

QCX
Avro
CF105
LOG
105-5
Iss. 4

ANALYZED

CF-105 MK. II

ESTIMATE OF ELECTRICAL POWER

TO BE SUPPLIED BY GROUND POWER UNITS

!

Report No. LOG/105/5 Iss. 4

March 1957

~~SECRET~~

NRC - CISTI
J. H. PARKIN
BRANCH

JUN 8 1955

ANNEXE
J. H. PARKIN
CNRC - CISTI

Classification cancelled / Changed to UNCLASS

By authority of AVRS

Date 27 Sept 68

Signature [Signature]

Unit / Rank / Appointment AVRSS

Compiled [Signature]

Checked [Signature]

Approved [Signature]

ENGINEERING DIVISION

AVRO AIRCRAFT LIMITED, MALTON, ONTARIO



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1. INTRODUCTION

To determine the electrical power to be supplied by Ground Power Units, reference has been made to the report, P/Systems/8R "LOAD ANALYSIS and POWER SYSTEM" CF-105 MK. II aircraft.

As full information on the PS13 engine was not available, the loading requirements of the J75 engine plus additional requirements for the PS13, were used in determining the load analysis of the MK. II aircraft.

With incorporation of the ASTRA system the Air Conditioning System will be altered; however it is not anticipated that the electrical load for the Air Conditioning System will alter, therefore, information on the existing Air Conditioning System has been utilized in determining the total electrical load for the MK. II aircraft.

There are four ground conditions that call for the use of Ground Power:

- (a) 1st Line Maintenance in the 1st Line Maintenance hangar.
- (b) 2nd Line Maintenance in Maintenance hangar.
- (c) Readiness/Standby in the readiness hangar or on the flight line.
- (d) Turn-around in a turn-around facility.

A detailed analysis of the power required during each of these conditions is represented in the following pages.

2. MAINTENANCE (CONDITIONS (a) and (b))

A.C. Loads

Service	Cont.	Short Duration	P.F.	Watts	V.A.
<u>Control Surface</u>					
Damping	x		.85	93.5	110.0
Vertical & Heading Ref. System	x		.85	425.5	500.0
Display (A.F.C.S.)	x		.85	180.0	212.0
<u>Instrument</u>					
Skin Temperature Indicator	x		.70	4.0	5.7
<u>Engine Instruments</u>					
Fuel Capacitance (2)	x		.60	16.0	26.6
Turbine Discharge Temp. (2)	x		.60	12.0	20.0
Pressure Ratio Indicator (2)	x		.67	120.0	180.0
<u>Flight Instruments</u>					
Artificial Horizon (Transformer;	x		.90	60.0	67.0
Doppler	x		.85	510.0	600.0
D.R. Computer	x		.85	98.0	115.0

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2. MAINTENANCE (CONDITIONS (a) and (b))

A.C. Loadscont'd

Service	Cont.	Short Duration	P.F.	Watts	V.A.
<u>Heating and De-Icing</u>					
Temp. Cont. Units (W/S & Canopy (4)	x		.95	1.14	1.2
Temp. Control - Cockpit	x		1.0	10.0	10.0
Temp. Control - Radar	x		1.0	10.0	10.0
L/H Ramp De-Icing		x	1.0	8355.0	8355.0
R/H Ramp De-Icing		x	1.0	8355.0	8355.0
W/S & Canopy Anti-Icing		x	1.0	5250.0	5250.0
<u>Lighting</u>					
Front C/P Inst. Lights (Transformer)	x		.95	38.5	40.5
Front C/P Console Edge Lights (Trans.)	x		.95	37.4	39.4
Front C/P Cons. Flood Lights (Trans.)	x		.95	45.0	47.4
Rear C/P Cons. Flood Lights (Trans.)	x		.95	45.0	47.4
Rear C/P Cons. Edge Lights (Trans.)	x		.95	25.0	26.3
<u>Power</u>					
<u>Fuel and Oil</u>					
Engine Control (Amplifier (2)	x		.95	476.0	500.0
C.G. Attitude Sensor	x		.60	8.0	13.3
<u>Radio (Navigation and Comm)</u>					
U.H.F. Command	x		.84	108.0	129.0
Radio Compass Tuning Drive		x	.85	21.0	25.0
U.H.F. Homer	x		.85	5.1	6.0
Data Link	x		.85	425.0	500.0
<u>Radar</u>					
Displays	x		.85	128.0	150.0
RX-TX	x		.90	7500.0	8350.0
Compressor	x		.85	306.0	360.0
Signal Data Convert	x		.85	110.0	130.0
Liquid Cooling Unit	x		.85	381.0	450.0
Gyro Heaters		x	1.0	200.0	200.0
Antenna Servo	x		.85	212.0	250.0
A.M.T.I.	x		.85	128.0	150.0
Synchronizer	x		.85	85.0	100.0
Optical Sight	x		.85	42.5	50.0
Computer	x		.85	38.2	45.0
NADAR II	x		.85	51.0	60.0
AN/APX-19 Air to Ground IFF	x		.85	162.0	190.0
AN/APX-26 Interrogator IFF	x		.85	362.0	425.0
AN/APX-27 Transponder IFF	x		.85	255.0	300.0
Fire Control Coupler	x		.85	127.0	150.0
Amplifier Calibrator	x		.85	127.0	150.0
Erection Computer	x		.85	85.0	100.0
Air Data Computer	x		.85	147.0	173.0
<u>Special Electronics</u>					
Infrared	x		.85	600.0	706.0
AN/ARD 501 Homing	x		.85	425.0	500.0
I.R. Cooling Unit	x		.85	340.0	400.0



2. MAINTENANCE (CONDITIONS (a) and (b))

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A.C. Loadscont'd

Service	Cont.	Short Duration	P.F.	Watts	V.A.
<u>D.C. Power</u>					
Low Voltage Power Supply	x		.90	1482.0	1650.0
<u>Warning and Emergency</u>					
Oxygen Capacitance	x		.60	4.0	6.7
<u>A.C. Power</u>					
Power Failure Detector (2)	x		.40	14.4	36.0
<u>Armament Missiles</u>					
Missile Auxiliaries	x		.85	1020.0	1200.0
Missile Heaters (4)		x	1.0	3000.0	3000.0
Weapons Controls	x		.85	170.0	200.0
Sparrow II Missiles - Turbine (4)		x	.85	2820.0	3316.0
- Glow Plug (4)		x	1.0	800.0	800.0
Total				45,802.0	48,789.0

D.C. Loads

Service	Cont.	Short Duration	No. of Units	Total Amps
<u>Control Surface</u>				
Speed Brake	x		1	.7
Hydraulic Pressure Warning Lights	x		4	.8
Damping System	x		1	9.5
<u>Instrument</u>				
U/C Switch Solenoid		x	1	.7
U/C Switch Warning Light		x	1	.17
U/C Indicator	x		3	.5
Pilot's Trim Indicator	x		1	.3
<u>Engine Instruments</u>				
Oil Pressure Indicator Lights	x		2	.4
Fuel Pressure Indicator Lights	x		2	.4
Pilot's R or L Emergency On Light		x	1	.2
Low Rotor O/Speed Indicator Lights	x		2	.4
Fuel Capacitance - AMP/IND	x		2	.6
<u>Flight Instruments</u>				
Turn & Slip Indicator	x		1	.2
Pitot Static	x		2	11.0
Boom Heater	x		1	19.0
<u>Landing Gear</u>				
U/C Valve	x		1	.7
No. 1 Door Up Relay		x	1	.35
No. 2 Door Up Relay		x	1	.2
Anti Spin Solenoids		x	2	2.0
Anti Skid Control	x		1	5.1
Nose Wheel Steering Solenoid		x	1	1.0



2. MAINTENANCE (CONDITIONS (a) and (b))

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D.C. Loadscont'd

Service	Cont.	Short Duration	No. of Units	Total Amps
<u>Armament</u>				
Pack Control		x	1	6.2
<u>Heating, Vent De-Icing</u>				
Ram Air Inlet Control Valve		x	2	1.2
Radar Nose Inlet Control Valve		x	1	.6
Air Conditioning Main Control Valve		x	1	1.0
Air Conditioning External Control Relay	x		1	.2
Air Modulator Relay	x		1	.2
Flow Augmentor Valve		x	1	1.0
C/P Shut-off Valve		x	1	.4
Rain Repellant Air Control Valve		x	1	1.0
Dump Solenoid		x	1	.4
Ground Control Relay	x		1	.35
Engine Air Conditioning S/O Valve		x	2	1.6
Engine Air Conditioning Relay		x	2	.4
Air Flow Shut-off Relay	x		1	.2
Visor Heat		x	2	3.0
Canopy De-Icing Relay		x	4	.6
Air Valve		x	1	.32
De-Icing Solenoid		x	1	1.0
Time Delay Relay		x	1	2.0
Ice Detector		x	3	45.0
De-Icing Controller		x	1	10.0
De-Icing Distributor		x	2	12.0
Parting Strip Relay		x	2	1.0
Engine Anti-Icing Relay		x	2	.4
Engine Anti-Icing Valve		x	2	10.0
<u>Ignition</u>				
Engine Igniters		x	2	20.0
Ignition Relay		x	2	.4
<u>Engine Controls</u>				
Fuel Control Valve		x	2	1.6
Heat Exchanger Oil Cooler Valve	x		2	2.0
Zone No. 1 Ejector Valve		x	2	1.0
Ejector Valve Relay		x	2	.4
Afterburner Relay		x	2	.4
Afterburner Valve		x	2	14.0
Starting Relay		x	2	.7
Manual Reset Relay		x	2	.4
Starting Power Relay	x		1	.3
Ignition Relay		x	2	.4
<u>Lighting</u>				
High Altitude Console Floods	x		4	4.0
Emergency Floods	x		2	.6
Taxi Light		x	1	8.9
Landing Light		x	1	8.9
Wing Tip Light	x		2	1.6



2. MAINTENANCE (CONDITIONS (a) and (b))

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D.C. Loadscont'd

Service	Cont.	Short Duration	No. of Units	Total Amps
<u>LightingCont'd</u>				
Fin Tip Light	x		2	2.2
Landing Light Relay		x	1	.2
Taxi & Landing Light Relay		x	1	.2
Flasher	x		1	.5
<u>Miscellaneous</u>				
Canopy Actuator		x	2	16.0
Pilots Relay		x	1	.2
Service Relay		x	1	.2
Rear Cockpit Relay		x	1	.2
Rear Service Relay		x	1	.2
Canopy Seal Valve		x	1	1.0
<u>D.C. Power</u>				
D.C. Shedding Control Relay	x		1	.5
D.C. Shedding C/O Relay	x		1	.2
Main D.C. Supply Relay	x		1	.4
T.R.U. Signal Relay	x		2	.4
Emergency Bus Relay	x		1	.2
<u>Fuel and Oil</u>				
Tank Level Sensing Valve		x	14	7.0
Air Pressure Regulator O/R Valve		x	2	2.0
Air Pressure Relief O/R Valve		x	2	2.0
Service Check Indicator Light		x	2	.1
Full and Partial Refuel Relay		x	1	.4
Refueling Indicator Lights		x	14	.6
Low Pressure Cock Valve		x	2	10.0
Collector Tank Monitor		x	1	
C.G. Control Units	x		2	12.2
Pump S/O Control Relay		x	2	.4
Low Level Warning Lights	x		2	.34
Pilot's Fuel Transfer Off	x		1	.17
Fuel Shut-off Relay		x	2	.4
Cross Feed Valve		x	1	5.0
Right Fuel System Isolation Valve		x	1	5.0
Left Fuel System Isolation Valve		x	1	5.0
External Tank Jettison Valve		x	1	1.0
External Tank Jettison Relay		x	1	.35
External Tank Air S/O Valve		x	1	1.0
Fuel-No-Air Valve	x		18	3.0
<u>Radio (Navigation & Communication)</u>				
U.H.F. Command	x		1	5.6
Intercomm	x		1	.875
U.H.F. Homer	x		1	3.16
Data Link	x		1	3.64
Radio Compass	x		1	4.2



2. MAINTENANCE (CONDITIONS (a) and (b))

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D.C. Loadscont'd

Service	Cont.	Short Duration	No. of Units	Total Amps
<u>Radar</u>				
Displays (AFCS)	x		1	1.02
Fire Control Compler	x		1	3.06
Erection Computer	x		1	.73
Weapons Control	x		1	2.98
Antenna Servo	x		1	1.09
Optical Sight	x		1	.08
Air-to-Ground I.F.F.	x		1	1.84
Interrogator I.F.F.	x		1	1.93
Transponder I.F.F.	x		1	1.78
Computer - Ballistics	x		1	2.36
<u>Special Electronics</u>				
Infrared	x		1	1.02
<u>Power & Control for A.C. System</u>				
External Supply Line Relay	x		2	1.2
A.C. Line Relay		x	2	1.2
External Line Shedding Relay	x		1	.2
A.C. Shedding Relay		x	1	.55
Transfer Relay	x		2	1.1
Transfer Control Relay	x		1	.2
<u>Warning and Emergency</u>				
Fire Extinguisher		x	2	1.5
Time Delay		x	2	.2
Hydraulic Bay Lock on Relay		x	1	.35
2nd Shot Relay		x	1	.35
Control Unit	x		3	.042
Fire Warning Light		x	3	.12
Fire Protection Relay		x	2	.7
Crash Relay		x	1	.35
Rear Cockpit Bail Out Warning Horn		x	1	4.0
Bail Out Indicator Light		x	2	.7
Master Warning Control	x		1	.34
Master Warning Lights	x		2	.7
Annunciator Box		x	1	.2
Oxygen Capacitance Indicator	x		1	.4
Cabin Pressure Warning Light		x	1	.2
Total				349.7

T.R.U. output of 349.7 amps at 27.5 volts D.C. will require an input of 15,000 VA A.C.

Total A.C. load = 48,789 (A.C. Load) + 15,000 (D.C. Load) = 63.8 KVA A.C.



2. MAINTENANCE (CONDITIONS (a) and (b))cont'd

The foregoing figures show a total possible load of 63.8 KVA, but this load will never be reached during maintenance operations, because of the fact that a high percentage of it is transient load and because it is physically impossible to operate and inspect all circuits simultaneously.

It will be assumed that Maintenance is being carried out under night conditions when cockpit lights might conceivably be switched "ON". Circuits other than those shown in the table, as being continually energized, will be energized for periods ranging from a few seconds to possibly 10 minutes, according to their functions.

During maintenance operations the Radar can be switched to two positions, Operate (NORMAL) and Operate (TEST), this creates two load conditions:-

Operate (NORMAL) With the Radar switched to this position the Radar RX-TX and Antenna Servo load is 8,600 VA.

Operate (TEST) With the Radar switched to this position the Radar RX-TX and Antenna Servo load is reduced to 600 VA.

In order to arrive at a reasonably rational figure for total power required during the two maintenance operation conditions we estimate the following:-

Condition #1 = Total continuous load + 25% of the short duration load.
Radar switched to Operate (NORMAL).

Condition #2 = Total continuous load + 25% of the short duration load.
Radar switched to Operate (TEST).

Condition #1 = Maximum continuous load during maintenance is 19,488.0 VA A.C. + (118.5 amps TRU output = 3,300.0 VA A.C. input) = 22.788 KVA A.C. Adding 25% of the short duration load, the total power required becomes $22.788 + 8.62 = 31.408 \text{ KVA A.C.}$

Condition #2 = Condition #1 total of 31.408 - 8.0 = 23.408 KVA A.C.



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3. READINESS - STANDBY - (CONDITION (c))

A.C. Loads

Service	Cont.	Short Duration	P.F.	Watts	V.A.
<u>Instrument</u>					
Skin Temperature Indicator	x		.70	4.0	5.7
<u>Engine Instruments</u>					
Fuel Capacitance	x		.60	16.0	26.6
Turbine Discharge Temperature (2)	x		.60	12.0	20.0
Pressure Ratio Indicators (2)	x		.67	120.0	180.0
<u>Flight Instruments</u>					
Artificial Horizon (Transformer)	x		.90	60.0	67.0
<u>Heating and De-Icing</u>					
Temp. Cont. Units (Canopy & W/S) (4)	x		.95	1.14	1.2
Temperature Control - Cockpit	x		1.0	10.0	10.0
Temperature Control - Radar	x		1.0	10.0	10.0
W/S & Canopy Anti-Icing		x	1.0	5250.0	5250.0
<u>Lighting</u>					
Front Cockpit Inst. Lights (Trans.)	x		.95	38.5	40.5
Front C/P Cons. Edge Lights (Trans.)	x		.95	37.4	39.4
Front C/P Cons. Flood Lights (Trans.)	x		.95	45.0	47.4
Rear C/P Cons. Flood Lights (Trans.)	x		.95	45.0	47.4
Rear C/P Cons. Edge Lights (Trans.)	x		.95	25.0	26.3
<u>Fuel and Oil</u>					
Engine Control C.G. Attitude Sensor	x		.95	476.0	500.0
<u>Warning & Emergency</u>					
Oxygen Capacitance (2)	x		.60	4.0	6.7
<u>A.C. Power</u>					
Power Failure Detectors (2)	x		.40	14.4	36.0
<u>Control Surface</u>					
Damping	x		.85	93.5	110.0
<u>Flight Instruments</u>					
Doppler	x		.85	510.0	600.0
D.R. Computer	x		.85	98.0	115.0
<u>Radio (Navigation and Communication)</u>					
U.H.F. Command	x		.85	108.0	129.0
Radio Compass Tuning Drive		x	.85	21.0	25.0
U.H.F. Homer	x		.85	5.1	6.0
Data Link	x		.85	425.0	500.0
<u>Radar</u>					
Compressor	x		.85	306.0	360.0
Liquid Cooling Unit	x		.85	381.0	450.0
Gyro Heaters		x	1.0	200.0	200.0
AN/APX-19 Air to Ground IFF	x		.85	162.0	190.0
<u>Partial Load</u>	x		.85	4250.0	5000.0
<u>Armament Missiles</u>					
Missile Heaters (4)		x	1.0	3000.0	3000.0
Total				15,427.0	16,999.0



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3. READINESS - STANDBY - CONDITION (c)cont'd

D.C. Loads

Service	Cont.	Short Duration	No. of Units	Amps
<u>D.C. Power</u>				
D.C. Shedding Control Relay	x		1	.5
D.C. Shedding C/O Relay	x		1	.2
Main D.C. Supply Relay	x		1	.4
T.R.U. Signal Relay	x		2	.4
Emergency Bus Relay	x		1	.2
<u>Power & Control for A.C. System</u>				
External Supply Line Relay	x		2	1.2
External Line Shedding Relay	x		1	.2
Transfer Relay	x		2	1.1
Transfer Control Relay	x		1	.2
<u>Warning & Emergency</u>				
Fire Protection Relay		x	2	.7
Master Warning Control	x		1	.7
Master Warning Lights (R & A)	x		2	.34
Annunciator Box		x	1	.7
Oxygen Capacitance Indicator	x		1	.2
<u>Control Surface</u>				
Speed Brake	x		1	.7
Hydraulic Pressure Warning Lights	x		4	.8
<u>Instrument</u>				
Undercarriage Indicators	x		3	.5
Pilot's Trim Indicator	x		1	.3
<u>Engine Instruments</u>				
Oil Pressure Indication Lights	x		2	.4
Fuel Pressure Indication Lights	x		2	.4
Pilot's R or L "EMERGENCY ON" Light		x	1	.2
Fuel Capacitance AMP/IND	x		2	.6
<u>Flight Instruments</u>				
Turn and Slip Indicator	x		1	.2
Pitot Static	x		2	11.0
Boom Heater	x		1	19.0
<u>Landing Gear</u>				
Undercarriage Valve	x		1	.7
<u>Heating, Vent. De-Icing</u>				
Air Conditioning External Control Relay	x		1	.2
Flow Augmentor Valve		x	1	1.0
Ground Control Relay	x		1	.35
Air Flow Shut-off Relay	x		1	.2
Canopy De-Icing Relay		x	4	.6
<u>Engine Controls</u>				
Fuel Control Valve		x	2	1.6
<u>Ignition</u>				
Engine Igniters		x	2	20.0
Ignition Relay		x	2	.4



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3. READINESS - STANDBY - CONDITION (c)

D.C. Loadscont'd

Service	Cont.	Short Duration	No. of Units	Amps
<u>Miscellaneous</u>				
Canopy Actuator		x	2	16.0
Service Relay		x	2	.4
<u>Fuel</u>				
Fuel-No-Air Valve		x	18	3.0
<u>Control Surface</u>				
Damping System	x		1	9.5
<u>Radio (Navigation and Communication)</u>				
U.H.F. Command	x		1	5.6
Intercomm	x		1	.875
U.H.F. Homer	x		1	3.16
Data Link	x		1	3.64
Radio Compass	x		1	4.2
<u>Radar</u>				
Displays (A.F.C.S.)	x		1	1.02
Fire Control Coupler	x		1	3.06
Erection Computer	x		1	.73
Weapons Control	x		1	2.98
Antenna Servo	x		1	1.09
Optical Sight	x		1	.08
Air to Ground IFF	x		1	1.84
Interrogator IFF	x		1	1.93
Transponder IFF	x		1	1.78
Computer Ballistics	x		1	2.36
<u>Special Electronics</u>				
Infrared	x		1	1.02
Total Amps				130.155

Condition (c) may be carried out at night when the cockpit lights will be switched "ON".

When the short duration loads are ignored, the continuous D.C. load is 85.55 amps, this will require an input to the T.R.U. of 2,700 VA A.C.

Total continuous - requirement is therefore 2,700.0 VA (D.C. Load) + 8,524.0 VA (A.C. Load) = 11,224 VA = 11.25 KVA A.C.

Total short duration-requirement is 16,999.0 VA (A.C. Load) + (130.155 amps T.R.U. output = 3,500.0 VA A.C. input) = 20,499.0 VA = 20.5 KVA A.C.



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4. TURN AROUND - CONDITION (d)

D.C. Load

Service	Cont.	Short Duration	No. of Units	Amps.
<u>Fuel</u>				
Tank Level Sensing Valves		x	14	7.0
Air Pressure Regulator O/R Valves		x	2	2.0
Air Pressure Relief O/R Valves		x	2	2.0
Service Check Indicator Lights		x	2	.1
Full and Partial Refuel Relay	x		1	.4
Refueling Indicator Lights		x	14	.6
C.G. Control Units	x		2	13.2
Low Level Warning Lights	x		2	.34
Pilot's Fuel Transfer Off Light	x		1	.17
<u>Armament</u>				
Pack Control		x	1	6.2
Total				32.01

Condition (d), power requirements are considered to be the same as for condition (c) (Standby-Readiness) with the addition of power for the Pressure Refueling and Armament systems, if the Radar is required to be left in Standby condition.

The total continuous power requirement for condition (c) with Radar on Standby is 11.25 KVA A.C.

The continuous power requirements for "Refueling" and "Armament" is 14.11 amps D.C. This will require an input to the T.R.U. of 1,500.0 VA A.C.

The total continuous power requirement for condition (d), with Radar on Standby is therefore, $11.25 + 1.5 = 12.75$ KVA A.C.

The total short duration power requirement for condition (c) with Radar on Standby is 20.5 KVA A.C.

The short duration power requirement for "Refueling" and "Armament" is 32.01 amps D.C. This will require an input to the T.R.U. of 1,700.0 VA A.C.

The total short duration power requirement for condition (d) with Radar on Standby is therefore, $20.5 + 1.7 = 22.2$ KVA A.C.

If no power is required for the Radar during condition (d), the total continuous power requirement will be reduced by 9.5 KVA A.C., and the total short duration power requirement will be reduced by 12.685 KVA A.C.



5. SUMMARY

From the foregoing we can tabulate the theoretical power requirements when the aircraft is on the ground as follows:-

For 1st and 2nd Line Maintenance

With Radar switched to Operate (NORMAL):-

maximum continuous power = 22.788 KVA A.C.

maximum short duration power = 31.408 KVA A.C.

With Radar switched to Operate (TEST):-

maximum continuous power = 14.788 KVA A.C.

maximum short duration power = 23.408 KVA A.C.

For Readiness - Standby

maximum continuous power = 11.25 KVA A.C.

maximum short duration power = 20.50 KVA A.C.

For Turn-Around

With Radar in Standby condition:-

maximum continuous power = 12.75 KVA A.C.

maximum short duration power = 22.20 KVA A.C.

With no power to Radar:-

maximum continuous power = 3.25 KVA A.C.

maximum short duration power = 9.32 KVA A.C.

In the initial design of the A.C. Ground Power Unit we believe it advisable to add a safety factor of 30%.

For A.C. Ground Power Unit design, our requirements are therefore:-

For 1st and 2nd Line Maintenance

maximum continuous power = $22.8 \times 1.3 = 29.6$ KVA.

maximum short duration power = $31.5 \times 1.3 = 41.0$ KVA.

For Readiness - Standby

maximum continuous power = $11.3 \times 1.3 = 14.7$ KVA.

maximum short duration power = $20.5 \times 1.3 = 26.7$ KVA.

For Turn-Around

If Radar is to be left in Standby condition:-

maximum continuous power = $12.8 \times 1.3 = 16.6$ KVA.

maximum short duration power = $22.2 \times 1.3 = 28.9$ KVA.



5. SUMMARYcont'd

For Turn-Around

If Radar is to be left in OFF condition:-

maximum continuous power = $3.3 \times 1.3 = 4.3$ KVA.

maximum short duration power = $9.3 \times 1.3 = 12.1$ KVA.

6. CONCLUSION

The A.C. Ground Power Unit shall be capable of supplying to the Aircraft Receptacle a continuous load of 40 KVA at .75 PF to unity PF, 208/120V, 3 ϕ , 400 cps. In order to operate the necessary control relays on the aircraft when external A.C. power is plugged in, the Ground Power Unit must also supply approximately 5.0 amperes at 28V D.C., which will be fed to the aircraft via the same connector as the A.C. Power.

It is suggested that the A.C. Ground Power Unit be fitted with a 40 KVA Aircraft Alternator in order to supply Ground Power identical with Aircraft Power. Equipment specification E500 covers the design requirements for the Aircraft Alternator.

7. POWER REQUIREMENTS FOR ENGINE STARTING UNIT

In order to cater for the condition when the Servicing Unit is not available, the aircraft engines are capable of being started with the Engine Starting Unit, which is required to supply 28 volt D.C., and 115 volt, 400 cps single phase A.C., to energize the following circuits:-

D.C.

Undercarriage Indication	.09 amp
Speed Brake	.7 amp
Pilot's R. or L. Emergency On Light	.2 amp
Canopy Seal Valve	1.0 amp
Emergency Bus Relay	.2 amp
Fire Protection	.8 amp
Fire Extinguisher	2.0 amps
Master Warning Lights	.7 amp
Master Warning Control	.3 amp
Low Pressure Cock Valves	10.0 amps
Canopy Actuation and Control	16.8 amps
Starter Control Valves	2.5 amps
Engine Starting	31.0 amps
Intercomm	.9 amp
U.H.F. Command	5.6 amps
Turn and Slip Indicator	.2 amps

A.C.

Engine Starting	500 VA
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7. POWER REQUIREMENTS FOR ENGINE STARTING UNITcont'd

The total short duration load for these services is of the order of
73.00 amperes D.C. and 500 VA A.C.

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