ack AUro CF 105 71 Maint 11-13

ARROW I

ANALYZED

MAINTENANCE INSTRUCTIONS

WINDSCREEN AND CANOPY DE-ICING

71/MAINT 11/13

J.H. PARKIN BRANCH

ANNEXE J. H. PARKIN CNRC - ICIST

ARROW I

MAINTENANCE INSTRUCTIONS

Classification cancelled / Changed to UNCLASS

By authority of AVRS

Date 30 Supt 6 Signature Bully

Unit / Rank / Appointment AVESS

WINDSCREEN AND CANOPY DE-ICING

71/MAINT 11/13

7 October 1957

Prepared

Maintenance Engineering Section

Approved

Design Group

Approved

Authorized

ENGINEERING DIVISION, AVRO AIRCRAFT LIMITED, MALTON, ONTARIO



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## 1. DESCRIPTION

#### 1.1 General

- 1.1.1 The windshield and canopy window panels are constructed of a number of plies of glass. The heating element is affixed to the inside of the outer ply and consists of a layer of transparent electrically conductive thermo-plastic.
- 1.1.2 The two window panels of the pilot's canopy and the two panels of the windshield are electrically heated to prevent misting and icing. An independently operated heating and temperature control circuit is provided for each panel.
- 1.1.3 The circuit for each panel includes a temperature controller, a sensor and a circuit relay. These components operate in conjunction to restrict the temperature of the heating elements to  $110^{\,\mathrm{OF}}$ .
- 1.1.4 The heating elements operate on 300-340 volts a-c which is supplied by a 3-phase 5.25 KVA auto-transformer. The auto-transformer is operative when the a-c primary bus bars are live. The two windshield panels are supplied from separate phases. The two window panels derive their supply from a common phase.
- 1.1.5 The power supply circuit for each heating element incorporates a circuit relay, the circuit being completed when the relay is energized. The operation of the circuit relay is controlled by the appropriate temperature control circuit.
- 1.1.6 There are no control switches for the system, the circuits being automatically operative when the main d-c and primary a-c bus bars are live.

### 1.2 Operation

- 1.2.1 The operating limits of each of the four temperature controllers and their associated temperature sensors are identical.
- 1.2.2 Each temperature controller incorporates a magnetic amplifier, a control relay, a supply relay and three segments of a bridge circuit. The fourth segment of the bridge is connected to the temperature sensor.
- 1.2.3 The temperature sensor is imbedded in the panel in contact with the heating element. It is a resistor with a positive co-efficient of temperature characteristic (i.e. as temperature rises, resistance increases; as



# 1.2.3. (continued)

temperature falls, resistance decreases).

- 1.2.4 Two segments of the bridge circuit are connected to two of the three cores of the magnetic amplifier. These cores have a control function. The third core, which has a constant voltage applied, serves as a reference core.
- 1.2.5 The bridge circuit is balanced when the panel temperature is  $110^{\circ}$ . Until this temperature is reached, the unbalance condition of the bridge results in the induction across the secondary winding of the magnetic amplifier of a voltage which is sufficient to energize the control relay.
- 1.2.6 The control relay, when energized, completes the ground return for the coil of the supply relay. The supply relay then completes the supply circuit to the coil of the circuit relay which in turn closes the supply circuit to the heating element.
- 1.2.7 When the peak temperature of 110°T is reached, the control relay is de-energized. The sensor must then decrease in resistance (decrease in temperature) to a value which will sufficiently unbalance the bridge to allow the relay to be energized (relay pull-in will require greater unbalance than relay drop-out) and again supply power to the panel heating element.

#### 2. FUNCTION TESTS

#### 2.1 Introduction

2.1.1 These functional checks are to ensure that the electrical components of the Windscreen and Canopy Desicing system are functioning correctly.

### 2.2 Ground Test Equipment

- (a) A-C Ground Power Supply Unit
- (b) W/S and Canopy De-Icing Test Panel

#### 2.3 Description of W/S and Canopy De-Icing Test Panel

2.3.1 The test panel is comprised of an a-c voltmeter, a miliameter, a five position wafer selector switch and the necessary cabling and connectors to enable the panel to be connected into the W/S and Canopy De-icing circuit at E40 panel in the nose wheel well.



- 2.3.2 The heater line voltage and the sensor circuit current will be indicated for any leg of the circuit selected for test.
- 2.3.3 The voltmeter being connected to the normally desenergized side of the relay contacts will also indicate the closing of the appropriate circuit relay, and should indicate the transformer secondary line to ground voltage of 310 ± 10 volts.
- 2.3.4 The miliameter is wired to be inserted in series with the temperature sensor circuit of the selected leg, and this milliamp reading will decrease in relation to increase of windscreen or canopy heat to the controlled shut-off temperature of  $110^{-5}$  5 F.
- 2.3.5 The consequent drop-out of the circuit relay will be indicated by the voltmeter.

### 2.4 Preparation for Tests

- 2.4.1 Connect the test panel in series with E40 panel as follows:
  - 2.4.1.1 Disconnect connector E1000/41 at E40 panel and connect it to the mating connector on the test panel.
  - 2.4.1.2 Connect the remaining connector on the test panel to equipment #1 on E40 panel.
- 2.4.2 Connect the ground wire from the test panel to the ground terminal on E40 panel.
- 2.4.3 Ensure that the two W/S TEMP. CONTROL circuit breakers and the three FORWARD DE-ICING circuit breakers, located on El circuit breaker panel, are serviceable and set.
- 2.4.4 Withdraw the following current limiters from E40 panel
  - (a) Equipment #11 L. W/Screen
  - (b) Equipment #12 R. W/Screen
  - (c) Equipment #13 L. Canopy
  - (d) Equipment #14 R. Canopy

Ensure they are serviceable and replace them individually in relation to the leg of the circuit selected for test.

2.4.5 Connect the A-C ground power supply unit to the aircraft.

#### 2.5 Function Check-R. Canopy De-Icing

- 2.5.1 Replace the R. Canopy limiter on E40 panel.
- 2.52 Select the MASTER ELECTRICS switch to the ON position.



- 2.5.3 Select the circuit selector switch on the test panel to R CANOPY.
- 2.5.4 The voltmeter should read 310 = 10 volts and the miliameter should read approximately \* milliamps.
- 2.5.5 When the R canopy reaches the cut-off temperature of 110° ± 5°F, the voltmeter reading should drop to zero and the miliameter reading should be approximately \* milliamps.
- 2.5.6 Select the MASTER ELECTRICS switch to OFF.
- 2.5.7 Remove the R.H. canopy limiter.

# 2.6 Function Check-L Canopy De-Icing

2.6.1 Repeat the procedure outlined in the previous paragraphs 2.5.1 to 2.5.7 reading L canopy for R. 6 mopy.

# 2.7 Function Check-L W/S De-Icing

2.7.1 Repeat the procedure outlined in the previous paragraphs 2.5.1 to 2.5.7 reading L W/Screen for R. Canoby.

#### 2.8 Function Check-R W/S De-Icing

2.8.1 Repeat the procedure outlined in the previous paragraphs 2.5.1 to 2.5.6 reading R. W/Screen for R. Canopy. & Figures to be incorporated in report when available.

## 2.9 Procedure on Completion of Tests

- 2.9.1 Disconnect A-C ground power supply unit from the aircraft.
- 2.9.2 Disconnect the test panel from the aircraft.
- 2.9.3 Reconnect connector E1000/41 to Equipment #1 on E40 panel.
- 2.9.4 Replace the three current limiters at Equipment #11-13-14 on E40 panel.

#### 3. PERIODIC INSPECTIONS

Carry out inspections as outlined in ARROW I Preliminary Maintenance Schedule 71/MAINT 00/2. (Formerly Maintenance Report 105-02)

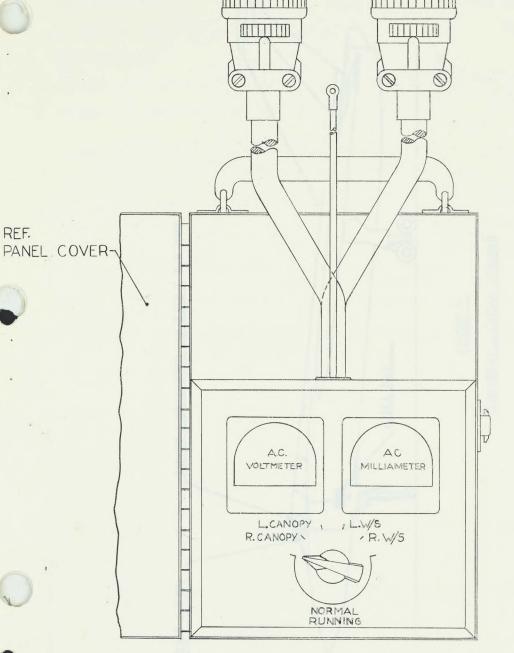


FIGURE I

W/S AND CANOPY DE-CING TEST PANEL

REF.

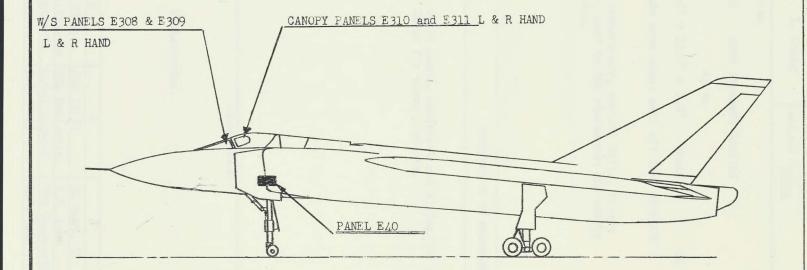


FIGURE 2

COMPONENT LOCATION DIAGRAM

CONFIDENTIAL

MAINTENANCE	DATA RECORD	SYSTEM DE-ICING	REF. NO. 20-26
AVRO AIRCRAFT LTD.	Engineering Div.	DESTOING	11-E40
DISTRIBUTION: STANDARD +	A/C TYPE - Arrow 1	COMPONENT	
S. Brown I. Craig K. Knowlton	EFF. A/C -25201	Windscreen and Ca Panel	nopy De-icing
MANUFACTURER'S PART NO.		AVRO PART NO.	ALLE THE
MANUFACTURER'S NAME AVro Air	rcraft Limited	7-2052-1	
AVROCAN SPEC. Nil E.O	. NO.		
envelope size 13.0" x 15.0" x	5.0" WEIGHT LB.	REF. DWGS. 7-2052-21	
300-10-131-310-3100	22 21 21 205 000	7-1100-2	
LOCATION Left side nose wheel	I well ait Sta. 195-208	7-1100-3	Suc 19
FUNCTION Houses transformer,		REF. M.D.R.	
and limiters, used in the de-icing system.	windscreen and canopy	20-13,20-10, 20-1	1
		RELIABIL	ITY
		OVERHAUL LIFE 150	O HRS.
		Q.T.R. Pending	

INSPECT	TION	OPERATION TO BE PERFORMED			MINUTES
PERIO	DD			EST.	ACTUA
Prima	777			23442	AJMBR
Elect	rics   Check pa	nel, equipment a r blown limiters	nd wiring for security and damag	e 1 x 5	
	CLas Taring			SCAT	
	1 4 25				
		ACCESSIBILI	TY		
	Unobstru	cted.			
SSUE	1	2	3		
		2 Jan 17/57	3 20 Sept. 57		
DATE	1 Sept. 25/56 D. Collingwood	Jan 17/57 WO2 Wentworth	20 Sept. 57 K.P. Lowe		
SSUE DATE COMPILED CHECKED	1 Sept. 25/56	Jan 17/57	20 Sept. 57		

		LUBRICAT	ION NIL			
PPLICATION	MATERIAL	SPECIFICATION	FREQUENCY		ACCESS	N.
	restronge.		A - MAKE DAM	7 0114		
and an adding	Industrial Art. Co.		377. XXC -25	about of		
ETAILS:	to read to	14		011	AT PERMIT	ANDREW
						TARL CAM
						200.200.000
	TOTAL DELL'A	GROUND SUPPORT	FOUIPMENT	This was		
SPECIAL	TOOLS FOR AIRCRAFT			TOOLS FOR BENC	CH USE	
			The Transfer of	1948 13500 OC		-95,000
	NIL		ne mentalma 1	NIL		bys
GROUND TESTING EQUIPMENT			CROIND	HANDLING EQUIP	MENT	
GROUI	TESTING EVOLMENT		GROUND	IDDING EQUIP		
A=C Command	Power Unit		Coolerit	as stord		
A=0 Ground	lower unit		Cockpit acce Maintenance	ss stand Platform 4G/1	596	
TOTAL A MAN		eminates a o	r komisen		Hells	
TERCHANGEABL	E X	REMOVAL IN	STRUCTIONS			MINUTES
EPLACEABLE					EST.	ACTUAL
Electrics	Disconnect 1 el Disconnect wiri Disconnect 1 bo	ng from transfo			1 x 10	
Airframe	Disconnect 1 pi Remove 5 mounti	pe from transfo ng screws.	rmer.		1 x 15	
		Remove and	d replace		1 x 25	
					ŧ	

MAINTENANCE	SYSTEM DE-ICING	REF. NO. 20-18	
AVRO AIRCRAFT LTD.	Engineering Div.	DE TOTAL	11-E40/6
DISTRIBUTION: STANDARD +	A/C TYPE - Arrow 1	COMPONENT	
S.Brown K. Knowlton	EFF. A/C - 25201	Transformer - Canopy De-Ici	
MANUFACTURER'S PART NO.		AVRO PART NO.	
MANUFACTURER'S NAME Hammer	Transformer Co.	7-20	52-1.6
AVROCAN SPEC. E 496 E	.o. no.		
ENVELOPE SIZE 9.00" X 7.00"	k,6.125" WEIGHT 18.5 LB.	REF. DWGS.	50 05 <b>5</b>
	T 01 11 0	7-20	52-257 52-1
	) - Left side of nose wheel		00-2 sht 1
well.			00-3 sht 15
FUNCTION Transforms 3 ph 400 cycles from alternato with a rated output of 5.	rs to 310 ± 10 volt A.C. 25 KVA to be used in the	REF. M.D.R.	20-26
canopy and windscreen de-	icing system.	RELIAE	BILITY
		OVERHAUL LIFE 150	OO <b>HRS.</b>
		O.T.R. P	ending

INSPECTIO	ON	OPERATION	OPERATION TO BE PERFORMED			MINUTES
PERIOD					EST.	ACTUA
Primary Electrics	S Check tra	ansformer and wiri	ng for security	and cleanliness	1 x 2	
25 Hrs.	Function 71/MAINT	check - Ref. Main	t. Instruction l	Report	1 x 15	
	1943.79					
		ACCESSIBILIT	Υ			
		ACCESSIBILIT	Y			
	Accessib panel E4 L/H side	le on windscreen a	and canopy de-ic	ing control 207		
SSUE	panel E40	le on windscreen a	and canopy de-ic	ing control 207		
	panel E40 L/H side	le on windscreen and on mose wheel we have a second control of the	and canopy de-ic well - Sta. 194-	ing control 207		
DATE	panel E40 L/H side 1 Sept. 10/56	le on windscreen and on nose wheel votes and the second se	and canopy de-ic rell - Sta. 194-	ing control 207		
COMPILED	panel E40 L/H side	le on windscreen and on nose wheel vo.	and canopy de-ic rell - Sta. 194- 3 July 26/57	ing control 207		

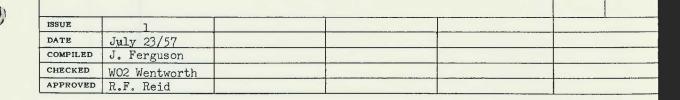
		LUBRICAT	TION NIL			
APPLICATION	MATERIAL	SPECIFICATION	FREQUENCY		ACCESS	YA.
			- maxes			
DETAILS:				or to	AS PROMES	SAISH
		GROUND SUPPOR	T EQUIPMENT	*00.T is *0.	JyP man a	MACON
SPECIAI	L TOOLS FOR AIRCRAFT	USE	SPECIAL TO	OOLS FOR BENG	CH USE	
	NIL	373		NIL		
GRO	UND TESTING EQUIPMENT		GROUND HA	ANDLING EQUIP	MENT	
W/S	S & Canopy De-Icin		Cockpit acce Maintenance I	Platform 4G	/1596	MINUTE
REPLACEABLE		REMOTALIN	TATE OF TORS		EST.	ACTU
Rer	CCTRICAL  move 4 mounting bosconnect electrica	l wiring	and Panlaga		3 7 10	
AII	RFRAME	nemove	and Replace		1 x 10	
Dis	sconnect 1 air con	ditioning pipe	for transformer		1 x 4	
			Remove and	replace		

.CTU

I A M	NTENANCE	DA	ATA RECORD	DE_ICING	REF. 1	NO.
AVRO	AIRCRAFT LTD.		Engineering Div.	22-10-10-	11-E40	
	STANDARD +		A/C TYPE - ARROW 1	COMPONENT		
	Brown			Relay-L. W/S De-	-ice	
	Inowlton		EFF. A/C -25201			
				AUDO DART NO		
MANUFACTURE	er's part no. N,	/A		AVRO PART NO.		
	TOT TOOM!	DON'TO	CDDGT47 MIDG	7 0050 15		
MANUFACTURE	ER'S NAME ELECTI	RONIC :	SPECIALTIES	7-2052-15		
AVROCAN SPE	a F1.51	E.O. NO				
AVROCAN SI 2.	С. Ццуц	E.O. 111	5.			
ENVELOPE SIZ	E 2.6875" x 2.	5" x 1	.625" WEIGHT .6 LB.	7-1100-3 Sht. 1	5	
				7-1100-2 Sht. 1		
		E40 -	L.H. side nose wheel	7-2052-1		
we	11.					
Tal	n		1 2- 4- 41.			
L. W/S h	hen energizea,	compte	etes an a-c supply to the	e REF. M.D.R. 20-26		
T' MA\ O II	eater.			20-20		
				RELIAB	II IT V	
				KELIAU	ILIT	
				OVERHAUL LIFE	.500	HRS.
				WASTAGE		
				Q.T.R. Pending		
Diene Carl						
INSPECTIO			OPERATION TO BE PERFORME	D	MEN X M	ACTUA
FERIOL			and the second section of the second		E01.	ACT OF
PRIMARY	Check re	elay ar	nd wiring for security		1 x 1	2 12 11
25 Hr.			k - Ref. Maint. instruction	on report	1 x 15	
	71/Maint	: 11/15	3			
	12.1					
			ACCESSIBILITY			
				control namel		
Ŷ	Accessible on w	rindscr	reen and canopy de-icing o	offor or patier		
	Accessible on w E40, mounted in	vindscr nose	reen and canopy de-icing o wheel well Sta. 195-207 I	J.H. side		
ı,	Accessible on w	vindscr n nose	reen and canopy de-icing ( wheel well Sta. 195-207 I	L.H. side		
I	Accessible on w E40, mounted in	vindscr n nose	reen and canopy de-icing ( wheel well Sta. 195-207 I	L.H. side		
1	Accessible on w E40, mounted in	vindscr n nose	reen and canopy de-icing ( wheel well Sta. 195-207 I	L.H. side		
]	Accessible on w E40, mounted in	vindscr n nose	reen and canopy de-icing ( wheel well Sta. 195-207 I	L.H. side		
]	Accessible on w E40, mounted in	vindscr n nose	reen and canopy de-icing ( wheel well Sta. 195-207 I	L.H. side		
]	Accessible on w	vindscr n nose	reen and canopy de-icing ( wheel well Sta. 195-207 I	L.H. side		
ISSUE	E40, mounted in	vindscr n nose	reen and canopy de-icing ( wheel well Sta. 195-207 I	L.H. side		
ISSUE	E40, mounted in	vindscr n nose	reen and canopy de-icing ( wheel well Sta. 195-207 I	L.H. side		
ISSUE DATE '	E40, mounted in July 23757	vindscr n nose	reen and canopy de-icing ( wheel well Sta. 195-207 1	L.H. side		
ISSUE DATE COMPILED	E40, mounted in	vindscr n nose	reen and canopy de-icing ( wheel well Sta. 195-207 1	L.H. side		

		LUBRIC	CATION NIL	SOMENS			
APPLICATION	MATERIAL	SPECIFICATION		AC	CESS	A LINE VALUE	
			Okto - Adda arv				
			100 S - 104 AXX				
DETAILS:	OR THAT OF			T CHICAGO	C'S RAVE	AsunAd	
						NA STERNA NA	
CDECIAL	TOOLS FOR AIRCRAF		ORT EQUIPMENT	OLS FOR BENCH	USE		
JI BOMD	TODO TON AMONAP						
	NIL			NIL			
	MIII		The second second	11.1.4.			
GROUN	ND TESTING EQUIPMEN	NT	GROUND HA	ANDLING EQUIPME	NT		
A/C Ground Po			Cockpit access star	nd			
w/S and Canop	by De-icing Test	c Panel	Maintenance platfor	rm - 4G/1596			
			II .			1	
			S ASSESSED				
INTERCHANGEABL	EX	REMOVA	LINSTRUCTIONS		MEN × M	MINUTES	
	E X	REMOVAI	L INSTRUCTIONS		MEN × M	MINUTES	
REPLACEABLE			L INSTRUCTIONS				
REPLACEABLE  1. Remové re 2. Disconne	elay cover plate	e - 4 screws	LINSTRUCTIONS				
REPLACEABLE  1. Remové re 2. Disconne	elay cover plate	e - 4 screws	LINSTRUCTIONS				
REPLACEABLE  1. Remové re 2. Disconne	elay cover plate	e - 4 screws	Remove and replace	e		ACTUAL	
REPLACEABLE  1. Remové re 2. Disconne	elay cover plate	e - 4 screws		e	EST.	ACTUAL	
REPLACEABLE  1. Remové re 2. Disconne	elay cover plate	e - 4 screws		9	EST.	ACTUAL	
REPLACEABLE  1. Remové re 2. Disconne	elay cover plate	e - 4 screws			EST.	ACTUAL	
REPLACEABLE  1. Remové re 2. Disconne	elay cover plate	e - 4 screws		B	EST.	ACTUAL	
REPLACEABLE  1. Remové re 2. Disconne	elay cover plate	e - 4 screws		e	EST.	ACTUAL	
REPLACEABLE  1. Remové re 2. Disconne	elay cover plate	e - 4 screws		B	EST.	ACTUAL	
REPLACEABLE  1. Remové re 2. Disconne	elay cover plate of electrical co mounting screws	e - 4 screws onnections	Remove and replace		EST.	ACTUAL	
REPLACEABLE  1. Remové re 2. Disconne	elay cover plate ot electrical co mounting screws	e - 4 screws onnections		Lu Po widza	EST.	ACTUAL	
REPLACEABLE  1. Remové re 2. Disconne	elay cover plate ot electrical co mounting screws	e - 4 screws onnections	Remove and replace	Lu Po widza	l x 15	ACTUAL	
REPLACEABLE  1. Remové re 2. Disconne	elay cover plate ot electrical co mounting screws	e - 4 screws onnections	Remove and replace	Lu Po widza	l x 15	ACTUAL	
REPLACEABLE  1. Remové re 2. Disconne	elay cover plate ot electrical co mounting screws	e - 4 screws onnections	Remove and replace	Lu Po widza	l x 15	ACTUAL	

		DATA RECORD	SYSTEM DE-ICING	20-20	28
AVRO AIRCRA		Engineering Div.		11-1	E40/8
ISTRIBUTION: STANI		A/C TYPE - ARROW 1	COMPONENT		
S. Bro K. Kno	own owlton	EFF. A/C -25201	Relay - R. W/S De-	-ice	
MANUFACTURER'S PA	ART NO. N/A		AVRO PART NO.		
MANUFACTURER'S NA	ME ELECTRONIC	C SPECIALITIES	7-2052-15		
avrocan spec. E451	54 E.O.	, NO.			
PAUPI OPESIZE 2 6	07EII - 2 5II Y	1.625" WEIGHT .6 LB.	REF. DWGS.		
SNVELUF BELL 200	875" * ~ • > *	1,02)" "2,011	7-1100-3 Sht. 15		
LOCATION Mounte	d on E40 Pane	l - L.H. side nose wheel	7-1100-2 Sht. 1		
well	4 011		7-2052-1		
	energized, com R. W/S heater	mpletes an A-C supply to	REF. M.D.R. 20-26		
			RELIABIL	ITY	
			OVERHAUL LIFE 1500		HRS.
			WASTAGE Q.T.R. Pending		
INSPECTION		OPERATION TO BE PERFORMI	ARD.	MEN × M	
PERIOD				EST.	ACTUA
PRIMARY	Check relay	and wiring for security	101	lxl	
25 Hour		eck - Ref. Maint Instruction	on report	2 - 15	
	71/Maint. 11	1/13.	Marketon Successive States	1 x 15	
		ACCESSIBILITY			



		LUBRICA	TION NIL			
APPLICATION	MATERIAL	SPECIFICATION	FREQUENCY	A	CCESS	W.A.
		1 10	DI - SALLEON			
	10 3/0-10 made		0.000			
DETAILS:						
		GROUND SUPPOR	T EQUIPMENT		N granes	STATE OF THE PARTY
SPECIAL	TOOLS FOR AIRCRAFT	USE	SPECIAL TO	OOLS FOR BENC	H USE	
	NIL			NIL		
GROU	JND TESTING EQUIPMENT	r	GROUND HA	ANDLING EQUIPA	MENT	
A/C Ground P W/S and cand	Power Unit		Cockpit access Sta Maintenance platfo		6	
INTERCHANGEAB	LE X				MEN X	MINUTES
REPLACEABLE	A	REMOVALI	NSTRUCTIONS		EST.	ACTUA
2. Disconne	relay cover plate ect electrical con 4 mounting screws	nnections	and replace		1 x 15	
						200 034
					1	200 SA
					1	200 SA
					1	9/30

<u>)</u>.

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MAINT	ENANCE	DATA RECORD	SYSTEM	REF. NO.
AVRO AIRCRA	AFT LTD.	Engineering Div.	DE-ICING	11-E40/9
S.Bro K. Kr		A/C TYPE - Arrow 1 EFF. A/C - 25201	COMPONENT Relay ~ L. Canop	y De-Ice
MANUFACTURER'S PA MANUFACTURER'S NA AVROCAN SPEC. E	AME Electronic		AVRO PART NO. 7-205	2-15
envelope size 2	.6875" x 2.5" ted on E40 pa	x 1.625" WEIGHT 0 .6 LB.		0-3 sht 15 -2 sht 1 2-1
	energized con . Canopy hear	mpletes an a-c supply to ter.	REF. M.D.R. 20-26	
			RELIABI	LITY
			overhaul life 15 wastage q.t.r. Pend	
INSPECTION PERIOD		OPERATION TO BE PERFORME	D	MEN X MINUTE
Primary	Check rela	y and wiring for security.		1 x 1
25 Hr.	Function c 71/MAINT 1	heck - Ref. Maint. Inspection 1/13	n Report	1 x 15
		ACCESSIBILITY		

ISSUE

COMPILED CHECKED

APPROVED

23 July 57
J. Ferguson
W02 Wentworth

R.F. Reid

		LUBRICA	TION NIL	
APPLICATION	MATERIAL	SPECIFICATION	FREQUENCY	ACCESS
			- 14M D-A	
			- 250 250	
DETAILS:	ON TRANS ONE	A.		6 . IN THAT PRINCIPATION
		GROUND SUPPOR	T EQUIPMENT	C.C. x. I.C. C.J.C. Institute
SPECIAL	TOOLS FOR AIRCRAFT	USE	SPECIAL TO	DOLS FOR BENCH USE
	NIL			NIL
GROU	ND TESTING EQUIPMENT		GROUND HA	ANDLING EQUIPMENT
.eea l	Al sect societari	o l	* <u>*</u>	
A/C Ground	Power Unit nopy De-Icing Tes	st Panel	Cockpit access Maintenance Pla	stand tform - 4G/1596
ny b and sa	mopy be reing to	70 2 0.1102		4.4 277
		LINESSEE SIT	M HOUSERS IN	
INTERCHANGEABL	E X	REMOVAL I	NSTRUCTIONS	MEN × MINUTES
REDIACEARIE		KEMPTAE.	MOTROCTIONS	EST. ACTUAL
REPLACEABLE				EST. ACTUAI
1.		cover plate -	4 screws	EST. ACTUAI
	Disconnect e		4 screws	EST. ACTUAI
1. 2.	Disconnect e	cover plate -	4 screws	EST. ACTUAI
1. 2.	Disconnect e	cover plate -	4 screws	EST. ACTUAI
1. 2.	Disconnect e	cover plate -	4 screws	EST. ACTUAI
1. 2.	Disconnect e	cover plate -	4 screws	EST. ACTUAI
1. 2.	Disconnect e	cover plate - lectrical conn nting screws	4 screws	1 x 15
1. 2.	Disconnect e	cover plate - lectrical conn nting screws	4 screws ections.	
1. 2.	Disconnect e	cover plate - lectrical conn nting screws	4 screws ections.	
1. 2.	Disconnect e Remove 4 mou	cover plate - lectrical conn inting screws	4 screws ections.	1 x 15
1. 2.	Disconnect e Remove 4 mou	cover plate - lectrical conn nting screws	4 screws ections.	1 x 15
1. 2.	Disconnect e Remove 4 mou	cover plate - lectrical conn inting screws	4 screws ections.	1 x 15
1. 2.	Disconnect e Remove 4 mou	cover plate - lectrical conn inting screws	4 screws ections.	1 x 15
1. 2.	Disconnect e Remove 4 mou	cover plate - lectrical conn inting screws	4 screws ections.	1 x 15
1. 2.	Disconnect e Remove 4 mou	cover plate - lectrical conn inting screws	4 screws ections.	1 x 15
1. 2.	Disconnect e Remove 4 mou	cover plate - lectrical conn inting screws	4 screws ections.	1 x 15

MAINTENANCE	DATA RECORD  Engineering Div.	SYSTEM DE-ICING	REF. NO. 20-30 11-E40/10
AVRO AIRCRAFT LTD.  DISTRIBUTION: STANDARD +  S. Brown	COMPONENT		
K. Knowlton	EFF. A/C - 25201	Relay - R. Can	opy De-Ice
manufacturer's part no. N/A		AVRO PART NO.	- Allerso
MANUFACTURER'S NAME Electron:	ic Specialties	7-20	52-15
AVROCAN SPEC. E454 E.	O. NO.		
ENVELOPE SIZE 2.6875" x 2.5"	x 1.625" WEIGHT 0.6 LB.	REF. DWGS.	00-3 sht 15
Mounted on E40 par well.	nel - L.H. side nose wheel		0-2 sht 1 52-1
When energized, conto the R. Canopy he	REF. M.D.R.	6	
		RELIAB	ILITY
		OVERHAUL LIFE 15	00 HRS.
		Q.T.R. Pendi	ng
INSPECTION	COMPANION TO DE DEPONDE		MEN × MINUTES

(a)

INSPECT	OPERATION TO BE PERFORMED		MEN X N	MINUTES
PERIO	D		EST.	ACTUAL
Primary	Check	relay and wiring for security.	1 x 1	Limi
25 Hr.	Functi 71/MAI	ion check - Ref. Maint. Instruction Report INT 11/13	1 x 15	
		ACCESSIBILITY		
		sible on windscreen and canopy de-icing control E40, mounted in nose wheel well Sta. 195-207 side.		
ISSUE	1			
DATE	July 23/57			
COMPILED	J. Ferguson			
	WO2 Wentworth	h		
CHECKED	WOZ Well CWOPCI			

			LUBRIC	ATION NIL		11111
PPLICATION	MATI	ERIAL	SPECIFICATION	FREQUENCY	ACCES	S
				2000 200 City - 100 300		
ETAILS:				tali Leanna es	ATTENDED TO SELECT	
E I			GROUND SUPPO	RT EQUIPMENT		
SPECIAL	TOOLS FOR	AIRCRAFT	USE	SPECIAL '	TOOLS FOR BENCH US	E
	NIL				NIL	
GROU	JND TESTING	EQUIPMENT	•	GROUND	HANDLING EQUIPMENT	0.000
A/C Grou W/S and	and Power Canopy Do	Unit e-Icing T	est Panel	Cockpit Access Maintenance Pl	s Stand atform 4G/1596	
TERCHANGEABI	LE X				ME	EN × MINUTES
EPLACEABLE	DE A		REMOVAL	INSTRUCTIONS		ST. ACTUAL
2.	Disconn Remove	ect elect	er plate - 4 crical connect g screws.	screws.ions.  Remove and rep	lace	c 15
					ald he said	
					Market Co. Co.	

M A I N T	ENANCE	DATA RECORD  Engineering Div.	DE-ICING		REF. 1 20- 11-E/	
S. Brown K. Knowlton	NDARD +	COMPONENT Temperatu: Windscre	re Contro een De-Io		and R	
MANUFACTURER'S P MANUFACTURER'S N AVROCAN SPEC.	AME AiResear	ech	AVRO PART N	o. 7-2052-	13	
	ted on panel	x 2.62" WEIGHT 2.5 LB. E40-L.H. side Nose Wheel	REF. DWGS.		3 sht 1 2 sht 1	
glass, autom	atically upor	perature of the windscreen receipt of specified	REF. M.D.R.	20-26		
			OVERHAUL LII WASTAGE Q.T.R.	reliabili Fe 1000 Pending		HRS.
INSPECTION PERIOD		OPERATION TO BE PERFORME	D		MEN × M	ACTUAL
Primary Electrics		t for security and damage.	6	.1	1 x 2	Assia
25 Hrs. Electrics	Function of	check - Ref. Maint. Instructio	on Report		1 x 15	

INSPECT	TION		MEN X N	MINUTES		
PERIO	)D		N TO BE PERFORMED		EST.	ACTUAL
D-4					1000/00	
Primary Electri	cs Check un	it for security ectrical connect	and damage. or for security.	150.00	1 x 2	
25 Hrs.						
Electri	cs Function	check - Ref. Ma	int. Instruction	Report		
	71/MAINT	11/13			1 x 15	
					-	
					755	
		ACCESSIBIL	ITY			
	Accessit	ole on windscreen	and canopy De-Id	cing control		
	panel E4	O, mounted in no	se wheel well STA	1970207		
	24 11 0200					
	<b>4</b> 1. 52ac					
ISSUE		2	3	1 4		
ISSUE DATE	1	2	3 April 8/57	4 July 23/57		
ISSUE DATE COMPILED	1 24 Sept. 56	2 19 Dec. 56	April 8/57	July 23/57		
DATE	1	2				



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APPLICATION		LUBRICATI	ON NIL			
	MATERIAL	SPECIFICATION	FREQUENCY	AC	CESS	7.8.
Carl III		1,150,15	- 217, 412	S. Street Williams		
DETAILS:	AN YEAR OLD		Horse der och	SEET, of The case	TARREST COLOR	DANUNAM DANUNAM MANUNIA
	11.0	GROUND SUPPORT	EQUIPMENT	TENT OF THE	size s	CONTRACTOR IN
SPECIAL 7	TOOLS FOR AIRCRAFT	USE	SPECIAL TO	OOLS FOR BENCH	USE	
	NIL		NIL			
GROUNI	D TESTING EQUIPMENT		GROUND HA	ANDLING EQUIPME	ENT	
A/C Ground	d Power Unit anopy De-Icing Te	est Panel	Cockpit acces Maintenance P	es stand	1 506	
		distance and the lost-	PATE AND ADDRESS OF THE PATE A	Tation Ady	MEN X I	MINUTES
NTERCHANGEABLE	x	REMOVAL INS	PATE AND ADDRESS OF THE PATE A	13.0101111 /49/1	. 19170 - 94	MINUTES
NTERCHANGEABLE REPLACEABLE ELFC	x	REMOVAL INS	TRUCTIONS	1a.01 01 iii .4,49	MEN × I	
nterchangeable  REPLACEABLE  ELFC  Dis  Ren	TRICS sconnect 1 Electronove 4 - 10/32 mover 4	rical connector ounting bolts.	TRUCTIONS		MEN × N	
nterchangeable  REPLACEABLE  ELFC  Dis  Ren	TRICS sconnect 1 Electronove 4 - 10/32 me	REMOVALINS rical connector ounting bolts.  Remove an	TRUCTIONS		MEN × N	

R

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TING 11=E40/ MENT erature control = L. an py De-Ice PART NO.  52-13  WGS.  100-3 Sht. 15 100-2 Sht. 1 052-1  D.B.R26  RELIABILITY  AUL LIFE HRS  MEN × MINU EST. AC	nd R.
MGS.  100-3 Sht. 15 100-2 Sht. 1 052-1  D.R26  RELIABILITY  AUL LIFE HRS  GE	UTES
100-3 Sht. 15 100-2 Sht. 1 052-1  D.R26  RELIABILITY  AUL LIFE HRS	JTES
RELIABILITY  AUL LIFE HR:  GE  MEN × MINU	JTES
AUL LIFE HRS	UTES
MEN × MINU	UTES
1 x 2	
l x 15	
	-

2

July 23/57

J. Ferguson WO2 Wentworth R.F. Reid

ISSUE

DATE

COMPILED

Jan 4/57

CHECKED D. Collingwood
CHECKED WO2 Wentworth
APPROVED R.F. Reid

		LUBRIC	ATION NIL		7.81.4	
PPLICATION	MATERIAL	SPECIFICATION	FREQUENCY	AC	CESS	
	THE RESULT	120	MOST PORTED A	20 (00) pa(1)		THANKSON
	est-ni spini		105 St - 219 MARS			
ETAILS:	- 10 THAT OR	Va.]		аста октов	PERMIT	DATUMBE
						DANUMAN
						The second of
	200	GROUND SUPPO	PT FOILIPMENT			
SPECIAL	TOOLS FOR AIRCRAFT			OOLS FOR BENCH	USE	
			10 9019 -8-1 - 013		True 1	Willes out
	NIL			NIL		_ v
		1000				
GROU	ND TESTING EQUIPMEN	Т	GROUND H	ANDLING EQUIPME	NT	
		ш				
A/C Ground F W/S and canc	opy de-icing test	panel	Cockpit access sta Maintenance platfo	ena orm - 4G/1596		
	_	COMPANY NO.	on relativistics		100000	
NTERCHANGEABL REPLACEABLE	EX	REMOVAL	INSTRUCTIONS		MEN X 1	ACTUAL
EPLACEABLE					ESI.	ACTUAL
			L.	MIN 2020		30114
1.	Disconnect 1 Ele	ctrical connec	tor,			
	Disconnect 1 Ele			THE RESIDENCE OF		F (3)
	Disconnect 1 Ele Remove 5-10/32		•	Tal/Malant		7.0
				ce	1 x 10	
			•	ce	1 x 10	
			•	ce	1 x 10	
			•	ce	1 x 10	
			•	ce		
		mounting bolts	•	ce		
		mounting bolts	Remove and replace		Mare	
		mounting bolts	Remove and replace	marrather as	Male	
		mounting bolts	Remove and replace	marrather as	Mare	
		mounting bolts	Remove and replace	marrather as	Male	
		mounting bolts	Remove and replace	marrather as	Male	
		mounting bolts	Remove and replace	marrather as	Male	
		mounting bolts	Remove and replace	and the second s	Male	

MAINTEI	NANCE D	DATA RECORD	SYSTEM	REF.	
AVRO AIRCRAF		Engineering Div.	ELECTRICS	11-E	308
DISTRIBUTION: STANDA S. Brown K. Knowl	RD +	A/C TYPE - Arrow 1 EFF. A/C - 25201	COMPONENT Panel - Heat Windscreen B		
MANUFACTURER'S PAR			AVRO PART NO. 7-1052-1388		
AVROCAN SPEC.	E223 E.O.	. NO.			
envelope size 19.75			REF. DWGS. 7-1100-3 sht	15	
panel.		d ice-free Glass windscreen	REF. M.D.R. 52-3		
Heater, e	element Resis	tance 70.4 ± 10.6 ohms	RELIABI	LITY	
312.7			OVERHAUL LIFE WASTAGE Q.T.R.		HRS.
INSPECTION		OPERATION TO BE PERFORM	ED ED	MEN X	MINUTES
PERIOD	(6			EST.	ACTUA
Primary Structure 25 Hrs Electrics		M.D.R. 52-3  check (See Maintenance Ins 11/13)	structions Report	2 x 10	
	1.				
		ACCESSIBILITY			
	Unobstru				

ISSUE

DATE
COMPILED
CHECKED

APPROVED

24 Sept 57 K.P. Lowe

WO2 Wentworth R.F. Reid

			LUBRICA	TIONNIL			
APPLICATION	MATE	RIAL	SPECIFICATION	FREQUENCY	A	CCESS	
D made of		The lame		- 316 ARE			-to-traff
ETAILS:	10 L. 17				100		DATEMENT
		- Del 19	GROUND SUPPOR	T EQUIPMENT		. Danie	I TO LEWIS
SPECIAL 7	COOLS FOR	AIRCRAFT	USE	SPECIAL T	OOLS FOR BENCI	H USE	
	NIL		in Their	NIL			Ł
GROUNI	TESTING	EQUIPMENT		GROUND H	ANDLING EQUIPM	ENT	
A-C Ground Power Unit W/S and Canopy De-icing Test Panel			Cockpit Access Stand  Maintenance Platform 4G/1596				
NTERCHANGEABLE	XX					MENX	MINUTES
REPLACEABLE			REMOVALI	NSTRUCTIONS		EST.	ACTUAL
	ret et.	net.	M.D.R. 52-3				

MAINTENANCE	E DATA RECORD	SYSTEM ELECTRICS	REF.	NO. -E310	
AVRO AIRCRAFT LTD.	Engineering Div.	4			
S. Brown K. Knowlton	A/C TYPE - Arrow 1 EFF. A/C - 25201	COMPONENT Panel - Hea Pilot's Cano			
AANUFACTURER'S PART NO.		AVRO PART NO.			
MANUFACTURER'S NAME Libb	by-Owens	7-1053-212			
AVROCAN SPEC. E223	3 E.O. NO.			exemple of the second	
ENVELOPE SIZE 14.875" x 9.0	00" x 1.18" WEIGHT LB.	REF. DWGS.			
the R.H. side of	st and ice free Glass panel in	7-1100-3 sht  REF. M.D.R.  53-1	4.7	-	
Heated element r	resistance 71.4 + 15% ohms.	RELIABILITY			
		OVERHAUL LIFE WASTAGE Q.T.R.		HRS.	
INSPECTION	OPERATION TO BE PERFORME	CD CO	MEN X	MINUTES	
PERIOD			EST.	ACTUA	
Primary Refe	er to M.D.R. 53-1		1.17.49		

.6

INSPECTION	OPERATION TO BE PERFORMED	MEN × MINUTE
PERIOD	4 5 5	EST. ACTU
Primary Structure	Refer to M.D.R. 53-1	
25 Hrs Electrics	Function Check (See Maintenance Instructions Rep 71/Maint 11/13)	2 x 10
		C 1) t
	ACCESSIBILITY	
	Control of the Contro	
	Unobstructed	
SSUE	1	
DATE 24	Sept 57	
OMPILED K.P	. Lowe	
	T. L. L.	
HECKED WO2	Wentworth	

DDI IGI MION		LUBRICATI	NIL NIL	
PPLICATION	MATERIAL	SPECIFICATION	FREQUENCY	ACCESS
		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
ETAILS:				
SDECIAL T	OOLS FOR AIRCRA	GROUND SUPPORT		OLS FOR BENCH USE
SPECIAL 1	NIL		NIL	
GROUNI	TESTING EQUIPME	ENT	GROUND HA	NDLING EQUIPMENT
A-C Ground Power Unit W/S and Canopy De-icing Test Panel			Cockpit Access Stand  Maintenance Platform 4G/1596	
INTERCHANGEABLE	xx	REMOVAL INS	TRUCTIONS	MEN × MINUTES
REPLACEABLE		KEMOTAL INS	1 1 0 1 1 0 1 1 5	EST. ACTUAL
	neier to Hei	. M.D.R. 53-1		

MAINTENANCE	DATA RECORD	SYSTEM ELECTRICS	REF. NO.	
AVRO AIRCRAFT LTD.	Engineering Div.		11. 10/07	
DISTRIBUTION: STANDARD + S. Brown K. Knowlton	A/C TYPE - Arrow 1 EFF. A/C - 25201	COMPONENT Panel - Heat Windscreen I		
MANUFACTURER'S PART NO.  MANUFACTURER'S NAME  AVROCAN SPEC. E223	E.O. NO.	AVRO PART NO. 7-1052-1387		
ENVELOPE SIZE 19.75" x 9.375" x 1.040" WEIGHT LB.		<b>REF. DWGS.</b> 7-1100-3 sht 15		
FUNCTIONTO provide a mist a panel.	nd ice free Glass windscree	n REF. M.D.R. 52-3		
Heater element resi	RELIABILITY			
constitution of the		OVERHAUL LIFE WASTAGE Q.T.R.	HRS.	
INSPECTION	OPERATION TO BE PERFOR	MED	MEN × MINUT	

· 6 · · ·

INSPECT	ION	OPERATION TO BE PERFORMED	MEN X I	WINUTES
PERIO	D		EST.	ACTUAL
Primary Structur	Refer to M.I	D.R. 52-3	1	
25 Hrs Electric		eck (See Maintenance Instructions Report /13)	2 x 10	
	U,			
	A	CCESSIBILITY		
	Unobstructed	d		
ISSUE	1			L
DATE	24 Sept 57			
COMPILED	K.P. Lowe			
CHECKED	WO2 Wentworth			
APPROVED	R.F. Reid			

		LUBRICAT	ION NIL	SPEAKITK	
PPLICATION	MATERIAL	SPECIFICATION	FREQUENCY	ACCESS	
ETAILS:					
				that have	THAT WAS
		GROUND SUPPORT			
SPECIAL T	TOOLS FOR AIRCRAF	T USE	SPECIAL TO	OLS FOR BENCH USE	
	NIL		NIL		
GROUNI	D TESTING EQUIPME	NT	GROUND HA	NDLING EQUIPMENT	
-C Ground Po	ower Unit		Cockpit Access Stand		
W/S and Canop Test Panel		10	Maintenance Pla		
TERCHANGEABLE	xx				
				MEN ×	MINUTES
PLACEABLE	Refer to Ref.		STRUCTIONS	MEN X	ACTUAL
PLACEABLE	Refer to Ref.		STRUCTIONS		
PLACEABLE	Refer to Ref.	, M.D.R. 52-3	STRUCTIONS		
EPLACEABLE	Refer to Ref.	, M.D.R. 52-3			
EPLACEABLE	Refer to Ref.	, M.D.R. 52-3			
EPLACEABLE	Refer to Ref	, M.D.R. 52-3			
PLACEABLE	Refer to Ref.	, M.D.R. 52-3			

M A I N T		DATA RECORD  Engineering Div.	SYSTEM ELECTRICS	REF. NO. 11-E311
DISTRIBUTION: STA	·	A/C TYPE - Arrow I	COMPONENT _	
S. Brown K. Knowlto	n	EFF. A/C - 25201	Pane Heated Glass - 1 L.H.	
MANUFACTURER'S I	NAME Libby - Ow		AVRO PART NO. 7-1053-2	11
ENVELOPE SIZE 1	E223 E.o 4.875" x 9.00" ts Canopy L.H.	x 1.18" WEIGHT	REF. DWGS. 7-1100-3	sht 15
panel in the	provide a mist L.H. side of th tance 71.4 OHMS	and ice free glass e_pilot's canopy. Heater = 15%	REF. M.D.R. 53-1	
			RELIAB	ILITY
	\		OVERHAUL LIFE WASTAGE Q.T.R.	HRS.
INSPECTION		OPERATION TO BE PERF	LADVID	MEN X MINUTES
PERIOD		OPERATION TO BE PERF	ORMED	EST. ACTUA
Primary Structure	Refer to M.D	.R. 53-1		
25 Hrs. Electrics	Function che	ck (See Maintenance Ins 13)	tructions report	2 x 10
•				
		ACCESSIBILITY		

ISSUE

DATE

25 Sept. 57

COMPILED K.P. Lowe CHECKED WO2 Wentworth APPROVED R.F. Reid

		LUBRICATI	ON NIL		
APPLICATION	MATERIAL	SPECIFICATION	FREQUENCY	ACCESS	
			- BEST SLE		
		1000	5 34 48 7		
DETAILS:					
		GROUND SUPPORT	FOUIDHENT		
SPECIAL	TOOLS FOR AIRCRAF			OOLS FOR BENCH USE	
SPECIAL	TOOLS FOR AIRCRAF	1 002	0.202.2		
	NIL		NII	L	
GROU	ND TESTING EQUIPMEN	NT	GROUND HA	ANDLING EQUIPMENT	
140 Ground Pow			Cockpit Access St		
I/S and Canopy	De-icing_test p	panel	Maintenance Plat	form 4G/1596	
INTERCHANGEABL	E XX	REMOVAL INS	TRUCTIONS	MEN X N	
REPLACEABLE				EST.	ACTUAL
Refer to	o Ref. M.D.R. 53	_1			
110101 0	J 1101 6 116D 616 77	-1			



ARROW 1

MAINTENANCE INSTRUCTIONS

ELECTRICS - AIR CONDITIONING

71/MAINT 11/11

AUGUST 1958

Prepared:

K.P. Lowe

Maintenance Engineering

Approveds (

G.F. Emmerson

Section Chief, Maintenance and

mounder

Reliability

Authorizeds

. Ames

Frief of Equipment Design

ENGINEERING DIVISION

AVRO AIRCRAFT LIMITED, MALTON, ONTARIO