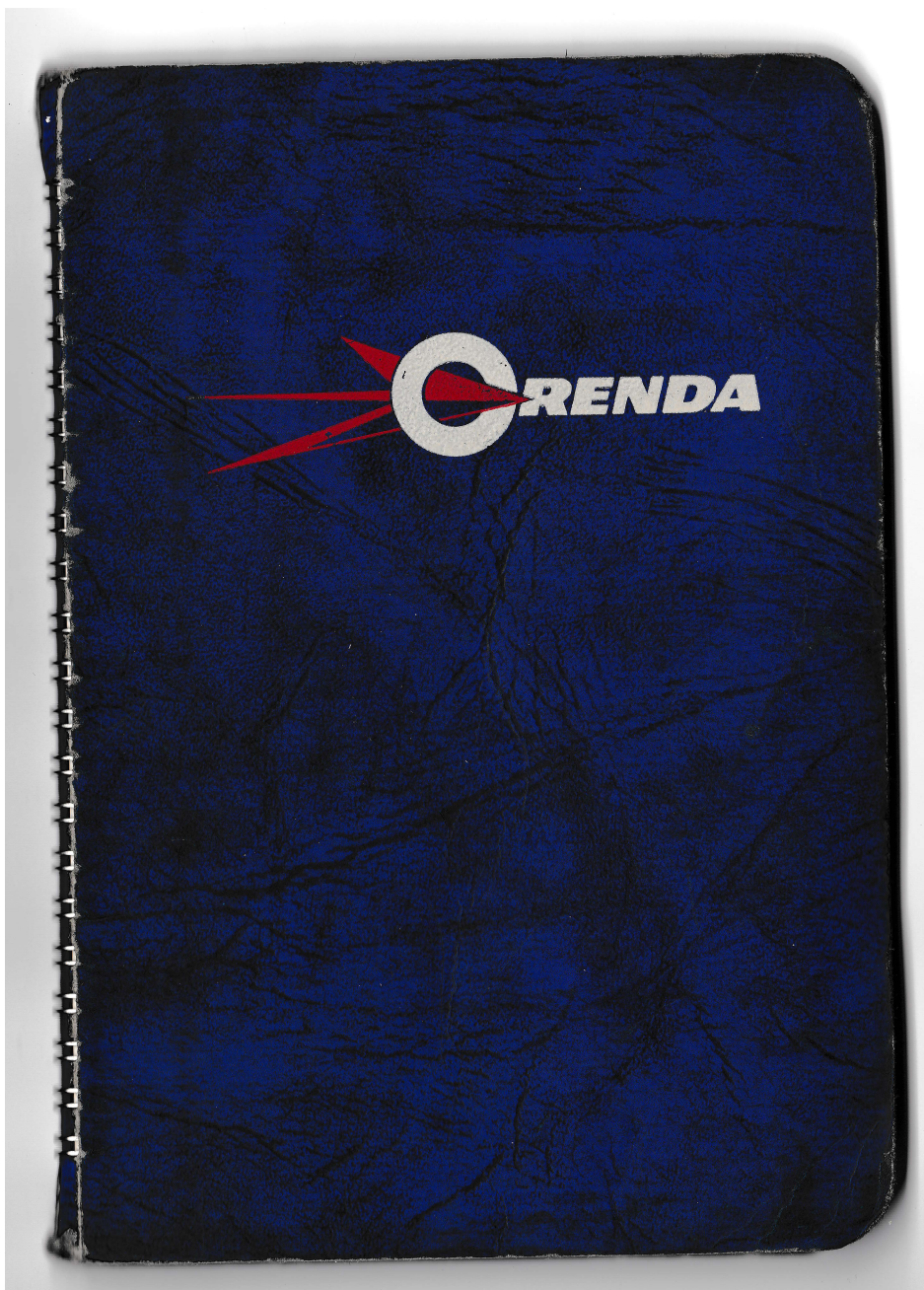




ORENDA

POCKET HANDBOOK

PRESENTED
WITH THE COMPLIMENTS
OF

ORENDA ENGINES LIMITED
MALTON ONTARIO

TO

NAME *P. D. Morgan*

HOME ADDRESS *45. Harney Ave*

Toronto

TELEPHONE NO. *RO-6-6253*

BUSINESS ADDRESS *Orenda Engines Ltd*

Dept 2.110

TELEPHONE NO. *BO-6-4911 Local 378*

IN CASE OF ACCIDENT OR SERIOUS
ILLNESS PLEASE NOTIFY:

MR. MRS. MISS

ADDRESS

TELEPHONE NO.

PRINTED IN CANADA

OESS108

1st Jan 56

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INTRODUCTION

The information contained in this pocket book will not be amended, therefore the publication should only be used for general reference purposes. More detailed official publications are issued to people concerned with the servicing, maintenance, and overhaul of Orenda engines.

ORENDA ENGINES LIMITED
Malton, Ontario

MAIL
Box 4015, Terminal 'A'
Toronto, Ontario
Canada

PHONE
CHerry 1-2681
CABLES
"Orenda"

RCAF ENGINEERING ORDERS FOR ORENDA ENGINES

RCAF ENGINEERING ORDERS FOR OREND A ENGINES

1 RCAF Engineering Orders covering Orend a turbojet engines and proprietary purchased units which are Orend a components are listed in the following summary.

2 Copies of the listed Engineering Orders may be obtained from: Air Officer Commanding,
AMCHQ,
No 1 Publications Depot,
RCAF Rockcliffe,
OTTAWA, Ontario.

3 Approved Engineering Orders which have not yet been issued but which are expected to be available at an early date have been included.

EO Title Engine Manuals	EO Number	
Description and Maintenance Instructions - Orend a 2, 8, 9 Part List - Orend a 2, 8, 9	10B-10A-2 10B-10A-4	
Description and Maintenance Instructions - Orend a 10 Part List - Orend a 10	10B-10B-2 10B-10B-4	
Description and Maintenance Instructions - Orend a 11 Part List - Orend a 11	10B-10AA-2 10B-10AA-4	
Description and Maintenance Instructions - Orend a 14 Part List - Orend a 14	10B-10BA-2 10B-10BA-4	
Repair and Overhaul Instructions Volume 1 - Orend a 8, 9, 10 Volume 2 - Orend a 11, 14	10B-10-3 10B-10-3	
Preservation, Storage, Handling and Shipping Instructions - Orend a Engines	10B-10-9	

EO Title Proprietary Part Manuals	EO Number	
AIRCRAFT ACCESSORIES GEARBOX (Avro) 74087	15-110A-2	
ALCOHOL FILTER (Vokes) - CAL-1-1223	15-80NA-2	
ALCOHOL PUMP (Weldon) - 5009B	15-80EB-2	
AUTOMATIC DUMP VALVE (Lucas-Rotax) - DV2/2B	15-15KB-2	
AUTOSYN PRESSURE TRANSMITTER (Eclipse-Pioneer) - 7500-1-A5-3A	20-70FFC-2	
AUTOSYN PRESSURE TRANSMITTER (Eclipse-Pioneer) - 7502-15-A5-1	20-70FFA-2	
CAPACITOR DISCHARGE SURFACE IGNITION SYSTEM (GLA) - 8600	15-5HA-2	
CHECK VALVE (Kohler) - K/1253-4-5	15-80L-2	
CIRCLE SEAL RELIEF VALVE (James-Pond-Clark) - 859A-4TT-29 & -32	15-80MA-2	
ELECTRIC STARTER (Jack & Heintz) - D26-2, D26-3	40-70CD-2	
EMERGENCY FLOW CONTROL UNIT (Lucas) - EC2/1	15-15KE-2	
FUEL PRESSURE WARNING UNIT (Eclipse-Pioneer) - 3135-13-C-30	20-120DC-2	
G/T DUPLEX "3" BURNER (Lucas) - CSH35	15-20GA-2	
G/T FLOW DISTRIBUTOR (Lucas) - FD1001/16F & FD1000/16F	15-15KA-2	

EO Title Proprietary Part Manuals (Cont)	EO Number	
G/T FUEL CONTROL UNIT (Bendix) - TJ-S1, TJ-S2, TJ-S3	15-15AA-2	
G/T FUEL PUMPS (Lucas-Rotax) - GC229/22P, GC230/23P	15-75KA-2	
G/T TEMPERATURE LIMITER (Hamilton Standard)-JFC-19	40-100DA-2	
IGNITION SYSTEM (Bendix-Scintilla) - TGLN4	15-5L-2	
MINIMUM PRESSURE AND DUMP VALVE (Lucas) - MPDV 1002/2A	15-15KF-2	
OIL COOLER (AiResearch) - 87059	15-25CA-2	
OIL DRAIN VALVE (Val Aero) - Part No. 2800	15-25QA-2	
OIL FILTER (Bendix-Skinner) - 566576	15-25MA-2	
OIL LUBRICATING PUMPS (Nichols) -GC-448, GC-625	15-25HA-2	
PILOT OPERATED SHUT-OFF VALVE (General Controls) - Part AV-9C1117E	15-100SB-2	
PRENCO DRAIN VALVE (Kohler) - 29802	15-25NA-2	
PRENCO DRAIN VALVE (Kohler) - 7201 & 7021	15-25NB-2	
PROPORTIONAL FLOW CONTROL UNIT (Lucas) - 1001/1A	15-15KD-2	
PRESSURE ACTUATED SWITCH (Meletron) - 410-16-183	40-45PB-2	
SCAVENGE OIL PUMPS (Nichols) - GC-376-1, GC-376-2	15-25HB-2	
STARTER-GENERATOR (Delco) - A8583, A8587	40-70EB-2	
TACHOMETER GENERATOR (G.E.) - 2CM9AAC-2	20-65BAA-2	
TORCH IGNITER REDUCING VALVE (Lucas) - RV5/5C	15-15KC-2	

LEADING PARTICULARS
AND ENGINE ILLUSTRATIONS

LEADING PARTICULARS

GENERAL

DRY WEIGHT

Orenda 8	2650 lb maximum
Orenda 9	2560 lb maximum
Orenda 10	2540 lb maximum
Orenda 11	2455 lb maximum
Orenda 14	2430 lb maximum

DIRECTION OF ROTATION

Orenda 8, 9, 10, 11, 14	Counter-clockwise viewed from the rear
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COMPRESSOR

Orenda 8, 9, 10, 11, 14	Axial flow, 10-stage
-------------------------	----------------------

COMBUSTION

Orenda 8, 9, 10, 11, 14	Six straight-through chambers
-------------------------	-------------------------------

TURBINE

Orenda 8, 9, 10	Axial flow, single-stage
Orenda 11, 14	Axial flow, 2-stage

FUEL SYSTEM

BURNERS

Orenda 8, 9, 10, 11, 14	Lucas Duplex "3"
-------------------------	------------------

FLOW DISTRIBUTOR

Orenda 8, 9, 10, 11, 14	Lucas
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HP PUMPS

Orenda 8, 9, 10, 11, 14	Lucas-Rotax (2 per engine)
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FUEL CONTROL UNIT

Orenda 8	Bendix TJ-S1
Orenda 9, 10	Bendix TJ-S2
Orenda 11	Bendix TJ-S3
Orenda 14	Lucas-Rotax Proportional

TYPE OF FUEL

Orenda 8, 9, 10	3-GP-22 (MIL-F-5624, Grade JP3)
Orenda 8, 9, 10, 11, 14	3-GP-22A (MIL-F-5624A, Grade JP4)

LEADING PARTICULARS (Cont)

Orenda 8, 9, 10, 11, 14	3-GP-23 A (MIL-F-5616, Grade JP1)
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Orenda 8, 9, 10, 11, 14	* 3-GP-25B (100/130 Octane) (MIL-F-5161B) Wide range referee fuel
-------------------------	---

* Maximum 25 Flying Hours

Engine operation with aircraft booster pumps inoperative is limited to 30 minutes

MINIMUM FUEL PRESSURE

Orenda 8, 9, 10, 11, 14	3 psi (cockpit warning light out)
-------------------------	-----------------------------------

MAXIMUM FUEL TEMPERATURE

Orenda 8, 9, 10, 11	43°C (109.4°F)
Orenda 14	91°C (195.8°F)

MINIMUM FUEL TEMPERATURE

Orenda 8, 9, 10, 11, 14	-40°C (-40°F)
-------------------------	---------------

OIL SYSTEM

TYPE OF SYSTEM

Orenda 8, 9, 10, 11, 14	Dry Sump
-------------------------	----------

TYPE OF OIL

(Normal conditions)	MIL-O-6081B Grade 1010
(Sub-zero conditions)	MIL-O-6081B Grade 1005

OIL TANK CAPACITY

Orenda 8	Normal 13.5 Imp pt (16.2 US pt) Minimum 9.5 Imp pt (11.4 US pt)
Orenda 9, 11	Normal 17.3 Imp pt (20.76 US pt) Minimum 7.7 imp pt (9.24 US pt)
Orenda 10, 14	See Airframe Manual

LEADING PARTICULARS (Cont)

MAXIMUM OIL TEMPERATURE

Orenda 8, 9, 10, 11, 14 70°C (158°F Ring Main)

MINIMUM OIL TEMPERATURE

Orenda 8, 9, 10, 11, 14 -40°C (-40°F)

OIL PRESSURE

Orenda 8, 9, 10, 11, 14
(Maximum) 20 $\pm$ 5 psi at 7250 rpm
(Minimum) 2 psi at idling rpm

MAXIMUM OIL CONSUMPTION

Orenda 8, 9, 10 2 Imp (2.4 US) pt/hr
Orenda 11, 14 1.5 Imp (1.8 US) pt/hr

STARTING SYSTEM

TYPE OF SYSTEM

Orenda 8, 9, 11 Jack and Heintz Electric
Starter Motor
Orenda 10, 14 Delco Electric Starter-
Generator

IGNITION SYSTEM

TYPE OF SYSTEM

Orenda 8, 9, 10 GLA High Intensity Capa-
citor discharge
Orenda 11, 14 Bendix Scintilla, High
Intensity

TORCH IGNITERS

Orenda 8,9,10 Avro (1 per engine) fed
through a reducing valve
from the HP line

IGNITER PLUGS

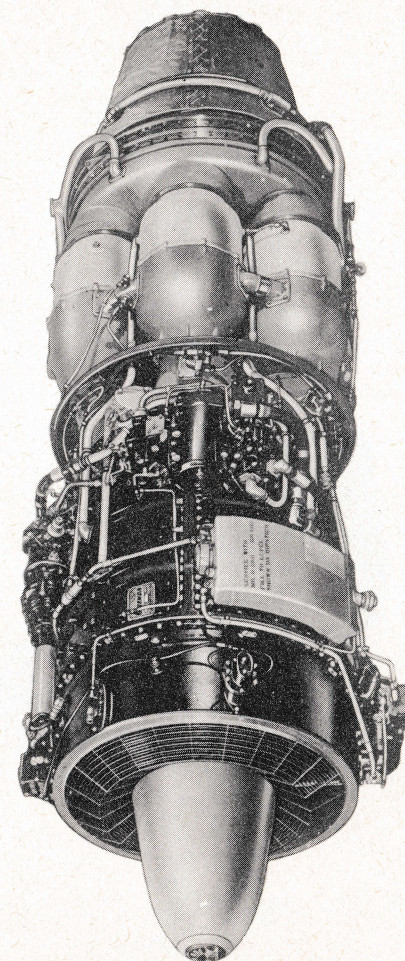
Orenda 8,9,10 GLA (one short & one long
reach plug per engine)
Bendix Scintilla
Orenda 11,14 (2 per engine)

LEADING PARTICULARS (Cont)

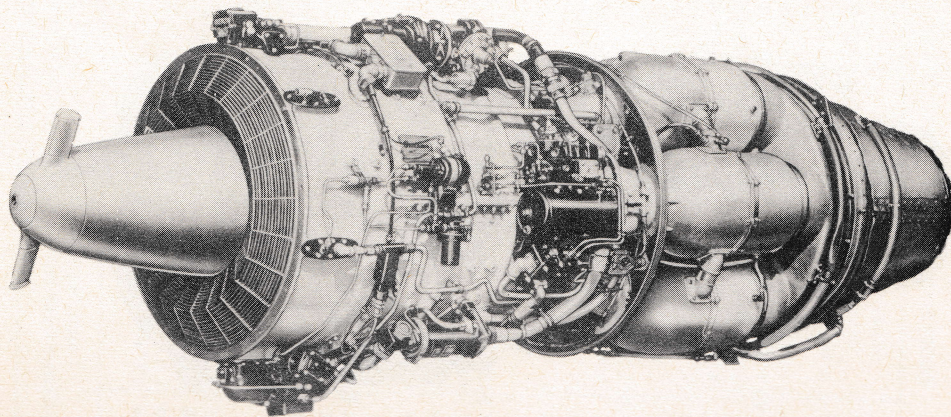
AUXILIARIES

Auxiliary	Qua- ntity	Engine Model	Location	Rotation *	Speed **
Fuel Pumps	2	8, 9, 10, 11, 14	Rear of aux- iliaries G/B	c-c	0.519
Lube and Scavenge Pump	1	8, 9, 11 10, 14	RH side of oil pump G/B Rear of oil pump G/B	c-c c-c	0.535 0.433
Auxiliary Scavenge Pump	1	8, 9, 11 10, 14	LH side of oil pump G/B Front of oil pump G/B	c c	0.535 0.433
Tacho- Genera- tor	1	8 9 10, 11, 14	RH side of Bevel drive G/B Front LH side of auxiliaries G/B "	c c-c c-c	0.500 0.537 0.538
Hydraulic Pump G/B	1	10, 14	Front RH side of auxiliaries G/B	c	0.492
* Direction of Rotation facing mounting pad on engine - clockwise or counter-clockwise ** Speed of Rotation relative to Compressor shaft					

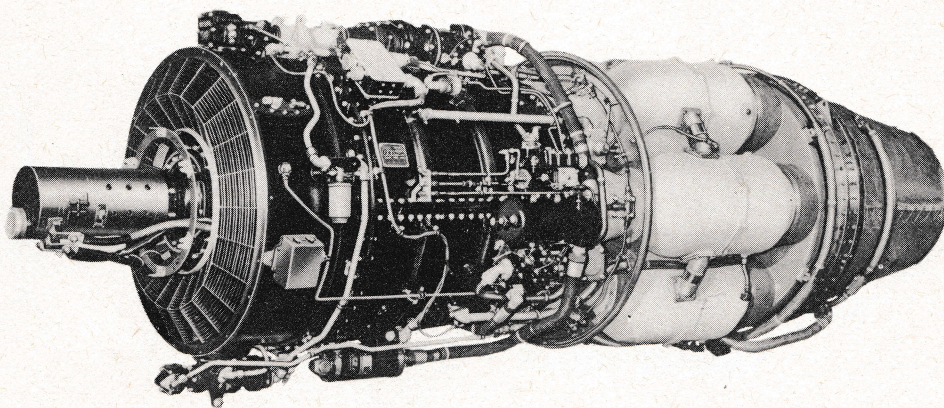
LEADING PARTICULARS (Cont)					
MAIN OPERATION LIMITATIONS					
S e r i e s	Rating	rpm	Max Thrust lb	Maximum Exhaust Temperature **	Time Limit
8	Max	7800	6355	720°C(1328°F)	§ 15 mins
	Military	7600	5870	690°C(1274°F)	30 mins
	Normal	7250	*5020	645°C(1193°F)	none
	Idle	2750 ±100	325	645°C(1193°F)	none
9	Max	7800	6355	720°C(1328°F)	§ 15 mins
	Military	7600	5870	690°C(1274°F)	30 mins
	Normal	7250	*5020	645°C(1193°F)	none
	Idle	2750 ±100	325	645°C(1193°F)	none
10	Max	7800	6355	720°C(1328°F)	§ 15 mins
	Military	7600	5870	690°C(1274°F)	30 mins
	Normal	7250	*5020	645°C(1193°F)	none
	Idle	2750 ±100	325	625°C(1157°F)	none
11	Max	7800	7275	715°C(1319°F)	§ 15 mins
	Military	7600	6600	685°C(1265°F)	30 mins
	Normal	7250	*5460	625°C(1157°F)	none
	Idle	2900 ±150	350	545°C(1013°F)	none
14	Max	7800	7275	720°C(1328°F)	§ 15 mins
	Military	7600	6600	685°C(1265°F)	30 mins
	Normal	7250	*5460	620°C(1148°F)	none
	Idle	2850 ±200	350	540°C(1004°F)	none
* May occur at speeds up to 7350 rpm.					
** At sea level static, ICAN standard conditions.					
§ 5 minutes, aircraft on ground.					



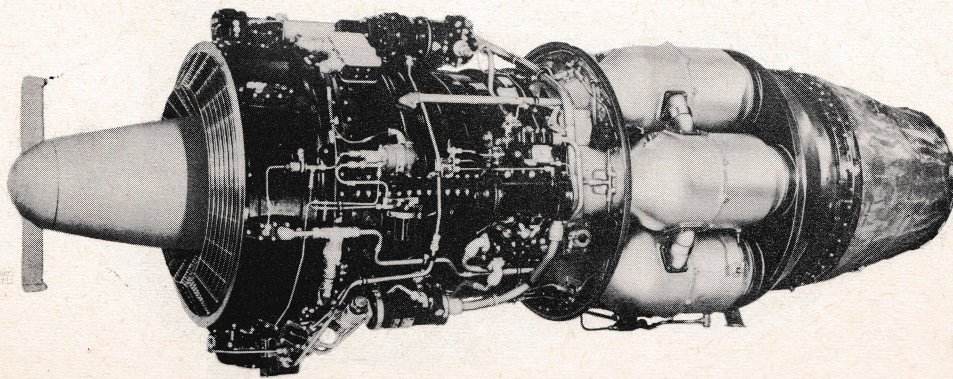
ORENDA 8



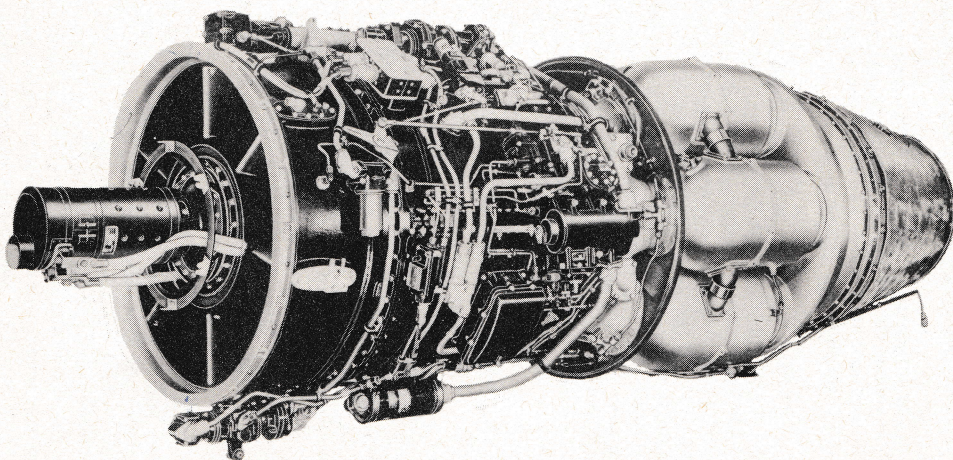
ORENDA 9



ORENDA 10



ORENDA 11



ORENDA 14

VISUAL DIFFERENCES IN ORENDA MODELS

1 The following points of difference are readily discernable on ORENDA engine models. All references to the port and starboard sides of the engine are as viewed from the rear of the engine.

2 ORENDA 8 - Three point mounting: two centre casing mounting trunnions and a rear mounting strut affixed to the backbone casing. Bendix fuel control unit incorporating throttling control, acceleration control, cylindrical LP filter, separate levers for HP shut-off cock and throttle. Torch igniter installed in the inter-connector between No. 5 and No. 6 combustion chambers. Plain nose fairing. Oil tank mounted on lower quarter of port and starboard sides of the compressor casing on left-hand and right-hand engines respectively. Two waste air manifolds around the top and bottom of the nozzle box, each having a separate outlet. Four vaned exhaust cone bullet. Engines are handed. Installed in CF100.

3 ORENDA 9 - Unhanded version of the Orenda 8. Nose fairing incorporates an anti-icing alcohol spinner. Oil tank is mounted on the starboard upper quarter of the compressor casing. Anti-icing equipment is mounted on port side of the compressor casing. Bendix fuel control unit has single HP cock and throttle lever. Single waste air manifold with an outlet below the nozzle box. Mounting details same as Orenda 8. Installed in CF100.

4 ORENDA 10 - Similar to Orenda 9 but with no oil tank and no nose fairing. Delco starter-generator has starter and generator terminal connections at No. 3 and No. 5 intake casing struts respectively. Oil pumps are mounted fore and aft on the oil pump gearbox. Two guide rollers are mounted at the bottom centre of the oil pump gearbox. Aircraft hydraulic pump gearbox is mounted on the auxiliaries gearbox. Three point

mounting: upper two centre casing mounting trunnions and a mounting bracket at the top centre of the intake and compressor casing mating flanges. Engines are unhanded. Installed in Sabre 5.

5 ORENDA 11 - Clean-line nozzle box: no waste air manifold and cooling air pipes located externally around the nozzle box and exhaust cone. Waste air outlet at the bottom of the nozzle box. Second stage turbine shroud ring. Nose group incorporates an anti-icing alcohol spinner. Oil tank mounted on the starboard upper quarter of the compressor casing. Simplified interconnectors. Igniter plugs installed directly into No. 2 and No. 5 combustion chambers. Steel fuel lines. Exhaust cone bullet with three integral vanes. Engines are unhanded. Mounting details same as Orenda 8 and 9. Installed in CF100.

6 ORENDA 14 - Similar to Orenda 11 but with no oil tank and no nose fairing. Delco starter-generator has starter and generator terminal connections at No. 3 and No. 5 intake casing struts respectively. Lucas proportional flow control unit incorporating flow transformer, acceleration control, altitude sensing and LP filter units. Emergency flow control unit between HP pumps and proportional flow control unit. Exhaust temperature limiter and solenoid valve mounted on the lower quarter of the port side of the compressor casing. Clean-line nozzle box. Second stage turbine shroud ring. Oil pumps are mounted fore and aft on the oil pump gearbox. Engine guide rollers are located at the bottom centre of the oil pump gearbox and on both sides of the engine at the compressor split line. Aircraft hydraulic pump gearbox is mounted on the auxiliaries gearbox. Exhaust cone bullet with three integral vanes. Mounting details same as Orenda 10. Engines are unhanded. Installed in Sabre 6.

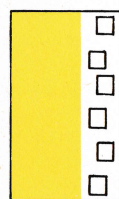
ORENDA SYSTEMS

RCAF PIPE LINE IDENTIFICATION BANDS USED ON OREDA ENGINES AND RELATED SYSTEMS

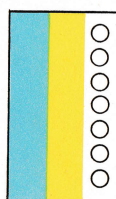
1 The identification bands as shown, only denote the system of which a line is a part. The particular function of a line is printed across its band.



fuel



lubrication



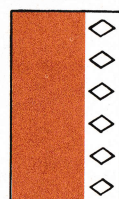
hydraulic



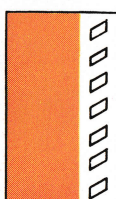
anti-icing



instrument
air



fire
protection



compressed
gas



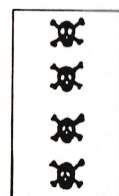
pneumatic
system



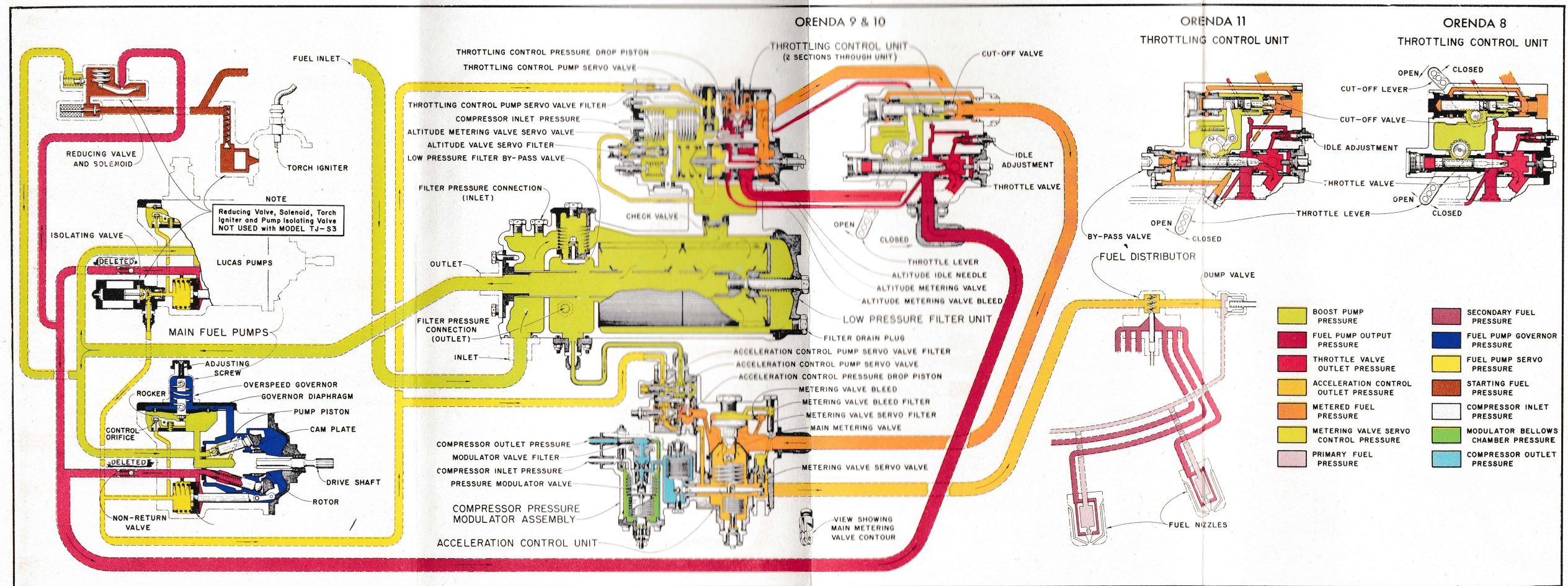
electrical
conduit

NOTE

Colours used in the following systems diagrams have no relation to the identification colours shown on this page.



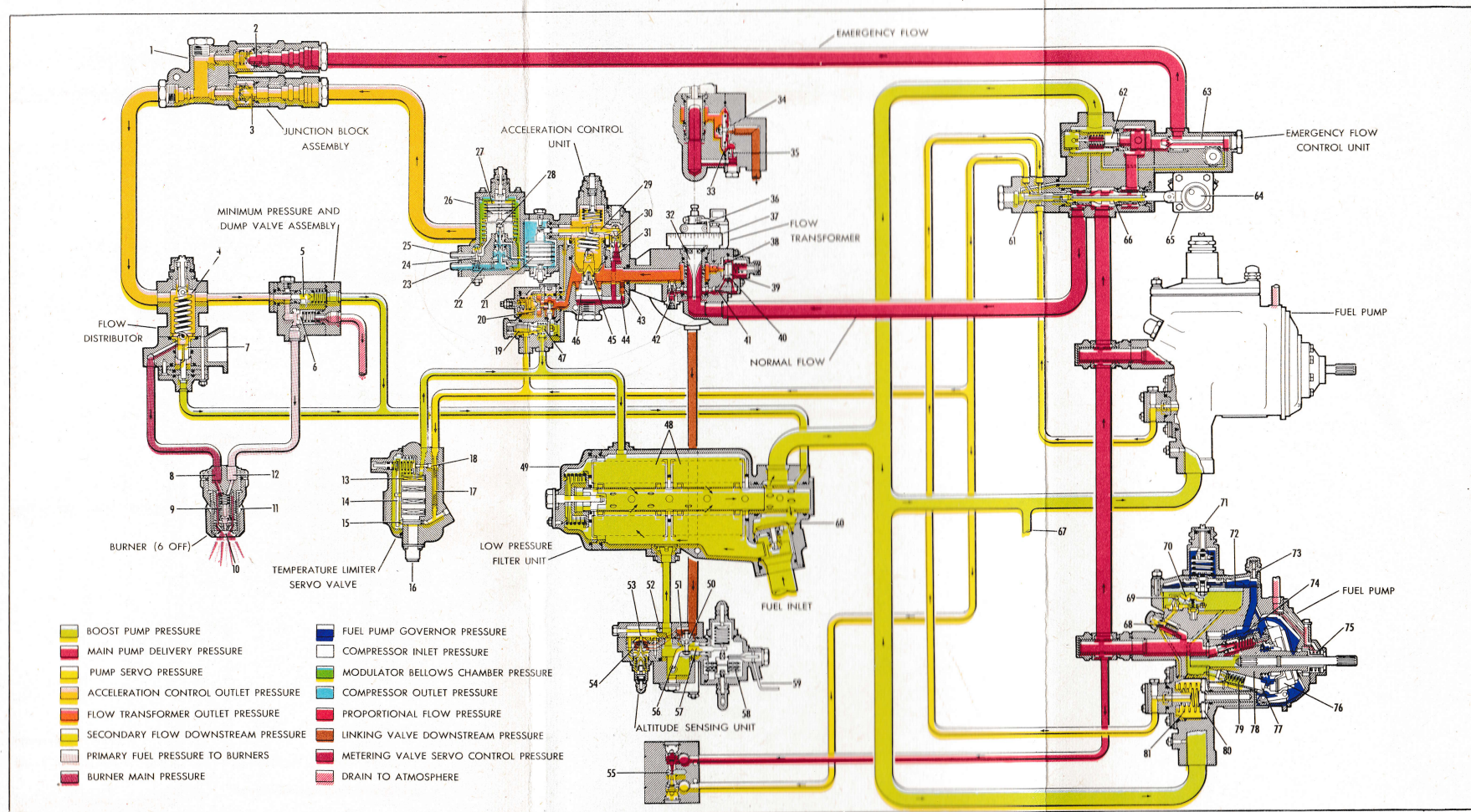
warning
symbol



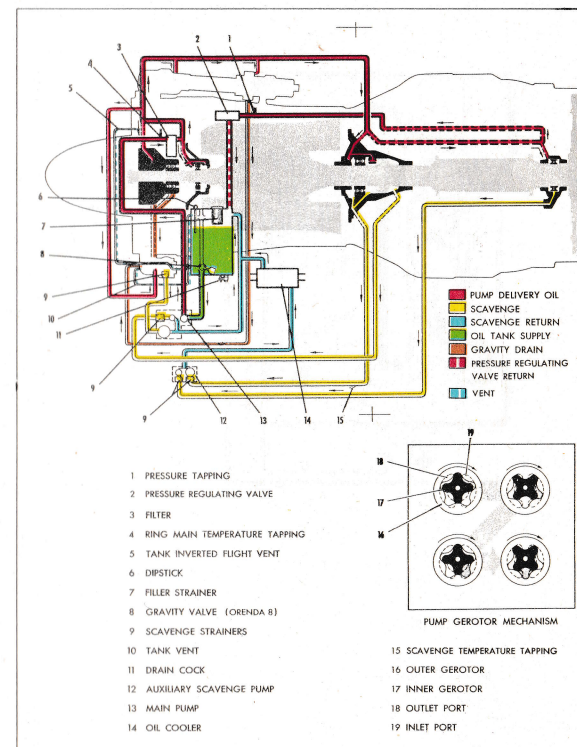
FUEL SYSTEM ORENDA 8, 9, 10 & 11

INDEX FOR FUEL SYSTEM OREDA 14

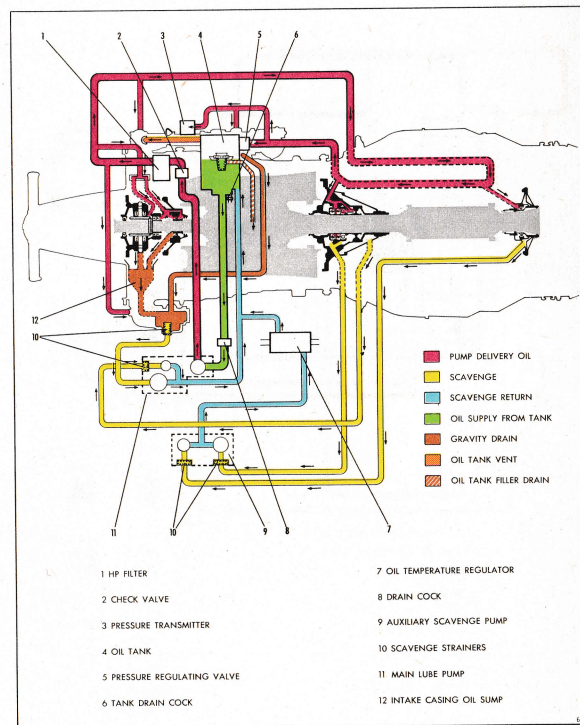
1	Junction Block	40	Altitude Idling Valve Diaphragm
2	Check Valve (EMERGENCY)	41	Altitude Idling Valve Fixed Orifice
3	Check Valve (NORMAL)	42	Sea Level Idle By-pass Valve
4	Flow Distributor Inlet Chamber	43	Metering Valve Bleed Filter
5	Minimum Pressure Valve	44	Metering Valve Bleed
6	Dump Valve Piston	45	Main Metering Valve
7	Distributor Piston	46	Metering Valve Servo Piston
8	Burner Main Fuel Passage	47	Acceleration Control Pump Servo Valve
9	Primary Fuel Filter	48	Filtering Elements
10	Atomizer Outlet Orifice	49	Filter Chamber Cover
11	Air Passage	50	Sensed Flow Actuator
12	Burner Primary Fuel Passage	51	Sensed Flow Actuator Diaphragm
13	Magnetic Circuit	52	Secondary Flow Sensor Fixed Orifice
14	Pivoted Armature	53	Secondary Flow Sensor Variable Orifice
15	Temperature Limiter Servo Control Valve	54	Secondary Flow Sensor Diaphragm
16	Power Supply Point	55	Kinetic Valve
17	Temperature Limiter Servo Valve Filter	56	Kinetic Knife
18	Pressure Compensating Piston	57	Sensed Flow Actuator Rocker Lever
19	Acceleration Control Pump Servo Valve Filter	58	Altitude Sensing Unit Evacuated Capsule
20	Acceleration Control Pressure Drop Piston	59	Altitude Sensing Unit P1 Port
21	Acceleration Control Evacuated Bellows	60	Low Pressure Filter Unit Pressure Relief Valve
22	Modulator Valve Filter	61	Servo Control Valve
23	Acceleration Control P2 Port	62	Emergency Flow Control Pressure Relief Valve
24	Needle Valve	63	Throttle Valve (EMERGENCY)
25	Acceleration Control P1 Port	64	Eccentric Cam
26	Compressor Pressure Modulator Assembly	65	Rotary Actuator
27	Modulator Double Bellows Assembly	66	Flow Transfer Valve
28	Pressure Modulator Valve	67	Pressure Tapping
29	Acceleration Control Rocker Lever	68	Restricting Orifice
30	Metering Valve Servo Valve	69	Pump Servo Control Orifice
31	Metering Valve Servo Valve Filter	70	Pump Governor Rocker Lever
32	Rotary Throttle Valve	71	Pump Governor Adjustment Screw
33	Linking Valve Diaphragm	72	Pump Governor Diaphragm
34	Linking Valve	73	Bleed Valve
35	Secondary Flow Orifice	74	Radial Drillings
36	Throttle Lever Pointer	75	Pump Driveshaft Seal
37	Throttle Indicator Plate	76	Camplate
38	Altitude Idling Valve Variable Orifice	77	Piston
39	Constant Flow Altitude Idling Valve	78	Pump Rotor
		79	Piston Return Spring
		80	Pump Servo Piston
		81	Helical Springs



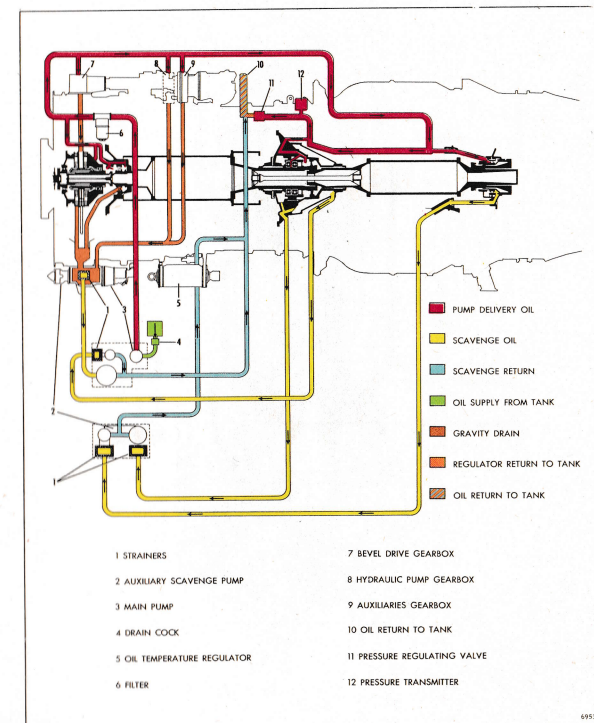
FUEL SYSTEM ORENDA 14



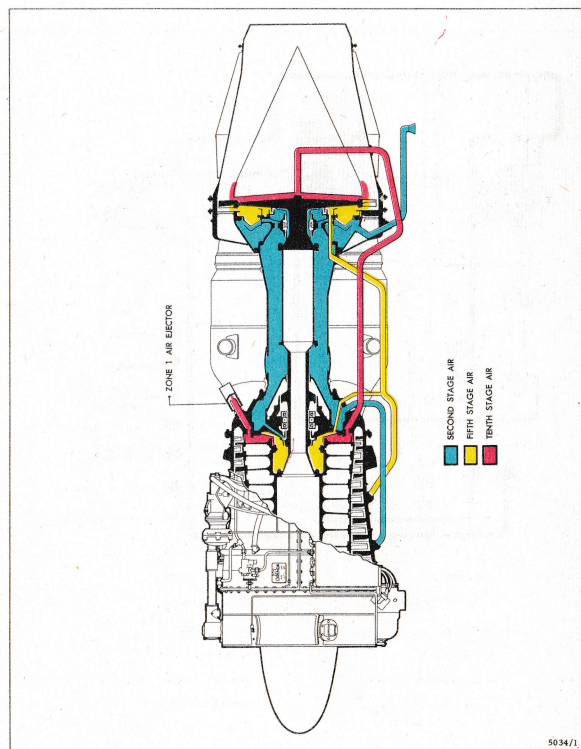
OIL SYSTEM
ORENDA 8



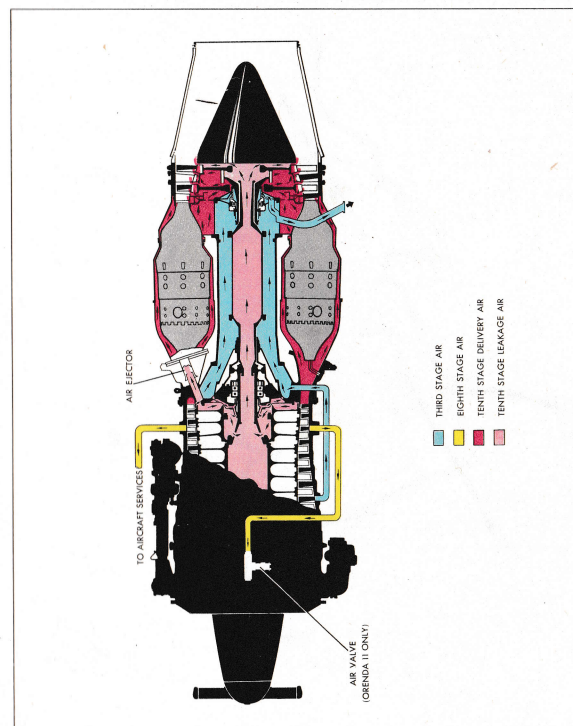
OIL SYSTEM
ORENDA 9 & 11



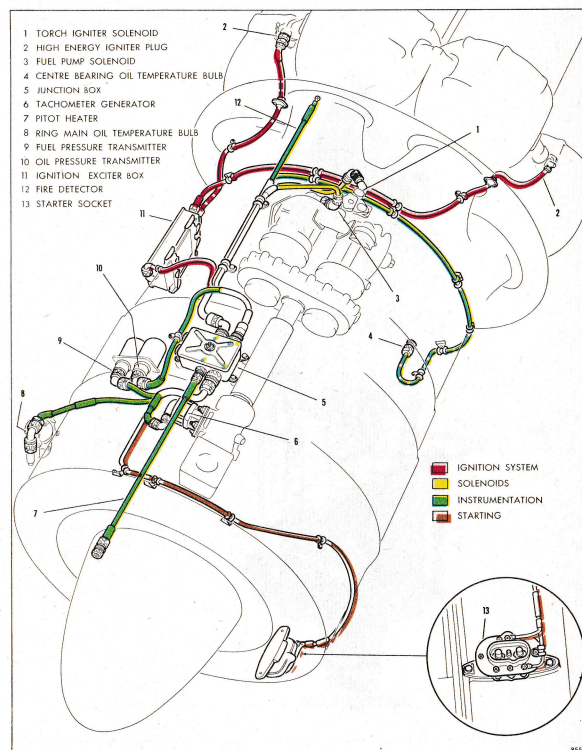
OIL SYSTEM
ORENDA 10 & 14



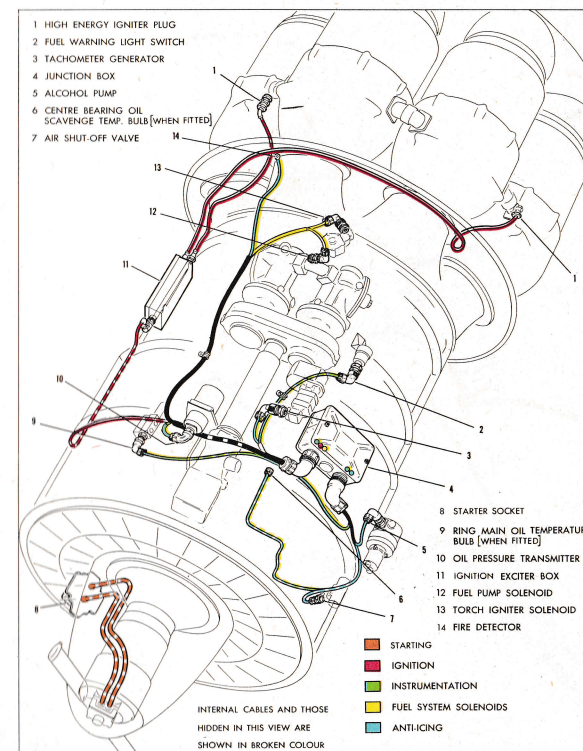
AIR SYSTEM
ORENDA 8, 9 & 10



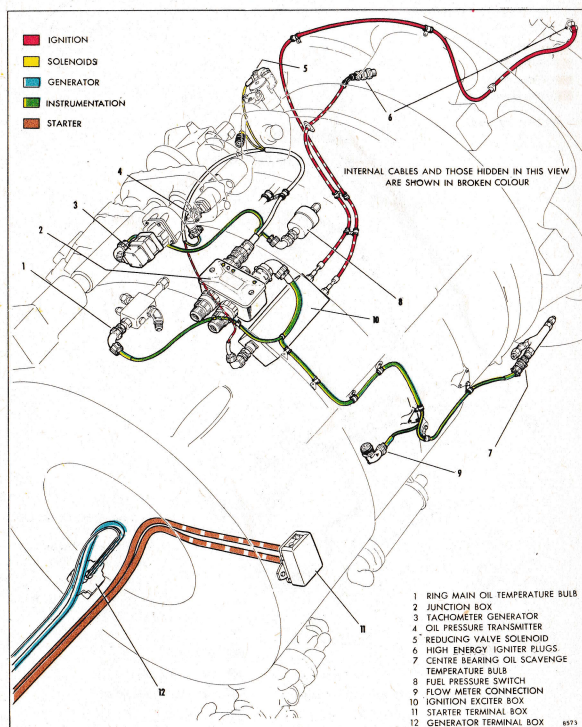
AIR SYSTEM
ORENDA 11 & 14



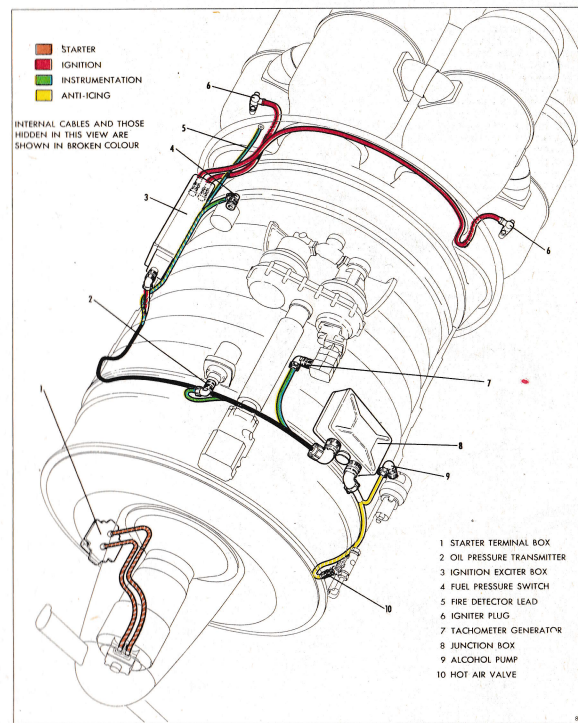
ELECTRICAL SYSTEM
ORENDA 8



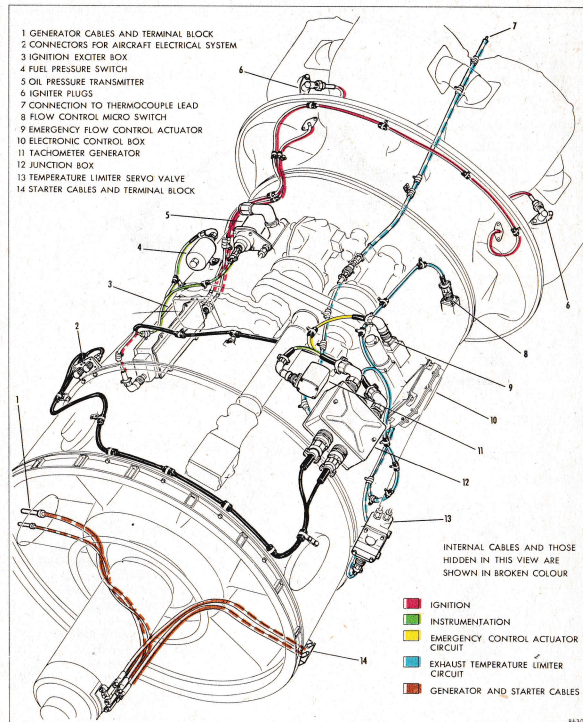
ELECTRICAL SYSTEM
ORENDA 9



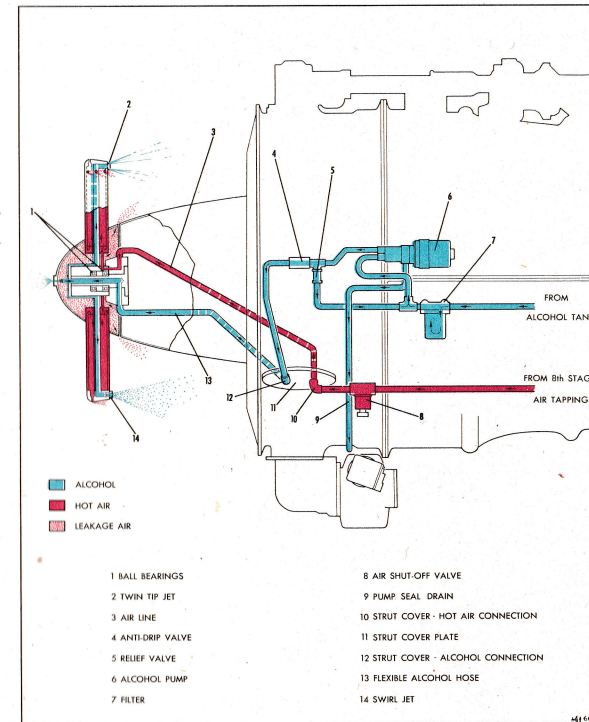
ELECTRICAL SYSTEM
ORENDA 10



ELECTRICAL SYSTEM
ORENDA 11



ELECTRICAL SYSTEM
 ORENDA 14



ANTI-ICING SYSTEM
 ORENDA 9 & 11

REFERENCE DATA

CANADA

NAVY											
ACT. SUB LIEUTENANT	SUB LIEUTENANT	LIEUTENANT	LIEUT. COMMANDER	COMMANDER	CAPTAIN	COMMODORE	REAR ADMIRAL	VICE ADMIRAL	ADMIRAL	ADMIRAL OF THE FLEET	
ARMY											
2 ND LIEUTENANT	LIEUTENANT	CAPTAIN	MAJOR	LIEUT. COLONEL	COLONEL	BRIGADIER	MAJOR GENERAL	LIEUT. GENERAL	GENERAL	FIELD MARSHAL	
AIR FORCE											
PILOT OFFICER	FLYING OFFICER	FLIGHT LIEUTENANT	SQUADRON LEADER	WING COMMANDER	GROUP CAPTAIN	AIR COMMODORE	AIR VICE MARSHAL	AIR MARSHAL	AIR CHIEF MARSHAL	MARSHAL OF THE ROYAL AIR FORCE	

Canadian commissioned ranks and insignia are the same as those of the United Kingdom Forces.

U. S. A.

ARMY-AIR FORCE-MARINE CORPS											
2 ND LIEUTENANT	FIRST LIEUTENANT	CAPTAIN	MAJOR	LIEUT. COLONEL	COLONEL	BRIGADIER GENERAL	MAJOR GENERAL	LIEUTENANT GENERAL	GENERAL	GENERAL OF THE ARMY	
NAVY											
ENSIGN	LIEUT. JUNIOR GRADE	LIEUTENANT	LIEUT. COMMANDER	COMMANDER	CAPTAIN	COMMODORE	REAR ADMIRAL	VICE ADMIRAL	ADMIRAL	ADMIRAL OF THE FLEET	

RELATIVE MILITARY COMMISSIONED RANKS

CANADA

NAVY	ARMY	AIR FORCE
Ordinary Seaman Ord. Sea.	Private Pte.	Aircraftsman 2 AC2
Ordinary Seaman (Trained) Ord. Sea. (Train)	Private Second Class Pte. 2 Cl	Aircraftsman 1 AC1
Able Seaman Able Sea.	Private First Class Pte. 1 Cl	Leading Aircraftsman LAC
Leading Seaman Lead. Sea.	Corporal Cpl.	Corporal Cpl.
Petty Officer II P. O. II	Sergeant Sgt.	Sergeant Sgt.
Petty Officer I P. O. I	Staff Sergeant S/Sgt.	Flight Sergeant F/Sgt.
Chief Petty Officer II CPO II	Warrant Officer II WO II	Warrant Officer II WO II
Chief Petty Officer I CPO I	Warrant Officer I WO I	Warrant Officer I WO I

RELATIVE MILITARY NON-COMMISSIONED RANKS

RCAF ABBREVIATIONS

FORMATIONS AND UNITS

ADC	Air Defence Command
ADGp	Air Defence Group
AFF	Acceptance and Ferry Flight
AFHQ	Air Force Headquarters
AFS	Advanced Flying School
AIB	Accidents Investigation Branch
AM	Air Ministry
AMC	Air Materiel Command
Aux	Auxiliary
AW sqn	All Weather Squadron
CEPE	Central Experimental and Proving Establishment
CFS	Central Flying School
CHQ	Command Headquarters
DDP	Department of Defence Production
DND	Department of National Defence
DOT	Department of Transport
DRB	Defence Research Board
GpHQ	Group Headquarters
IAM	Institute of Aviation Medicine
JSES	Joint Services Experimental Station (Churchill)
MERU	Mobile Equipment Repair Unit
NRC	National Research Council
NWSR	North West Staging Route
RAAF	Royal Australian Air Force
RAF	Royal Air Force
RCAF	Royal Canadian Air Force
RCN	Royal Canadian Navy
RD	Repair Depot
RMC	Royal Military College
RNZAF	Royal New Zealand Air Force
SAR	Search and Rescue
STS	Survival Training School
TacAGp	Tactical Air Group

RCAF ABBREVIATIONS

FORMATIONS AND UNITS (Cont)

TC	Training Command
TFsqn	Tactical Fighter squadron
TGp	Tactical Group
Tsqn	Transport squadron
TSU	Technical Services Unit
TTS	Technical Training School
UKSLS	United Kingdom Services Liaison Staff
USAF	United States Air Force
USN	United States Navy

PERSONNEL

CAS	Chief of the Air Staff
CIA	Chief Inspector of Accidents
OP	Chief of Air Operations
SAC	Scientific Advisor to the CAS

GENERAL

AFHQ	Air Force Headquarters
AOG	Aircraft on Ground
CAP	Canadian Air Publication
EO	Engineering Order (Technical Publications)
PC	Order-in-Council
pmc	Private Motor Car
QR (Air)	Queen's Regulations and Orders for the RCAF
RV	Receipt Voucher
SA	Subsistence Allowance
TD	Temporary Duty
TO	Transfer Order; Technical Order (US)
TOPSEC	Top Secret
TOS	Taken on Strength
UCR	Unsatisfactory Condition Report
URR	Urgent Repair Requirement
u/s	Unserviceable

RCAF ABBREVIATIONS

TELEGRAPHIC ADDRESSES

Air Defence Command Headquarters, St. Hubert.	CANAIREF
Air Force Headquarters, Ottawa.	CANAIRHED
Air Materiel Command Headquarters, Ottawa.	CANAIRMAT
Air Member, Canadian Joint Staff, London, England.	CANAIRLON
Air Member, Canadian Joint Staff, Washington, D. C.	CANAIRWASH
Air Transport Command Headquarters, Lachine.	CANAIRLIFT

ABBREVIATIONS

SPECIFICATIONS AND STANDARDS

CANADIAN AND US

AMS	Aeronautical Material Specification
AN*	Air Force - Navy Aeronautical Specification
AN**	Air Force - Navy Aeronautical Standard
ANA	Air Force - Navy Aeronautical Bulletin
AND	Air Force - Navy Aeronautical Design Standard
ASA	American Standard
Avrocan	Aircraft Specification issued by Avro Canada
CS	Aircraft Standard issued by Avro Canada
CSA	Canadian Standards Association
DND	Canadian Department of National Defence Specification

* Followed by a letter

** Followed by a number

ABBREVIATIONS

SPECIFICATIONS AND STANDARDS (Cont)

DS	Design Specification issued by Orenda Engines Limited
EDI	Engineering Department Instruction issued by Orenda Engines Limited
FED	US Federal Specification or Standard
GP	Canadian Government Specification
G/T	Gas Turbine Specification
JAN	Joint Army - Navy Specification
MIL	US Military Specification
MIL-STD	US Military Standard
MS	Military Standard
NAS	National Aircraft Standard
QPL	US Qualified Products List
TI	Technical Instruction issued by Orenda Engines Limited

BRITISH

AGS	Aircraft General Standard (Ministry of Supply)
BESA	British Standard
DTD	Directorate of Technical Development Specification

STANDARD CONSTANTS

Absolute zero	-273°C = -459.4°F = 0°K (Kelvin)
Acre	4840 sq yd = 4046.856 sq m
Air	1 Kg occupies 0.816 cu m
	1 lb occupies 13.07 cu ft
	1 cu m weighs 1.2255 kg
	1 cu ft weighs 0.07651 lb (at standard temp and press)
Atmosphere - Standard pressure	760 mm of Hg = 29.921 in. Hg 14.696 psi = 1.03329 kg/sq cm

STANDARD CONSTANTS (Cont)

Atmosphere- Standard temp	15°C = 59°F
Cheval Vapeur	75 Kilogrammetres per sec
Degree K	= Standard air temp °C + 273
Foot (ft)	12 in. (1/3 yd) = 30.48 cm
Gallon - (gal)	Contains 10 lb weight of distilled water at 62°F and 30 in. mercury pressure = 4.5459631 litres
Gravity (g)	980.65 cm/sec/sec 32.1740 ft/sec/sec International Standard 32.190 ft/sec/sec at Greenwich
Horse-Power (BHP)	33,000 ft-lb/min or 550 ft-lb/sec = 1.01387 CV (746.08 watts)
Hundredweight (cwt)	112 lb = 50.802 kg
Inch (in.)	1/36 standard yd = 2.54 cm
Joule	10 ⁷ ergs (1 joule per sec = 1 watt)
Kilogramme (kg)	Metric standard unit of mass = 2.20462 lb
Kilogramme calorie	The heat necessary to raise 1 kg of water at the temperature of max density, through 1°C
Knot (British Admiralty Knot)	1 nautical mile/hour = 1.85318 km per hour
Litre (l)	The volume occupied by 1 kg of distilled water at 4°C and 760 mm of mercury pressure
Mach number	The ratio of the speed of a body to the speed of sound (1120 fps in air at 15°C) under surrounding conditions
Metre (m)	One ten-millionth part of a quadrant of the earth's surface = 39.3701 in.
Mile	(1760 yds, 5280 ft) = 1609.334 m

STANDARD CONSTANTS (Cont)

Millibar	1/10 pieze = 0.02953 in. or 0.745 mm mercury
Millimetre (mm)	(1/1000 metre) = 0.0393701 in.
Nautical mile	The length of the arc of 1 minute of the meridian = 6080 ft at the equator (British Admiralty standard) = 1.85318 kilometres
Newton	The force which imparts an acceleration of 1 metre per sec/sec to a mass of 1 kilogramme = 7.224809 poundals
Pound	British Imperial Standard Unit of Mass = 0.45359243 kg
Poundal	The force which imparts an acceleration of one foot per sec/sec to a mass of one pound (2 pints) = 1.1364908 litres (100 kilogrammes) = 220.462 lb
Quart	
Quintal	
Short ton (2000 lb)	907.2 kg
Slug	A unit mass of "g" pounds (Usually 32.3)
Standard temp	15°C and 760 mm mercury = 59°F and 29.92 in. mercury
Watt (W)	1 joule per second
Yard (yd)	British Imperial linear standard 36 in = 3 feet = 0.9144 metre

STANDARD (DENSITY) HEIGHT

H _a	= (1.2352 H _a) + (118.6 T _o - 1780)
H _a	= Height in Standard Atmosphere (Density Basis) in feet
H _a	= True Aneroid Height (ICAN Altimeter) in feet
T _o	= Observed Temperature, ° Centigrade

CONVERSION FACTORS

Atmospheres to psi	x 14.696
B Th U to Centigrade Heat Units	x 0.5556
B Th U to foot pounds	x 778.4
B Th U per min to hp	÷ 42.42
B Th U per sec to hp	÷ 0.707
CHU to B Th U	x 1.8
Centigrade to Fahrenheit	(°C x 9/5) + 32
Centimetres to feet	÷ 30.48
Cheval vapeur to kilowatts	x 0.7355
Cubic in. to Imp gal	÷ 277.42
Cubic in. to litres	x 0.0164
Cubic In. to US gal	÷ 231
Cubic metres to cubic yds	x 1.30795
Cubic yds to cubic metres	x 0.76455
Dynes to poundals	x 0.00007233
Fahrenheit to Centigrades	(°F - 32) x 5/9
Feet to centimetres	x 30.48
Feet/min to mph	÷ 88
Feet/sec to metres per min	x 18.288
Foot-pound to B Th U	÷ 778.4
Foot-pound to CHU	÷ 1401.12
Foot-pound/sec to hp	÷ 550
Gal (Imp) to cu in.	x 277.42
Gal (US) to litres	x 3.785332
Grammes/litre to oz/gal	x 0.160354
Horse-power to B Th U/min	x 42.42
Horse-power to B Th U/sec	x 0.707
H. P. to kilogrammetres/sec	x 76.04025
Inches to Hg to psi	x 0.49117
Kilogrammes to lb	x 2.205
Kilogrammes to tons	÷ 1016.05
Kilogrammetres/sec to cheval vapeur	÷ 75
Kilogrammetres/sec to hp	÷ 76.04025
Kilogrammes/sq cm to mm Hg	x 735.54
Kilometres (1000 m) to feet	x 3280.8
Kilometres/litre to ml gal (US)	x 2.3521
Kilowatts to cheval vapeur	x 1.35962

CONVERSION FACTORS (Cont)

Litres to cubic in.	x 61.024
Litres to US gal	x 0.26417
Litres/kilometre to US gal/ml	x 0.4252
Metre/min to feet/sec	x 0.054664
Metres/sec to mph	x 2.23694
Miles/hr to feet/min	x 88
Miles/hr to metres/sec	x 0.44704
Millimetres of Hg (gauge) to kilogrammes/sq cm	x 0.0013596
Ounces/gal to grammes/litre	x 28.349527
Piezes to atmospheres	÷ 101.331
Pounds/sq in. to atmospheres	÷ 14.696
Pounds/sq in. to in. Hg	x 2.03596
Poundals to pounds weight	x 32.19
Poundals to Dynes	x 13825.5
Poundals to Newtons	x 0.13825497
Square metres to sq yards	x 1.19599
Square yds to sq metres	x 0.83613
Ton-miles to tonne-kilometres	x 1.583
Ton-kilometres to ton-miles	x 0.631
Tonne-kilometres/litre to ton-miles/gal	x 2.868
Ton-miles/gal to tonne-kilometres/litre	x 0.348
US gal to cu in.	x 231.0
US gal to litres	x 3.785411
US tons to tonnes	x 0.907185

CONVERSION TABLES

Centigrade/Fahrenheit To Fahrenheit/Centigrade

°C	°C or °F	°F	°C	°C or °F	°F
-40.0	-40	-40.0	-21.7	- 7	19.4
-39.4	-39	-38.2	-21.1	- 6	21.2
-38.9	-38	-36.4	-20.6	- 5	23.0
-38.3	-37	-34.6	-20.0	- 4	24.8
-37.8	-36	-32.8	-19.4	- 3	26.6
-37.2	-35	-31.0	-18.9	- 2	28.4
-36.7	-34	-29.2	-18.3	- 1	30.2
-36.1	-33	-27.4	-17.8	0	32.0
-35.6	-32	-25.6	-17.2	1	33.8
-35.0	-31	-23.8	-16.7	2	35.6
-34.4	-30	-22.0	-16.1	3	37.4
-33.9	-29	-20.2	-15.6	4	39.2
-33.3	-28	-18.4	-15.0	5	41.0
-32.8	-27	-16.6	-14.4	6	42.8
-32.2	-26	-14.8	-13.9	7	44.6
-31.7	-25	-13.0	-13.3	8	46.4
-31.1	-24	-11.2	-12.8	9	48.2
-30.6	-23	- 9.4	-12.2	10	50.0
-30.0	-22	- 7.6	-11.7	11	51.8
-29.4	-21	- 5.8	-11.1	12	53.6
-28.9	-20	- 4.0	-10.6	13	55.4
-28.3	-19	- 2.2	-10.0	14	57.2
-27.8	-18	- 0.4	- 9.4	15	59.0
-27.2	-17	1.4	- 8.9	16	60.8
-26.7	-16	3.2	- 8.3	17	62.6
-26.1	-15	5.0	- 7.8	18	64.4
-25.6	-14	6.8	- 7.2	19	66.2
-25.0	-13	8.6	- 6.7	20	68.0
-24.4	-12	10.4	- 6.1	21	69.8
-23.9	-11	12.2	- 5.6	22	71.6
-23.3	-10	14.0	- 5.0	23	73.4
-22.8	- 9	15.8	- 4.4	24	75.2
-22.2	- 8	17.6	- 3.9	25	77.0

CONVERSION TABLES

Centigrade/Fahrenheit To Fahrenheit/Centigrade
(Cont)

°C	°C or °F	°F	°C	°C or °F	°F
-3.3	26	78.8	15.0	59	138.2
-2.8	27	80.6	15.6	60	140.0
-2.2	28	82.4	16.1	61	141.8
-1.7	29	84.2	16.7	62	143.6
-1.1	30	86.0	17.2	63	145.4
-0.6	31	87.8	17.8	64	147.2
0.0	32	89.6	18.3	65	149.0
0.6	33	91.4	18.9	66	150.8
1.1	34	93.2	19.4	67	152.6
1.7	35	95.0	20.0	68	154.4
2.2	36	96.8	20.6	69	156.2
2.8	37	98.6	21.1	70	158.0
3.3	38	100.4	21.7	71	159.8
3.9	39	102.2	22.2	72	161.6
4.4	40	104.0	22.8	73	163.4
5.0	41	105.8	23.3	74	165.2
5.6	42	107.6	23.9	75	167.0
6.1	43	109.4	24.4	76	168.8
6.7	44	111.2	25.0	77	170.6
7.2	45	113.0	25.6	78	172.4
7.8	46	114.8	26.1	79	174.2
8.3	47	116.6	26.7	80	176.0
8.9	48	118.4	27.2	81	177.8
9.4	49	120.2	27.8	82	179.6
10.0	50	122.0	28.3	83	181.4
10.6	51	123.8	28.9	84	183.2
11.1	52	125.6	29.4	85	185.0
11.7	53	127.4	30.0	86	186.8
12.2	54	129.2	30.6	87	188.6
12.8	55	131.0	31.1	88	190.4
13.3	56	132.8	31.7	89	192.2
13.9	57	134.6	32.2	90	194.0
14.4	58	136.4	32.8	91	195.8

CONVERSION TABLES

Centigrade/Fahrenheit To Fahrenheit/Centigrade
(Cont)

°C	°C or °F	°F	°C	°C or °F	°F
33.3	92	197.6	38.3	101	213.8
33.9	93	199.4	38.9	102	215.6
34.4	94	201.2	39.4	103	217.4
35.0	95	203.0	40.0	104	219.2
35.6	96	204.8	40.6	105	221.0
36.1	97	206.6	41.1	106	222.8
36.7	98	208.4	41.7	107	224.6
37.2	99	210.2	42.2	108	226.4
37.8	100	212.0	42.8	109	228.2
JET PIPE TEMPERATURE RANGE					
348.9	660	1220	404.4	760	1400
354.4	670	1238	410.0	770	1418
360.0	680	1256	415.6	780	1436
365.6	690	1274	421.1	790	1454
371.1	700	1292	426.7	800	1472
376.7	710	1310	432.2	810	1490
382.2	720	1328	437.8	820	1508
387.8	730	1346	443.3	830	1526
393.3	740	1364	448.9	840	1544
398.9	750	1382	454.4	850	1562

CONVERSION TABLES

Cubic Centimetres Per Minute
To Pints Per Hour

cc's/min	pts/hr	cc's/min	pts/hr
5	0.528	1200	126.72
10	1.056	1300	137.28
15	1.584	1400	147.84
20	2.112	1500	158.40
25	2.640	1600	168.96
30	3.168	1700	179.52
35	3.696	1800	190.08
40	4.224	1900	200.64
45	4.752	2000	211.20
50	5.280	2100	221.76
55	5.808	2200	232.32
60	6.336	2300	242.88
65	6.864	2400	253.44
70	7.392	2500	264.00
75	7.920	2600	274.56
80	8.448	2700	285.12
85	8.976	2800	295.68
90	9.504	2900	306.24
95	10.032	3000	316.80
100	10.560	3100	327.36
200	21.120	3200	337.92
300	31.680	3300	348.48
400	42.240	3400	359.04
500	52.800	3500	369.60
600	63.360	3600	380.16
700	73.920	3700	390.72
800	84.480	3800	401.28
900	95.040	3900	411.84
1000	105.600	4000	422.40
1100	116.160		

CONVERSION TABLES

US Gal/Imp Gal to Imp Gal/US Gal

US Gal	US or Imp Gal	Imp Gal	US Gal	US or Imp Gal	Imp Gal
1.201	1	0.833	38.430	32	26.645
2.402	2	1.665	39.631	33	27.478
3.603	3	2.498	40.832	34	28.311
4.804	4	3.331	42.033	35	29.143
6.005	5	4.163	43.234	36	29.976
7.206	6	4.996	44.435	37	30.809
8.407	7	5.829	45.636	38	31.641
9.608	8	6.661	46.837	39	32.474
10.809	9	7.494	48.038	40	33.307
12.010	10	8.327	49.239	41	34.139
13.210	11	9.159	50.440	42	34.972
14.411	12	9.992	51.641	43	35.805
15.612	13	10.825	52.842	44	36.637
16.813	14	11.657	54.043	45	37.470
18.014	15	12.490	55.244	46	38.303
19.215	16	13.323	56.445	47	39.135
20.416	17	14.155	57.646	48	39.968
21.617	18	14.988	58.847	49	40.801
22.818	19	15.821	60.047	50	41.634
24.019	20	16.653	61.248	51	42.466
25.220	21	17.486	62.449	52	43.299
26.421	22	18.319	63.650	53	44.132
27.622	23	19.151	64.851	54	44.964
28.823	24	19.984	66.052	55	45.797
30.024	25	20.817	67.253	56	46.630
31.225	26	21.649	68.454	57	47.462
32.426	27	22.482	69.655	58	48.295
33.627	28	23.315	70.856	59	49.128
34.828	29	24.147	72.057	60	49.960
36.029	30	24.980	73.258	61	50.793
37.229	31	25.813	74.459	62	51.626

CONVERSION TABLES

US Gal/Imp Gal to Imp Gal/US Gal (Cont)

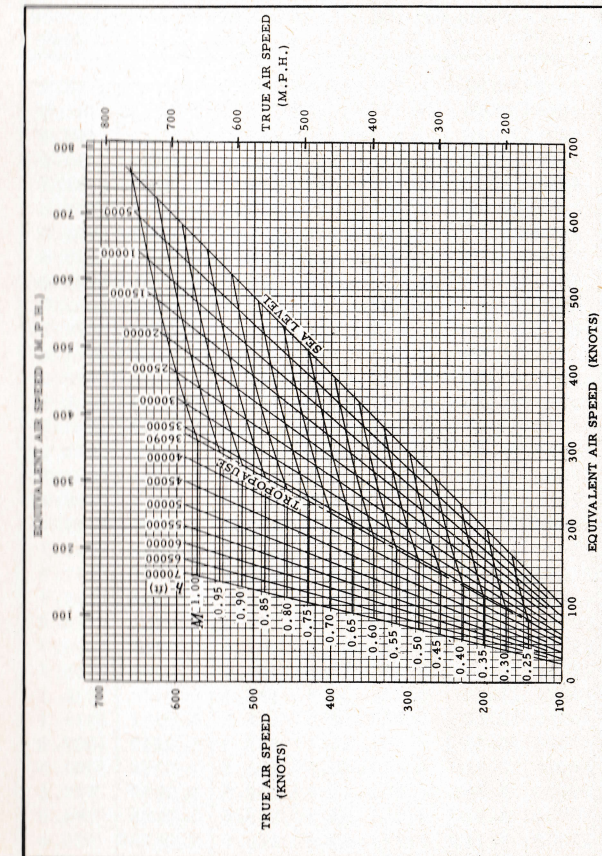
US Gal	US or Imp Gal	Imp Gal	US Gal	US or Imp Gal	Imp Gal
75.660	63	52.458	112.889	94	78.271
76.861	64	53.291	114.090	95	79.104
78.062	65	54.124	115.291	96	79.936
79.263	66	54.956	116.492	97	80.769
80.464	67	55.789	117.693	98	81.602
81.665	68	56.622	118.894	99	82.434
82.866	69	57.454	120.095	100	83.267
84.067	70	58.287	121.296	101	84.100
85.267	71	59.120	122.497	102	84.932
86.468	72	59.952	123.698	103	85.765
87.669	73	60.785	124.899	104	86.598
88.870	74	61.618	126.100	105	87.430
90.071	75	62.450	127.301	106	88.263
91.272	76	63.283	128.502	107	89.096
92.473	77	64.116	129.703	108	89.928
93.674	78	64.948	130.904	109	90.761
94.875	79	65.781	132.104	110	91.594
96.076	80	66.614	133.305	111	92.426
97.277	81	67.446	134.506	112	93.259
98.478	82	68.279	135.707	113	94.092
99.679	83	69.112	136.908	114	94.924
100.880	84	69.944	138.109	115	95.757
102.081	85	70.777	139.310	116	96.590
103.282	86	71.610	140.511	117	97.422
104.483	87	72.442	141.712	118	98.255
105.684	88	73.275	142.913	119	99.088
106.885	89	74.108	144.114	120	99.920
108.086	90	74.940	145.150	121	100.753
109.286	91	75.773	146.516	122	101.586
110.487	92	76.066	147.717	123	102.418
111.688	93	77.438	148.918	124	103.251

CONVERSION TABLES

Pounds per Sq Inch (Boost) to Millimetres
Mercury (Absolute) and/or Inches
Mercury (Absolute)

mm. Hg abs.	lb/ sq in.	in. Hg abs.	mm. Hg abs.	lb/ sq in.	in. Hg abs.
631	-2 1/2	24.83	1432	+13	56.39
657	-2	25.85	1484	+14	58.42
682	-1 1/2	26.87	1536	+15	60.46
708	-1	27.89	1587	+16	62.50
734	-1/2	28.90	1639	+17	64.53
760	0	29.92	1691	+18	66.57
786	+ 1/2	30.94	1743	+19	68.60
812	+ 1	31.96	1794	+20	70.64
838	+ 1 1/2	32.98	1846	+21	72.68
863	+ 2	33.99	1898	+22	74.71
889	+ 2 1/2	35.01	1949	+23	76.75
915	+ 3	36.03	2001	+24	78.78
941	+ 3 1/2	37.05	2053	+25	80.82
967	+ 4	38.06	2105	+26	82.86
993	+ 4 1/2	39.08	2156	+27	84.89
1019	+ 5	40.10	2208	+28	86.93
1044	+ 5 1/2	41.12	2260	+29	88.96
1070	+ 6	42.14	2311	+30	91.0
1096	+ 6 1/2	43.15	2363	+31	93.04
1122	+ 7	44.17	2415	+32	95.07
1148	+ 7 1/2	45.19	2467	+33	97.11
1174	+ 8	46.21	2518	+34	99.14
1200	+ 8 1/2	47.23	2570	+35	101.18
1225	+ 9	48.24	2622	+36	103.22
1251	+ 9 1/2	49.26	2673	+37	105.25
1277	+ 10	50.28	2725	+38	107.29
1329	+ 11	52.32	2777	+39	109.32
1381	+ 12	54.35	2829	+40	111.36

EQUIVALENT AIR SPEED AND MACH NUMBER CORRESPONDING WITH TRUE AIR SPEED IN STANDARD ATMOSPHERE



ICAN ALTITUDE DATA

Altitude feet	Pressure		Temperature		Density lb/cuft p	Velocity of sound ft/sec
	in. Hg	lb/sq in P	°C t	°C abs. Ta		
0	29.92	14.70	+15.0	288.0	0.0765	1116.8
1000	28.86	14.17	+13.0	286.0	0.0743	1112.9
2000	27.82	13.66	+11.0	284.0	0.0721	1109.1
3000	26.81	13.17	+ 9.0	282.0	0.0700	1105.2
4000	25.84	12.69	+ 7.1	280.1	0.0679	1101.3
5000	24.89	12.22	+ 5.1	278.1	0.0659	1097.4
6000	23.98	11.78	+ 3.1	276.1	0.0640	1093.5
7000	23.09	11.34	+ 1.1	274.1	0.0620	1089.6
8000	22.22	10.91	- 0.8	272.2	0.0601	1085.6
9000	21.39	10.50	- 2.8	270.2	0.0583	1081.7
10000	20.58	10.11	- 4.8	268.2	0.0565	1077.7
11000	19.79	9.72	- 6.8	266.2	0.0547	1073.8
12000	19.03	9.35	- 8.8	264.2	0.0530	1070.0
13000	18.28	8.98	-10.7	262.3	0.0513	1065.9
14000	17.57	8.63	-12.7	260.3	0.0497	1061.7
15000	16.88	8.29	-14.7	258.3	0.0481	1057.6
16000	16.21	7.96	-16.7	256.3	0.0466	1053.5
17000	15.57	7.65	-18.7	254.3	0.0451	1049.4
18000	14.94	7.34	-20.7	252.3	0.0436	1045.3
19000	14.33	7.04	-22.6	250.4	0.0422	1041.2
20000	13.74	6.75	-24.6	248.4	0.0408	1037.0
21000	13.18	6.47	-26.6	246.4	0.0394	1032.9
22000	12.63	6.20	-28.6	244.4	0.0381	1028.8
23000	12.10	5.94	-30.6	242.4	0.0367	1024.7
24000	11.59	5.69	-32.5	240.5	0.0355	1020.5
25000	11.10	5.45	-34.5	238.5	0.0343	1016.3
26000	10.62	5.22	-36.5	236.5	0.0331	1012.1
27000	10.16	4.99	-38.5	234.5	0.0319	1007.8
28000	9.720	4.77	-40.5	232.5	0.0308	1003.5
29000	9.293	4.56	-42.5	230.5	0.0297	999.2
30000	8.880	4.36	-44.4	228.6	0.0286	994.9
31000	8.483	4.17	-46.4	226.6	0.02757	990.6

ICAN ALTITUDE DATA (Cont)

Altitude feet	Pressure		Temperature		Density lb/cu.ft p	Velocity of sound ft/sec
	in. Hg	lb/sq in P	°C t	°C abs. Ta		
32000	8.101	3.98	-48.4	224.6	0.02656	986.3
33000	7.732	3.80	-50.4	222.6	0.02558	981.9
34000	7.377	3.62	-52.4	220.6	0.02463	977.5
35000	7.036	3.46	-54.3	218.7	0.02369	973.1
36000	6.708	3.29	-56.3	216.7	0.02270	968.8
37000	6.394	3.14	-56.5	216.5	0.02175	968.3
38000	6.096	2.99	-56.5	216.5	0.02074	968.3
39000	5.812	2.86	-56.5	216.5	0.01977	968.3
40000	5.541	2.72	-56.5	216.5	0.01885	968.3
41000	5.283	2.60	-56.5	216.5	0.01797	968.3
42000	5.036	2.47	-56.5	216.5	0.01713	968.3
43000	4.802	2.36	-56.5	216.5	0.01633	968.3
44000	4.578	2.25	-56.5	216.5	0.01556	968.3
45000	4.365	2.14	-56.5	216.5	0.01484	968.3
46000	4.160	2.04	-56.5	216.5	0.01415	968.3
47000	3.966	1.95	-56.5	216.5	0.01349	968.3
48000	3.781	1.85	-56.5	216.5	0.01286	968.3
49000	3.604	1.77	-56.5	216.5	0.01226	968.3
50000	3.436	1.66	-56.5	216.5	0.01169	968.3

ENGINE PERFORMANCE REDUCTION

To Calculate Reduced rpm:

- (i) Indicated rpm
- (ii) Indicated air inlet temperature
- (iii) Corrected mean air inlet temperature = T_a
- (iv) $\sqrt{288 \div T_a}$
- (v) Reduced rpm = (i) $\times$ (iv)

To Calculate Reduced JPT°C:

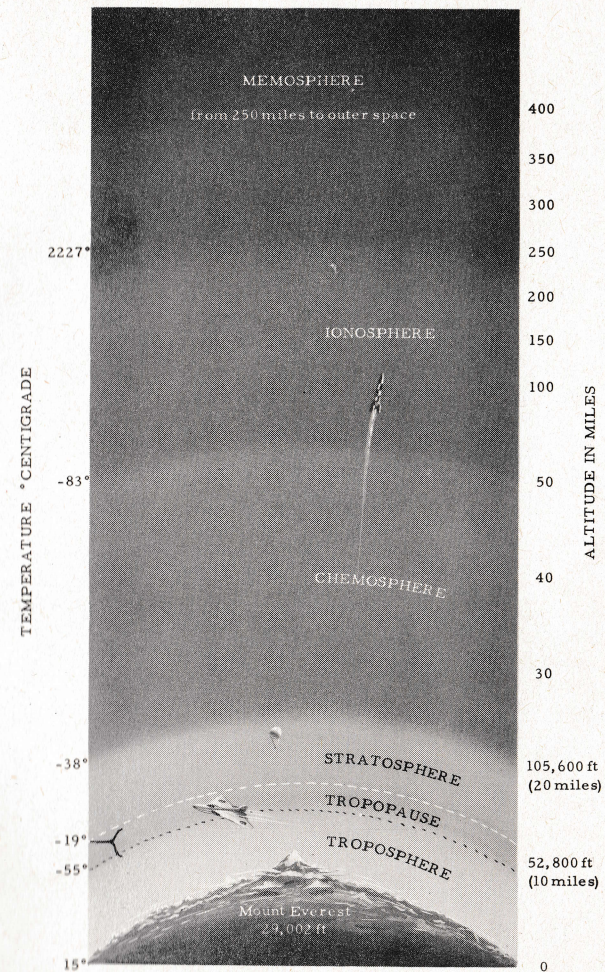
- (vi) Indicated JPT°C
- (vii) Corrected mean JPT°C
- (viii) $JPT^\circ K = (vii) + 273^\circ$
- (ix) $288 \div T_a$
- (x) Reduced JPT°C = (viii) $\times$ (ix)
- (xi) Reduced JPT°C = (x) - 273°

To Calculate Reduced Thrust:

- (xii) Barometer temperature
- (xiii) Barometer pressure
- (xiv) Barometer correction
- (xv) $P_a = (xiii) \times (xiv)$
- (xvi) $29.92 \div P_a$
- (xvii) Indicated thrust
- (xviii) Corrected thrust
- (xix) Reduced thrust = (xviii) $\times$ (xvi)

To Calculate Reduced Specific Fuel Consumption:

- (xx) Indicated fuel consumption
- (xxi) Corrected fuel consumption
- (xxii) Reduced fuel consumption = (xxi) $\times$ (xvi) $\times$ (iv)
- (xxiii) Reduced specific fuel consumption = (xxii) $\div$ (xix)



STRUCTURE OF THE ATMOSPHERE