

QCX  
Avro  
CF105  
E-2

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ANALYZED

AVRO AIRCRAFT LIMITED

MALTON, ONTARIO

Aircraft

CF-105

Report No. E-2

No. of Sheets 85

ESTIMATED POWER LOADS

FOR

CF-105 AIRCRAFT

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15799928

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POWER LOADS

## 1. Primary Electrical Service Loads - Essential for Flight

SERVICE	LOADS
Oxygen System	13.3 VA
Cockpit Lights	403.7 VA
Artificial Horizon	67.0 VA
Fuel Capacitance	13.3 VA
Air Conditioning	30.0 VA
Pressure Ratio Indicator	25.0 VA
	<u>552.3 VA</u>
R/H Transformer-Rectifier	2670.0 VA
L/H Transformer-Rectifier	2670.0 VA
TOTAL	<u>5892.3 VA</u>

## 1.1 D.C. loads - breakdown of transformer - rectifier loads

	CONTINUOUS	INTERMITTENT	INSTANTANEOUS	SHORT TIME
Engine Services	.59 amps	.50 amps	34.90 amps	
Ignition Relight (10 Secs)				14.00 amps
U/C Actuation	5.96 amps			
U/C Indication	.09 amps			
Nose Wheel Steering	1.18 amps			
Fuel System			16.00 amps	
Low Pressure Cocks			6.00 amps	
External Tank Jettison			8.35 amps	
Fire Extinguisher			19.15 amps	
Fire Detection		1.08 amps		
Canopy Actuation (8 secs)				17.72 amps
Refuelling	34.18 amps		34.00 amps	
Fuel Capacitance	.32 amps			
Alternator Controls	5.74 amps			
Hydraulic Pres Warning	.74 amps			
Speed Brakes	.6 amps			
Turn & Bank	.2 amps			
Cockpit Lights	3.66 amps			
Exterior Lights	6.94 amps			
Ramp De-Icing (Control)	16.01 amps			
Ice Detection		32.14 amps		
Air Conditioning	2.50 amps		3.50 amps	
Landing Lights	20.00 amps			
Ice Detection (Ramps & Radome)		18.75 amps		

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## 1.1 (Cont'd)

In terms of A.C. load an arbitrary requirement of 125 amps D.C. continuous (Based on the premise that all loads will not be on simultaneously.) is equivalent to 5340 VA which is divided between the two TRUs as shown in Para. 1.0.

- 1.2 On failure of one TRU part of the D.C. load (Para. 2.0) is shed leaving approximately 100 amps on the remaining unit, due to the increased efficiency of the unit when loaded to its full rating this is equivalent to 4200 VA.

2.0 D.C. LOADS (SHEDDING)

This load is shed on failure of one TRU.

SERVICE	LOAD
Landing & Taxi Lights	500 watts

In terms of A.C. load this equals 840 VA which is divided 420 VA on the R/H TRU and 420 VA on the L/H TRU.

3.0 PRIMARY ELECTRONIC LOADS - ESSENTIAL FOR FLIGHT

- 3.1 Supplied by electrics on failure of MX 1179 integrated electronics power supply unit.

## 3.2

SERVICE	A.C.	D.C.
AN/APX -25 Air to ground IFF	270 VA	110 Watts
Misc		100 Watts
TOTAL	270 VA	210 Watts

In terms of AC load this equals 353 VA which is divided 177 VA each to the R/H & L/H TRU's.

## 3.3

SERVICE	A.C.	D.C.
V.H.F. Communication AN/ARC-52	100 VA	220 Watts
Interphone AN/AIC-10		80 Watts
TOTAL	100 VA	300 Watts

\* In terms of AC load this equals 504 VA which is divided 252 VA each to the R/H & L/H TRU's.

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## 3.4 Supplied by Electrics at all times

SERVICE	A.C.	D.C.
AN/ARN6 Inc. Remote Control	25 VA	140 Watts
Radar Homar	180 VA	-
Doppler	500 VA	-
Air Data Boom	300 VA	-
Damping (Emergency Channel)	100 VA	-
J-4 Compass	60 VA	-
TOTAL	1165 VA	140 Watts*

\* In terms of AC load this equals 235.5 VA which is divided 118 VA each to the R/H & L/H TRU's.

4.0 WEAPONS SERVICE LOAD NOT ESSENTIAL FOR FLIGHT

SERVICE	A.C.	D.C.
Weapons System (Falcon)	400 VA	80 Watts*
Accumulator Heat	600 VA	-
TOTAL	1000 VA	80 Watts

\* In turns of A.C. load this equals 135 VA which is divided 68 VA each to the R/H & L/H TRU's.

These loads normally fed from the Electrical System are automatically shed on failure of MX 1179.

5.0 INTAKE DUCT DE-ICING LOAD

Right Hand - 8400 V.A.  
Left Hand - 8400 V.A.

6.0 WINDSHIELD & CANOPY ANTI-ICING LOAD - ESSENTIAL 2500 V.A.7.0 LOAD DISTRIBUTION

Normal Flight

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7.1 LOAD DISTRIBUTION (Cont'd)PARA REF.

1.0	R/H 20 KVA Alternator -	Primary Electrical	552.3	VA
5.0		R/H Duct De-Icing	8400	VA
6.0		Windshield De-Icing	2500	VA
4.0		Weapons	1000	VA
3.4		Primary Electronics	1165.0	VA
1.0		(R/H) D.C. Primary	2670	VA
2.0		TRU (D.C. Shedding	420	VA
			16698.3	VA
5.0	L/H 20 KVA Alternator	L/H Duct De-Icing	8400	VA
		L/H (D.C. Primary	2670	VA
		TRU (D.C. Shedding	420	VA
			11490	VA

7.2 MX1179 Failure - Both Alternators Operating

1.0	R/H 20 KVA Alternator -	Primary Electrical	552.3	VA
5.0		R/H Duct De-Icing	8400	VA
6.0		Windshield De-Icing	2500	VA
3.4		Primary Electronics	1165.0	VA
1.0		(D.C. Primary	2670.0	VA
2.0	R/H	(D.C. Shedding	420.0	VA
3.3	TRU	(Electronic DC Primary	252.0	VA
3.2		(Electronic DC Shedding	177.0	VA
			16136.3	VA
3.2	L/H 20 KVA Alternator -	Primary Electronic	510.0	VA
5.0		L/H Duct De-Icing	8400.0	VA
1.0		(D.C. Primary	2670.0	VA
2.0	L/H	(D.C. Shedding	420.0	VA
3.3	TRU	(Electronic DC Primary	252.0	VA
3.2		(Electronic DC Shedding	177.0	VA
			12429.0	VA

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7.3 Right Alternator Out - MX1179 & Left Alternator Normal

1.0	Primary Electrical	552.3 VA
5.0	L/H Duct De-Icing	8400.0 VA
7.0	Wind Shield De-Icing	2500.0 VA
4.0	Weapons	1000.0 VA
3.4	Primary Electronics	1165.0 VA
1.2	L/H - TRU - D.C. Primary	4200.0 VA
		<hr/> 17808.3 VA

7.4 Left Alternator Out - MX1179 & Right Alternator Normal

1.0	Primary Electrical	552.3 VA
5.0	R/H Duct De-Icing	8400.0 VA
7.0	Windshield De-Icing	2500.0 VA
4.0	Weapons	1000.0 VA
3.4	Primary Electronics	1165.0 VA
1.2	R/H - TRU - D.C. Primary	4200.0 VA
		<hr/> 17808.3 VA

\* In case of failure of 1 alternator and the loss of one TRU the remaining TRU could carry the full D.C. primary Load.

8.0 RESERVE POWER

Available power (2 alternators)	40.0 KVA
Power Load (Para 7.2)	<hr/> 28.5 KVA
Reserve Power	11.5 KVA
Total Electrical System Load	28.5 KVA
Less fixed anti-icing load	<hr/> 16.8 KVA
	11.7 KVA

Therefore reserve Electrical Power = 100%

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