17S	Depression in head	Drive as received, do not heat treat.
D	17S	Raised tit in center of head	Heat treat, place in ice box, drive within one hour after removal.
DD	24S	Raised tit on each side of head	Heat treat, place in ice box, drive within 20 minutes after removal.

DRILL SIZES FOR RIVETS.

RIVET DIAMETER	DRILL SIZES	DECIMAL EQUIVALENTS
1/16"	51	.067
3/32"	40	.098
1/8"	30	.1285
5/32"	20	.161
3/16"	10	.1935
1/4"	F	.257
5/16"	0	.316
3/8"	V	.377

34. SHEET METAL GAGES

Aluminum Alloy Decimals of an inch	Stubs Wire Gage (S.W.G.)
.016"	27
.020"	25
.025"	23
.032"	21
.040"	19
.051"	17
.064"	16
.072"	15
.081"	14
.094"	13
.102"	12
.125"	10
.156"	8
.188"	6
.250"	3
.313"	0
.375"	00

NOTE: Refer to T.O. 01-20E-3, Pages 6 to 9 for skin thickness at any specific location on the airplane. When making a patch always use sheet metal of the same thickness as the material being patched, and of the same alloy specifications.

35. DECIMAL EQUIVALENT OF DRILL SIZES

Size	Decimal Equivalent	Size	Decimal Equivalent
1/2	0.500"	K	0.281"
31/64"	0.4943"	J	0.277"
15/32"	0.4687"	I	0.272"
29/64"	0.4531"	H	0.266"
7/16	0.4375"	17/64"	0.2656"
27/64"	0.4218"	G	0.261"
Z	0.413"	F	0.257"
13/32"	0.4062"	E-1/4"	0.250"
Y	0.404"	D	0.246"
X	0.397"	C	0.242"
25/64"	0.3906"	B	0.238"
W	0.386"	15/64"	0.2343"
V	0.377"	A	0.234"
3/8"	0.375"	1	0.228"
U	0.368"	2	0.221"
23/64"	0.3593"	7/32"	0.2187
T	0.358"	3	0.213"
S	0.348"	4	0.209"
11/32"	0.3437"	5	0.2055"
R	0.339"	6	0.204"
Q	0.332"	13/64"	0.2031
21/64"	0.3281"	7	0.201"
P	0.323"	8	0.199"
O	0.316"	9	0.196"
5/16"	0.3125"	10	0.1935"
N	0.302"	11	0.191"
19/64"	0.2968"	12	0.189"
M	0.295"	3/16"	0.1875"
L	0.290"	13	0.185"
9/32"	0.2812"	14	0.182h

DECIMAL EQUIVALENT OF DRILL SIZES (Con't)

Size	Decimal Equivalent	Size	Decimal Equivalent
15	0.180"	41	0.096"
16	0.177"	3/32 "	0.0937"
17	0.173"	42	0.0935"
11/64 "	0.1718"	43	0.089"
18	0.1695"	44	0.086"
19	0.166"	45	0.082"
20	0.161"	46	0.081"
21	0.159"	47	0.0785"
22	0.157"	5/64 "	0.0781"
5/32 "	0.1562"	48	0.076"
23	0.154"	49	0.073"
24	0.152"	50	0.070"
25	0.1495"	51	0.067"
26	0.147"	52	0.0635"
27	0.144"	1/16 "	0.0625"
9/64 "	0.1406"	53	0.0595"
28	0.1405"	54	0.055"
29	0.136"	55	0.052"
30	0.1285"	3/64 "	0.0468"
1/8 "	0.125"	56	0.0465"
31	0.120"	57	0.043"
32	0.116"	58	0.042"
33	0.113"	59	0.041"
34	0.111"	60	0.040"
35	0.110"	61	0.039"
7/64 "	0.1093"	62	0.038"
36	0.1065"	63	0.037"
37	0.104"	64	0.036"
38	0.1015"	65	0.035"
39	0.0995"	66	0.033"
40	0.098"	1/32 "	0.0312"

DECIMAL EQUIVALENT OF DRILL SIZES (CON'T)

Size	Decimal Equivalent
67	0.032 ⁱ
68	0.031 ⁱ
69	0.029 ⁱ
70	0.028 ⁱⁱ
71	0.026 ⁱⁱ
72	0.025 ⁱⁱ
73	0.024 ⁱⁱ
74	0.0225 ⁱⁱ
75	0.021 ⁱⁱ
76	0.020 ⁱⁱ
77	0.018 ⁱⁱ
1/64 ⁱⁱ	0.0156 ⁱⁱ
78	0.016 ⁱⁱ
79	0.0145 ⁱⁱ
80	0.0135 ⁱⁱ

36. SCREW AND BOLT SIZES

Size	Decimal Equivalent	Nearest Fraction
#0	.0600"	1/16"
#1	.0730"	5/64"
#2	.0860"	3/32"
#3	.0990"	3/32"
#4	.1120"	7/64"
#5	.1250"	1/8"
#6	.1380"	9/64"
#8	.1640"	5/32"
#10	.1900"	3/16"
1/4"	.2500"	
5/16"	.3125"	
3/8"	.3750"	
7/16"	.4375"	
1/2"	.5000"	
9/16"	.5625"	
5/8"	.6250"	
3/4"	.7500"	
7/8"	.8750"	
1"	1.0000"	

37. DIMENSIONS OF TUBE FLARES AND MAXIMUM WRENCH TORQUE (AC-810 and AC-811)

Size Number	Tube O.D.	Flare O.D.		Maximum Wrench Torque (inch - pounds)	
		Minimum	Maximum	Aluminum Alloy Tube and Fittings	Copper Tube, Brass Fittings
3	3/16	.296	.311	40	40
4	1/4	.343	.358	70	70
5	5/16	.406	.421	100	100
6	3/8	.469	.484	125	125
7	7/16	.531	.546	175	175
8	1/2	.640	.655	200	200
10	5/8	.765	.780	350	325
12	3/4	.921	.936	500	450
16	1	1.171	1.186	750	600

38. AMERICAN NATIONAL TAPER PIPE THREAD

Nominal Size of Pipe (inches)	Threads per inch	Outside Diameter of Pipe (inches)		Pipe Reamer Size (inches)
		Decimal	Nearest Common Fraction	
1/8	27	0.405	13/32	0.327
1/4	18	0.540	35/64	0.4225
3/8	18	0.675	43/64	0.5572
1/2	14	0.840	27/32	0.6879
3/4	14	1.050	1 3/64	0.8972
1	11 1/2	1.315	1 5/16	1.1278
1 1/4	11 1/2	1.660	1 21/32	1.4714
1 1/2	11 1/2	1.900	1 29/32	1.7103

AMERICAN (NATIONAL) SCREW THREAD SERIES (CON'T)

NATIONAL COARSE THREAD SERIES MEDIUM FIT, CLASS 3, (NC)				NATIONAL FINE THREAD SERIES MEDIUM FIT, CLASS 3 (NF)			
Size and Threads	Dia. of body for thread- ing	Tap Pref'd dia. of hole	Drill Nearest Stand'd Drill	Size and Threads	Dia. of body for thread- ing	Tap Pref'd Dia. of hole	Drill Nearest Stand'd Drill Si.
5/8-11	.625	.5315	17/32"	5/8-18	.625	.568	9/16"
3/4-10	.750	.6480	41/64"	3/4-16	.750		11/16"
7/8-9	.875		49/64"	7/8-14	.875		51/64"
1-8	1.000		7/8"	1-14	1.000		59-64"

40. CORRESPONDING TUBE AND PIPE THREAD SIZES FOR TRIPLE TYPE SOLDERLESS FITTINGS

Fitting Size Number	2	3	4	5	6	7	8	10	12	14	16
Tube O.D.	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
Pipe Thread	1/8	1/8	1/8	1/8	1/4	1/4	3/8	1/2	3/4	3/4	1

41. METALS AND RECOMMENDED SOLDERING FLUX

Metal	Flux	Type	Remarks
Aluminum	Stearine	Non-corrosive	
Brass	Rosin	Non-corrosive	Use on electrical connections and wire
Copper	Rosin	Non-corrosive	
Lead	Rosin, tallow or stearine	Non-corrosive	
Tin	Rosin	Non-corrosive	
Iron and Steel	Zinc Chloride	Corrosive	Never use on electric wire or connections
Zinc	Zinc Chloride	Corrosive	
Galvanized Iron	Zinc Chloride	Corrosive	

42. LUBRICANTS FOR DIE THREADING AND TAPPING

Material	Lubricant	Remarks
Mild steel	Lard oil	
Cast iron	Soap compound or Soda water	May be ac- complished dry
Bronze and Brass		Dry
Aluminum	Kerosene	

43. INSPECTION PERIODS

Inspection	Type of Inspection	When accomplished	Symbols if not made	How long without
PRE-FLIGHT	Instruments, controls auxiliary systems and power plant for proper functioning of plane and fastening of cowling, fuel caps, etc.	Prior to first flight of the day and for all transient aircraft	Red dash	6 days
DAILY	General condition of airplane and engine	Each flying day	Red dash	6 days
25 HOUR	Thorough and searching, includes the pre-flight and daily	Between 20th and 30th hour after last 50 hour inspection	Red dash 25th hour-- Red diagonal after 30th hour.	1 month

INSPECTION PERIODS (CON'T)

Inspection	Type of Inspection	When accomplished	Symbols if not made	How long without
50 HOUR	Includes pre-flight daily and 25 hour. Complete thorough and searching inspection	Between 40th and 50th hour after last 50 hr. inspection	Red dash after 50th hour, Red diagonal after 60th hr	3 months
100 HR, 200 HR AND 300 HOUR	Special inspection.	Concurrently with 50-hour inspection	Same symbol as applies to 50-hr. inspection.	3 months
ENGINE CHANGE	Special inspections and maintenance work	Each time an engine is changed		
25 HOURS AFTER ENGINE CHANGE	Engine shakedown inspection	Between 20th and 30th flying hours after engine change	Red dash after 25th hr. - Red diagonal after 30th hr.	
WEEKLY & DAILY	Battery check	Weekly & Daily	Red Dash	

44. FORM SYMBOLS

SYMBOLS	COLUMN	EXPLANATION OF SYMBOLS
Red Cross	X	Major defects or unsatisfactory condition. This symbol grounds the airplane until defects are corrected.
Red Diagonal	/	Minor defect. "Exceptional release" must be signed before airplane can be flown.
Red Dash	-	Required inspection not made. Requires "Exceptional release."
Red symbol with small numeral added	X 2 /3	Indicates more than one defect in column. Small numeral indicates total defects in column regardless of predominating symbol. Predominating symbol will always indicate most serious defect.

FORM SYMBOLS (CON'T)

SYMBOLS	COLUMN	EXPLANATION OF SYMBOLS
Black last name initial	H	Inspection made condition satisfactory, except column No's 10, 19, and 30, which indicates "Inspection Performed" but not the results thereof.
Black last name initial with circle	Ⓜ	Indicates "Greased or Oiled except in column 46 which indicates "Water Added to Battery"
Black Dash	—	Inspection today not required
Vertical black line through column		Indicates this column "Not Applicable."

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