

QCX
Auro
CF105
71 Maint
11-13

ARROW I ANALYZED
MAINTENANCE INSTRUCTIONS
WINDSCREEN AND CANOPY DE-ICING
71/MAINT 11/13

NRC - CISTI
J. H. PARKIN
BRANCH

JUN 8 1995

ANNEXE
J. H. PARKIN
CNRC - ICIST



SECURITY CLASSIFICATION - CONFIDENTIAL

ANALYZED

ARROW I
MAINTENANCE INSTRUCTIONS

Classification cancelled / Changed to UNCLASS
By authority of AVES
Date 30 Sept 56
Signature P. Bell
Unit / Rank / Appointment AVES

WINDSCREEN AND CANOPY DE-ICING

71/MAINT 11/13

7 October 1957

Prepared J. Gunnison
For Maintenance Engineering Section

Approved J. Brown
For Technical Design Group

Approved P. Bell
For Equipment Design Group

Authorized J. Gunnison
Project Designer

ENGINEERING DIVISION, AVRO AIRCRAFT LIMITED, MALTON, ONTARIO



CONFIDENTIAL

71/MAINT 11/13

TABLE OF CONTENTS

<u>Chapter</u>	<u>Para.</u>	<u>Subject</u>	<u>Page</u>
1		DESCRIPTION	1
	1.1	General	1
	1.2	Operation	1
2		FUNCTION TESTS	2
	2.1	Introduction	2
	2.2	Ground Test Equipment	2
	2.3	Description of Canopy and Windscreen De-Icing Test panel	2
	2.4	Preparation for Test	3
	2.5	Function Check - R Canopy De-Icing	3
	2.6	Function Check - R W/S De-Icing	4
	2.7	Function Check - L W/S De-Icing	4
	2.8	Function Check - L Canopy De-Icing	4
	2.9	Procedure on Completion of Tests	4
3		PERIODIC INSPECTIONS	4

ILLUSTRATIONS

FIGURE 1	W/S and Canopy De-Icing Test Panel	5
FIGURE 2	Component Location Diagram	6

COMPONENT DATA

11-E40	Windscreen & Canopy De-Icing Panel
11-E40/6	Windscreen & Canopy De-Icing Transformer
11-E40/7	L. W/S De-Icing Relay
11-E40/8	R. W/S De-Icing Relay
11-E40/9	L. Canopy De-Icing Relay
11-E40/10	R. Canopy De-Icing Relay
11-E40/20	L. W/S Temp. Control Unit
11-E40/21	R. W/S Temp. Control Unit
11-E40/22	L. Canopy Temp. Control Unit
11-E40/23	R. Canopy Temp. Control Unit
11-E308	R/H W/S Panel with Breaker Panel
11-E309	L/H W/S Panel
11-E310	R/H Canopy Panel
11-E311	L/H Canopy Panel



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°F.
- 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^oF. 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^oF 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 De-icing 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 milliammeter, 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.



CONFIDENTIAL

71/MAINT 11/13

- 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 de-energized 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 milliammeter 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 $110 \pm 5^{\circ}\text{F}$.
- 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 E1 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.
- 2.5.2 Select the MASTER ELECTRICS switch to the ON position.



CONFIDENTIAL

71/MAINT 11/13

- 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 $110^{\circ} \pm 5^{\circ}\text{F}$, 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. Canopy.

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. Canopy.

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)



CONFIDENTIAL

71/MAINT 11/13

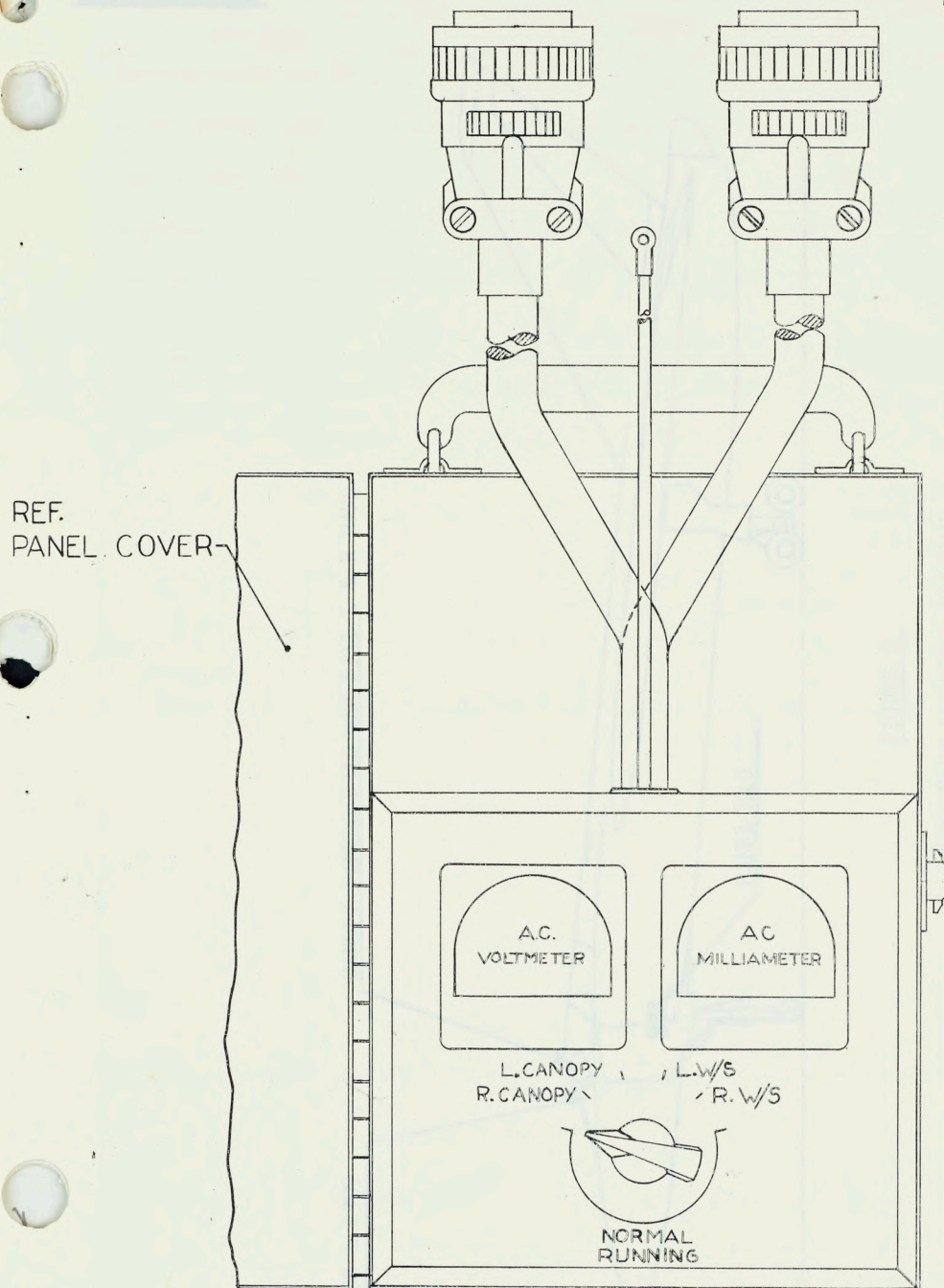


FIGURE I

W/S AND CANOPY DE-ICING TEST PANEL



CONFIDENTIAL

71/MAINT 11/13

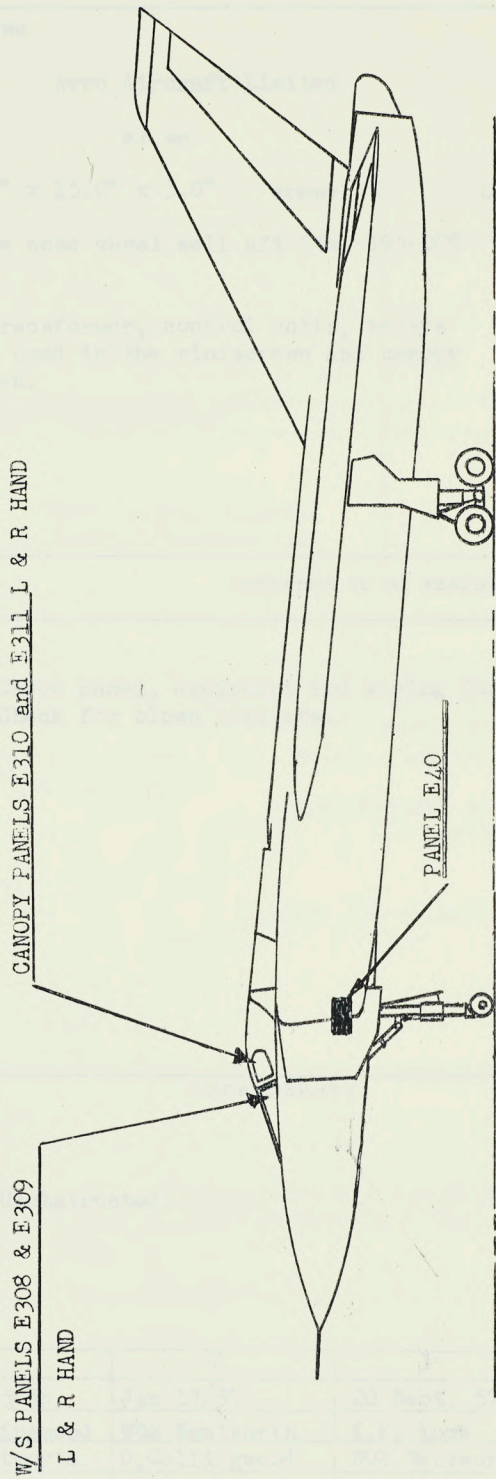


FIGURE 2

COMPONENT LOCATION DIAGRAM

MAINTENANCE DATA RECORD				SYSTEM	REF. NO.
AVRO AIRCRAFT LTD.		Engineering Div.		DE-ICING	20-26 11-E40
DISTRIBUTION: STANDARD + S. Brown I. Craig K. Knowlton		A/C TYPE - Arrow 1 EFF. A/C - 25201		COMPONENT Windscreen and Canopy De-icing Panel	
MANUFACTURER'S PART NO.				AVRO PART NO.	
MANUFACTURER'S NAME Avro Aircraft 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 7-1100-2 sht 1 7-1100-3 sht 15	
LOCATION Left side nose wheel well aft Sta. 195-208					
FUNCTION Houses transformer, control units, relays and limiters, used in the windscreen and canopy de-icing system.				REF. M.D.R. 20-13, 20-10, 20-11	
				RELIABILITY	
				OVERHAUL LIFE 1500 HRS.	
				WASTAGE	
				Q.T.R. Pending	
INSPECTION PERIOD	OPERATION TO BE PERFORMED			MEN X MINUTES	
				EST.	ACTUAL
Primary Electrics	Check panel, equipment and wiring for security and damage Check for blown limiters.			1 x 5	
ACCESSIBILITY					
Unobstructed.					
ISSUE	1	2	3		
DATE	Sept. 25/56	Jan 17/57	20 Sept. 57		
COMPILED	D. Collingwood	W02 Wentworth	K.P. Lowe		
CHECKED	W02 Wentworth	D. Collingwood	W02 Wentworth		
APPROVED	G. Emmerson	R.F. Reid	R.F. Reid		

LUBRICATION NIL

APPLICATION	MATERIAL	SPECIFICATION	FREQUENCY	ACCESS

DETAILS:

GROUND SUPPORT EQUIPMENT

SPECIAL TOOLS FOR AIRCRAFT USE	SPECIAL TOOLS FOR BENCH USE
NIL	NIL
GROUND TESTING EQUIPMENT	GROUND HANDLING EQUIPMENT
A=C Ground Power Unit	Cockpit access stand Maintenance Platform 4G/1596

INTERCHANGEABLE REPLACEABLE	X	REMOVAL INSTRUCTIONS	MEN X MINUTES	
			EST.	ACTUAL
		Electrics - Disconnect 1 electrical connector. Disconnect wiring from transformer Disconnect 1 bonding lead.	1	10
		Airframe Disconnect 1 pipe from transformer. Remove 5 mounting screws.	1	15
		Remove and replace	1	25

MAINTENANCE DATA RECORD				SYSTEM	REF. NO.
AVRO AIRCRAFT LTD.		Engineering Div.		DE-ICING	20-18 11-E40/6
DISTRIBUTION: STANDARD + S. Brown K. Knowlton		A/C TYPE - Arrow 1 EFF. A/C - 25201		COMPONENT Transformer - Windscreen and Canopy De-Icing	
MANUFACTURER'S PART NO.				AVRO PART NO.	
MANUFACTURER'S NAME Hammer Transformer Co.				7-2052-16	
AVROCAN SPEC. E 496 E.O. NO.				REF. DWGS.	
ENVELOPE SIZE 9.00" x 7.00" x 6.125" WEIGHT 18.5 LB.				7-0152-257 7-2052-1 7-1100-2 sht 1 7-1100-3 sht 15	
LOCATION De-Icing panel E40 - Left side of nose wheel well.				REF. M.D.R. 20-26	
FUNCTION Transformer 3 phase, 200-115 volt A.C., 400 cycles from alternators to 310 \pm 10 volt A.C. with a rated output of 5.25 KVA to be used in the canopy and windscreen de-icing system.				RELIABILITY	
				OVERHAUL LIFE 1500 HRS.	
				WASTAGE	
				Q.T.R. Pending	
INSPECTION PERIOD	OPERATION TO BE PERFORMED			MEN X MINUTES	
				EST.	ACTUAL
Primary Electrics	Check transformer and wiring for security and cleanliness			1	2
25 Hrs.	Function check - Ref. Maint. Instruction Report 71/MAINT 11/13			1	15
ACCESSIBILITY					
Accessible on windscreen and canopy de-icing control panel E40, in nose wheel well - Sta. 194-207 L/H side.					
ISSUE	1	2	3		
DATE	Sept. 10/56	Jan. 4/57	July 26/57		
COMPILED	D. Collingwood	D. Collingwood	J. Ferguson		
CHECKED	W02 Wentworth	D. Collingwood	W02 Wentworth		
APPROVED	G. Emmerson	R.F. Reid	R.F. Reid		

LUBRICATION NIL

APPLICATION	MATERIAL	SPECIFICATION	FREQUENCY	ACCESS

DETAILS:

GROUND SUPPORT EQUIPMENT

SPECIAL TOOLS FOR AIRCRAFT USE	SPECIAL TOOLS FOR BENCH USE
NIL	NIL
GROUND TESTING EQUIPMENT	GROUND HANDLING EQUIPMENT
A=C Ground Power Unit W/S & Canopy De-Icing Test Panel	Cockpit access stand Maintenance Platform 4G/1596

INTERCHANGEABLE	REPLACEABLE	X	REMOVAL INSTRUCTIONS	MEN X MINUTES	
				EST.	ACTUAL
			<p><u>ELECTRICAL</u></p> <p>Remove 4 mounting bolts. Disconnect electrical wiring</p> <p style="text-align: center;">Remove and Replace</p>	1 x 10	
			<p><u>AIRFRAME</u></p> <p>Disconnect 1 air conditioning pipe for transformer</p> <p style="text-align: center;">Remove and replace</p>	1 x 4	

CTD

MAINTENANCE DATA RECORD		SYSTEM	REF. NO.	
AVRO AIRCRAFT LTD. Engineering Div.		DE-ICING	20-27 11-E40/7	
DISTRIBUTION: STANDARD + S. Brown K. Knowlton		A/C TYPE - ARROW 1 EFF. A/C -25201	COMPONENT Relay-L. W/S De-ice	
MANUFACTURER'S PART NO. N/A		AVRO PART NO. 7-2052-15		
MANUFACTURER'S NAME ELECTRONIC SPECIALTIES				
AVROCAN SPEC. E454 E.O. NO.				
ENVELOPE SIZE 2.6875" x 2.5" x 1.625" WEIGHT .6 LB.		REF. DWGS. 7-1100-3 Sht. 15 7-1100-2 Sht. 1 7-2052-1		
LOCATION Mounted on panel E40 - L.H. side nose wheel well.				
FUNCTION When energized, completes an a-c supply to the L. W/S heater		REF. M.D.R. 20-26		
		RELIABILITY		
		OVERHAUL LIFE 1500 HRS. WASTAGE Q.T.R. Pending		
INSPECTION PERIOD	OPERATION TO BE PERFORMED	MEN X MINUTES		
		EST.	ACTUAL	
PRIMARY 25 Hr.	Check relay and wiring for security Function check - Ref. Maint. instruction report 71/Maint 11/13	1 x 1 1 x 15		
ACCESSIBILITY Accessible on windscreen and canopy de-icing control panel E40, mounted in nose wheel well Sta. 195-207 L.H. side				
ISSUE	1			
DATE	July 23/57			
COMPILED	J. Ferguson			
CHECKED	W02 Wentworth			
APPROVED	R.F. Reid			

LUBRICATION NIL

APPLICATION	MATERIAL	SPECIFICATION	FREQUENCY	ACCESS

DETAILS:

GROUND SUPPORT EQUIPMENT

SPECIAL TOOLS FOR AIRCRAFT USE	SPECIAL TOOLS FOR BENCH USE
NIL	NIL

GROUND TESTING EQUIPMENT	GROUND HANDLING EQUIPMENT
A/C Ground Power Unit W/S and Canopy De-icing Test Panel	Cockpit access stand Maintenance platform - 4G/1596

INTERCHANGEABLE	REPLACEABLE	X	REMOVAL INSTRUCTIONS	MEN X MINUTES	
				EST.	ACTUAL

CTUA

1. Remove relay cover plate - 4 screws
2. Disconnect electrical connections
3. Remove 4 mounting screws.

Remove and replace

1 x 15

MAINTENANCE DATA RECORD				SYSTEM	REF. NO.
AVRO AIRCRAFT LTD.		Engineering Div.		DE-ICING	20-28 11-E40/8
DISTRIBUTION: STANDARD + S. Brown K. Knowlton		A/C TYPE - ARROW 1 EFF. A/C -25201		COMPONENT Relay - R. W/S De-ice	
MANUFACTURER'S PART NO. N/A				AVRO PART NO.	
MANUFACTURER'S NAME ELECTRONIC SPECIALITIES				7-2052-15	
AVROCAN SPEC. E454 E.O. NO.				REF. DWGS.	
ENVELOPE SIZE 2.6875" x 2.5" x 1.625" WEIGHT .6 LB.				7-1100-3 Sht. 15 7-1100-2 Sht. 1 7-2052-1	
LOCATION Mounted on E40 Panel - L.H. side nose wheel well				REF. M.D.R.	
FUNCTION When energized, completes an A-C supply to the R. W/S heater				20-26	
RELIABILITY					
OVERHAUL LIFE 1500 HRS.					
WASTAGE					
Q.T.R. Pending					
INSPECTION PERIOD	OPERATION TO BE PERFORMED			MEN X MINUTES	
				EST.	ACTUAL
PRIMARY	Check relay and wiring for security			1	1
25 Hour	Function check - Ref. Maint Instruction report 71/Maint. 11/13.			1	15
ACCESSIBILITY					
Accessible on windscreen and canopy de-icing control panel E40, mounted in nose wheel well Sta. 195-207 L.H. side					
ISSUE	1				
DATE	July 23/57				
COMPILED	J. Ferguson				
CHECKED	WO2 Wentworth				
APPROVED	R.F. Reid				

LUBRICATION NIL

APPLICATION	MATERIAL	SPECIFICATION	FREQUENCY	ACCESS

DETAILS:

GROUND SUPPORT EQUIPMENT

SPECIAL TOOLS FOR AIRCRAFT USE	SPECIAL TOOLS FOR BENCH USE
NIL	NIL

GROUND TESTING EQUIPMENT	GROUND HANDLING EQUIPMENT
A/C Ground Power Unit W/S and canopy de-icing test panel	Cockpit access Stand Maintenance platform - 4G/1596

INTERCHANGEABLE	REPLACEABLE	REMOVAL INSTRUCTIONS	MEN X MINUTES	
			EST.	ACTUAL

1. Remove relay cover plate - 4 screws
2. Disconnect electrical connections
3. Remove 4 mounting screws

Remove and replace

1 x 15

MAINTENANCE DATA RECORD				SYSTEM	REF. NO.
AVRO AIRCRAFT LTD.		Engineering Div.		DE-ICING	20-29 11-E40/9
DISTRIBUTION: STANDARD + S. Brown K. Knowlton		A/C TYPE - Arrow 1 EFF. A/C - 25201		COMPONENT Relay - L. Canopy De-Ice	
MANUFACTURER'S PART NO. N/A				AVRO PART NO. 7-2052-15	
MANUFACTURER'S NAME Electronic Specialties					
AVROCAN SPEC. E454 E.O. NO.					
ENVELOPE SIZE 2.6875" x 2.5" x 1.625" WEIGHT 0.6 LB.				REF. DWGS. 7-1100-3 sht 15 7-110-2 sht 1 7-2052-1	
LOCATION Mounted on E40 panel - L.H. side nose wheel well.				REF. M.D.R. 20-26	
FUNCTION When energized completes an a-c supply to the L. Canopy heater.				RELIABILITY OVERHAUL LIFE 1500 HRS. WASTAGE Q.T.R. Pending	
INSPECTION PERIOD	OPERATION TO BE PERFORMED			MEN X MINUTES	
				EST.	ACTUAL
Primary 25 Hr.	Check relay and wiring for security.			1	1
	Function check - Ref. Maint. Inspection Report 71/MAINT 11/13			1	15
ACCESSIBILITY					
Accessible on windscreen and canopy de-icing control panel E40, mounted in nose wheel well Sta. 195-207 L.H. side.					
ISSUE	1				
DATE	23 July 57				
COMPILED	J. Ferguson				
CHECKED	W02 Wentworth				
APPROVED	R.F. Reid				

LUBRICATION NIL

APPLICATION	MATERIAL	SPECIFICATION	FREQUENCY	ACCESS

DETAILS:

GROUND SUPPORT EQUIPMENT

SPECIAL TOOLS FOR AIRCRAFT USE	SPECIAL TOOLS FOR BENCH USE
NIL	NIL
GROUND TESTING EQUIPMENT	GROUND HANDLING EQUIPMENT
A/C Ground Power Unit W/S and Canopy De-Icing Test Panel	Cockpit access stand Maintenance Platform - 4G/1596

INTERCHANGEABLE REPLACEABLE	X	REMOVAL INSTRUCTIONS	MEN X MINUTES	
			EST.	ACTUAL
		<ol style="list-style-type: none"> Remove relay cover plate - 4 screws Disconnect electrical connections. Remove 4 mounting screws 		
		Remove and replace	1	15

MAINTENANCE DATA RECORD				SYSTEM	REF. NO.
AVRO AIRCRAFT LTD.		Engineering Div.		DE-ICING	20-30 11-E40/10
DISTRIBUTION: STANDARD + S. Brown K. Knowlton		A/C TYPE - Arrow 1 EFF. A/C - 25201		COMPONENT Relay - R. Canopy De-Ice	
MANUFACTURER'S PART NO. N/A				AVRO PART NO. 7-2052-15	
MANUFACTURER'S NAME Electronic Specialties					
AVROCAN SPEC. E454 E.O. NO.					
ENVELOPE SIZE 2.6875" x 2.5" x 1.625" WEIGHT 0.6 LB.				REF. DWGS. 7-1100-3 sht 15 7-110-2 sht 1 7-2052-1	
LOCATION Mounted on E40 panel - L.H. side nose wheel well.				REF. M.D.R. 20-26	
FUNCTION When energized, completes an a-c supply to the R. Canopy heater.				RELIABILITY OVERHAUL LIFE 1500 HRS. WASTAGE Q.T.R. Pending	
INSPECTION PERIOD	OPERATION TO BE PERFORMED			MEN X MINUTES	
				EST.	ACTUAL
Primary	Check relay and wiring for security.			1 x 1	
25 Hr.	Function check - Ref. Maint. Instruction Report 71/MAINT 11/13			1 x 15	
ACCESSIBILITY					
Accessible on windscreen and canopy de-icing control panel E40, mounted in nose wheel well Sta. 195-207 L.H. side.					
ISSUE	1				
DATE	July 23/57				
COMPILED	J. Ferguson				
CHECKED	W02 Wentworth				
APPROVED	R.F. Reid				

LUBRICATION NIL

APPLICATION	MATERIAL	SPECIFICATION	FREQUENCY	ACCESS

DETAILS:

GROUND SUPPORT EQUIPMENT

SPECIAL TOOLS FOR AIRCRAFT USE	SPECIAL TOOLS FOR BENCH USE
NIL	NIL

GROUND TESTING EQUIPMENT	GROUND HANDLING EQUIPMENT
A/C Ground Power Unit W/S and Canopy De-Icing Test Panel	Cockpit Access Stand Maintenance Platform 4G/1596

INTERCHANGEABLE	REPLACEABLE	REMOVAL INSTRUCTIONS	MEN X MINUTES	
			EST.	ACTUAL
	X			

1. Remove relay cover plate - 4 screws
2. Disconnect electrical connections.
3. Remove 4 mounting screws.

Remove and replace

1 x 15

MAINTENANCE DATA RECORD				SYSTEM	REF. NO.
AVRO AIRCRAFT LTD.		Engineering Div.		DE-ICING	20-10 11-E40/20-21
DISTRIBUTION: STANDARD + S. Brown K. Knowlton		A/C TYPE - Arrow 1 EFF. A/C - 25201		COMPONENT Temperature Control - L and R Windscreen De-Ice	
MANUFACTURER'S PART NO. 47556				AVRO PART NO.	
MANUFACTURER'S NAME AiResearch				7-2052-13	
AVROCAN SPEC. N/A E.O. NO.					
ENVELOPE SIZE 4.0" x 3.85" x 2.62" WEIGHT 2.5 LB.				REF. DWGS. 7-1100-3 sht 15 7-1100-2 sht 1 7-2052-1	
LOCATION Mounted on panel E40-L.H. side Nose Wheel Well				REF. M.D.R. 20-26	
FUNCTION Controls the temperature of the windscreen glass, automatically upon receipt of specified electrical signals.				RELIABILITY	
				OVERHAUL LIFE 1000 HRS.	
				WASTAGE	
				Q.T.R. Pending	
INSPECTION PERIOD	OPERATION TO BE PERFORMED			MEN X MINUTES	
				EST.	ACTUAL
Primary Electrics	Check unit for security and damage. Check electrical connector for security.			1	2
25 Hrs. Electrics	Function check - Ref. Maint. Instruction Report 71/MAINT 11/13			1	15
ACCESSIBILITY					
Accessible on windscreen and canopy De-Icing control panel E40, mounted in nose wheel well STA 195-207 L/H side					
ISSUE	1	2	3	4	
DATE	24 Sept. 56	19 Dec. 56	April 8/57	July 23/57	
COMPILED	D. Collingwood	WO2 Wentworth	D. Collingwood	J. Ferguson	
CHECKED	WO2 Wentworth	D. Collingwood	WO2 Wentworth	WO2 Wentworth	
APPROVED	G. Emmerson	R.F. Reid	R.F. Reid	R.F. Reid	

LUBRICATION NIL

APPLICATION	MATERIAL	SPECIFICATION	FREQUENCY	ACCESS

DETAILS:

GROUND SUPPORT EQUIPMENT

SPECIAL TOOLS FOR AIRCRAFT USE	SPECIAL TOOLS FOR BENCH USE
NIL	NIL
GROUND TESTING EQUIPMENT	GROUND HANDLING EQUIPMENT
A/C Ground Power Unit W/S and Canopy De-Icing Test Panel	Cockpit access stand Maintenance Platform 4G/1596

INTERCHANGEABLE	REPLACEABLE	X	REMOVAL INSTRUCTIONS	MEN × MINUTES	
				EST.	ACTUAL

			<p><u>ELECTRICS</u></p> <ul style="list-style-type: none"> - Disconnect 1 Electrical connector - Remove 4 - 10/32 mounting bolts. <p align="center">Remove and replace</p>	1	10
--	--	--	--	---	----

d R.

ACTUAL

MAINTENANCE DATA RECORD			SYSTEM	REF. NO.
AVRO AIRCRAFT LTD.		Engineering Div.	DE-ICING	20-11 11-E40/22-23
DISTRIBUTION: STANDARD + S. Brown K. Knowlton		A/C TYPE - ARROW 1 EFF. A/C - 25201	COMPONENT Temperature control - L. and R. Canopy De-Ice	
MANUFACTURER'S PART NO. 47556			AVRO PART NO.	
MANUFACTURER'S NAME Airesearch			7-2052-13	
AVROCAN SPEC. N/A E.O. NO.				
ENVELOPE SIZE 4.0" x 3.85" x 2.62" WEIGHT 2.5 LB.			REF. DWGS.	
LOCATION Mounted on panel E40 - L.H. side of nose wheel well.			7-1100-3 Sht. 15 7-1100-2 Sht. 1 7-2052-1	
FUNCTION Controls the temperature of the canopy glass automatically upon receipt of specified electrical signals.			REF. M.D.R. 20-26	
RELIABILITY				
OVERHAUL LIFE			HRS.	
WASTAGE				
Q.T.R.				
INSPECTION PERIOD	OPERATION TO BE PERFORMED		MEN X MINUTES	
			EST.	ACTUAL
Primary Electrics	Check unit for security and damage. Check electrical connector for security		1	2
25 Hours Electrics	Function check - Ref. Maint. Instruction report 71/Maint. 11/13.		1	15
ACCESSIBILITY				
Accessible on windscreen and canopy De-Icing control panel E40, mounted in nose wheel well Sta. 195-207 L/H side.				
ISSUE	1	2		
DATE	Jan 4/57	July 23/57		
COMPILED	D. Collingwood	J. Ferguson		
CHECKED	WO2 Wentworth	WO2 Wentworth		
APPROVED	R.F. Reid	R.F. Reid		

LUBRICATION NIL

APPLICATION	MATERIAL	SPECIFICATION	FREQUENCY	ACCESS

DETAILS:

GROUND SUPPORT EQUIPMENT

SPECIAL TOOLS FOR AIRCRAFT USE	SPECIAL TOOLS FOR BENCH USE
NIL	NIL
GROUND TESTING EQUIPMENT	GROUND HANDLING EQUIPMENT
A/C Ground Power Unit W/S and canopy de-icing test panel	Cockpit access stand Maintenance platform - 4G/1596

INTERCHANGEABLE REPLACEABLE	X	REMOVAL INSTRUCTIONS	MEN X MINUTES	
			EST.	ACTUAL
		1. Disconnect 1 Electrical connector. 2. Remove 5-10/32 mounting bolts. Remove and replace	1 x 10	

ACTUAL

MAINTENANCE DATA RECORD			SYSTEM	REF. NO.	
AVRO AIRCRAFT LTD.		Engineering Div.		ELECTRICS	11-E308
DISTRIBUTION: STANDARD + S. Brown K. Knowlton		A/C TYPE - Arrow 1 EFF. A/C - 25201		COMPONENT Panel - Heated Glass Windscreen R.H.	
MANUFACTURER'S PART NO.			AVRO PART NO.		
MANUFACTURER'S NAME			7-1052-1388		
AVROCAN SPEC. E223 E.O. NO.			REF. DWGS.		
ENVELOPE SIZE 19.75" x 9.375" x 1.040" WEIGHT LB.			7-1100-3 sht 15		
LOCATION Windscreen - R.H. side			REF. M.D.R.		
FUNCTION To provide a mist and ice-free Glass windscreen panel. Heater element Resistance 70.4 ± 10.6 ohms			52-3		
			RELIABILITY		
			OVERHAUL LIFE HRS.		
			WASTAGE		
			Q.T.R.		
INSPECTION PERIOD	OPERATION TO BE PERFORMED		MEN × MINUTES		
			EST.	ACTUAL	
Primary Structure	Refer to M.D.R. 52-3				
25 Hrs Electrics	Function check (See Maintenance Instructions Report 71/Maint 11/13)		2 x 10		
ACCESSIBILITY					
Unobstructed					
ISSUE	1				
DATE	24 Sept 57				
COMPILED	K.P. Lowe				
CHECKED	W02 Wentworth				
APPROVED	R.F. Reid				

LUBRICATION NIL

APPLICATION	MATERIAL	SPECIFICATION	FREQUENCY	ACCESS

DETAILS:

GROUND SUPPORT EQUIPMENT

SPECIAL TOOLS FOR AIRCRAFT USE	SPECIAL TOOLS FOR BENCH USE
NIL	NIL

GROUND TESTING EQUIPMENT	GROUND HANDLING EQUIPMENT
A-C Ground Power Unit W/S and Canopy De-icing Test Panel	Cockpit Access Stand Maintenance Platform 4G/1596

INTERCHANGEABLE REPLACEABLE	XX	REMOVAL INSTRUCTIONS	MEN X MINUTES	
			EST.	ACTUAL

Refer to Ref. M.D.R. 52-3

MAINTENANCE DATA RECORD				SYSTEM	REF. NO.
AVRO AIRCRAFT LTD.		Engineering Div.		ELECTRICS	11-E310
DISTRIBUTION: STANDARD + S. Brown K. Knowlton		A/C TYPE - Arrow I EFF. A/C - 25201		COMPONENT Panel - Heated Glass - Pilot's Canopy R.H.	
MANUFACTURER'S PART NO.				AVRO PART NO.	
MANUFACTURER'S NAME Libby-Owens				7-1053-212	
AVROCAN SPEC. E223 E.O. NO.					
ENVELOPE SIZE 14.875" x 9.00" x 1.18" WEIGHT LB.				REF. DWGS. 7-1100-3 sht 15	
LOCATION Pilot's Canopy - L and R Hand Side.					
FUNCTION To provide a mist and ice free Glass panel in the R.H. side of the pilots canopy Heated element resistance 71.4 + 15% ohms.				REF. M.D.R. 53-1	
				RELIABILITY	
				OVERHAUL LIFE HRS.	
				WASTAGE	
				Q.T.R.	
INSPECTION PERIOD	OPERATION TO BE PERFORMED			MEN X MINUTES	
				EST.	ACTUAL
Primary Structure 25 Hrs Electrics	Refer to M.D.R. 53-1 Function Check (See Maintenance Instructions Report 71/Maint 11/13)			2	10
ACCESSIBILITY					
Unobstructed					
ISSUE	1				
DATE	24 Sept 57				
COMPILED	K.P. Lowe				
CHECKED	WO2 Wentworth				
APPROVED	R.F. Reid				

LUBRICATION NIL

APPLICATION	MATERIAL	SPECIFICATION	FREQUENCY	ACCESS

DETAILS:

GROUND SUPPORT EQUIPMENT

SPECIAL TOOLS FOR AIRCRAFT USE	SPECIAL TOOLS FOR BENCH USE
NIL	NIL
GROUND TESTING EQUIPMENT	GROUND HANDLING EQUIPMENT
A-C Ground Power Unit W/S and Canopy De-icing Test Panel	Cockpit Access Stand Maintenance Platform 4G/1596

INTERCHANGEABLE	REPLACEABLE	REMOVAL INSTRUCTIONS	MEN X MINUTES		ACTD.
			EST.	ACTUAL	
	XX				

Refer to Ref. M.D.R. 53-1

MAINTENANCE DATA RECORD				SYSTEM	REF. NO.
AVRO AIRCRAFT LTD.		Engineering Div.		ELECTRICS	11-E309
DISTRIBUTION: STANDARD + S. Brown K. Knowlton		A/C TYPE - Arrow 1 EFF. A/C - 25201		COMPONENT Panel - Heated Glass - Windscreen L.H.	
MANUFACTURER'S PART NO.				AVRO PART NO.	
MANUFACTURER'S NAME				7-1052-1387	
AVROCAN SPEC. E223 E.O. NO.				REF. DWGS.	
ENVELOPE SIZE 19.75" x 9.375" x 1.040" WEIGHT LB.				7-1100-3 sht 15	
LOCATION Windscreen L.H. side				REF. M.D.R.	
FUNCTION To provide a mist and ice free Glass windscreen panel. Heater element resistance 70.4 ± 10.6 ohms				52-3	
				RELIABILITY	
				OVERHAUL LIFE HRS.	
				WASTAGE	
				Q.T.R.	
INSPECTION PERIOD	OPERATION TO BE PERFORMED			MEN × MINUTES	
				EST.	ACTUAL
Primary Structure	Refer to M.D.R. 52-3				
25 Hrs Electrics	Function Check (See Maintenance Instructions Report 71/Maint 11/13)			2 x 10	
ACCESSIBILITY					
Unobstructed					
ISSUE	1				
DATE	24 Sept 57				
COMPILED	K.P. Lowe				
CHECKED	WO2 Wentworth				
APPROVED	R.F. Reid				

LUBRICATION **NIL**

APPLICATION	MATERIAL	SPECIFICATION	FREQUENCY	ACCESS

DETAILS:

GROUND SUPPORT EQUIPMENT

SPECIAL TOOLS FOR AIRCRAFT USE	SPECIAL TOOLS FOR BENCH USE
NIL	NIL
GROUND TESTING EQUIPMENT	GROUND HANDLING EQUIPMENT
A-C Ground Power Unit W/S and Canopy De-icing Test Panel	Cockpit Access Stand Maintenance Platform 4G/1596

INTERCHANGEABLE	XX	REMOVAL INSTRUCTIONS	MEN X MINUTES	
			EST.	ACTUAL
REPLACEABLE				

Refer to Ref. M.D.R. 52-3

by

STUAL

MAINTENANCE DATA RECORD				SYSTEM	REF. NO.
AVRO AIRCRAFT LTD.		Engineering Div.		ELECTRICS	11-E311
DISTRIBUTION: STANDARD + S. Brown K. Knowlton		A/C TYPE - Arrow I EFF. A/C - 25201		COMPONENT Panel Heated Glass - Pilot's Canopy L.H.	
MANUFACTURER'S PART NO.				AVRO PART NO. 7-1053-211	
MANUFACTURER'S NAME Libby - Owens					
AVROCAN SPEC. E223		E.O. NO.			
ENVELOPE SIZE 14.875" x 9.00" x 1.18" WEIGHT LB.				REF. DWGS. 7-1100-3 sht 15	
LOCATION Pilots Canopy L.H. side					
FUNCTION To provide a mist and ice free glass panel in the L.H. side of the pilot's canopy. Heater element resistance 71.4 OHMS + 15%				REF. M.D.R. 53-1	
				RELIABILITY	
				OVERHAUL LIFE HRS.	
				WASTAGE	
				Q.T.R.	
INSPECTION PERIOD		OPERATION TO BE PERFORMED		MEN X MINUTES	
				EST.	ACTUAL
Primary Structure		Refer to M.D.R. 53-1			
25 Hrs. Electrics		Function check (See Maintenance Instructions report 71/MAINT 11/13)		2 x 10	
ACCESSIBILITY					
Unobstructed					
ISSUE	1				
DATE	25 Sept. 57				
COMPILED	K.P. Lowe				
CHECKED	W.O. Wentworth				
APPROVED	R.F. Reid				

LUBRICATION NIL

APPLICATION	MATERIAL	SPECIFICATION	FREQUENCY	ACCESS

DETAILS:

GROUND SUPPORT EQUIPMENT

SPECIAL TOOLS FOR AIRCRAFT USE	SPECIAL TOOLS FOR BENCH USE
NIL	NIL
GROUND TESTING EQUIPMENT	GROUND HANDLING EQUIPMENT
A+C Ground Power Unit W/S and Canopy De-icing test panel	Cockpit Access Stand Maintenance Platform 4G/1596

INTERCHANGEABLE	REPLACEABLE	REMOVAL INSTRUCTIONS	MEN X MINUTES	
			EST.	ACTUAL
	XX	Refer to Ref. M.D.R. 53-1		



CONFIDENTIAL

71/MAINT 11/11

ARROW 1

MAINTENANCE INSTRUCTIONS

ELECTRICS - AIR CONDITIONING

71/MAINT 11/11

AUGUST 1958

Prepared:

K.P. Lowe
K.P. Lowe
Maintenance Engineering

Approved:

G.F. Emmerson
G.F. Emmerson
Section Chief, Maintenance and
Reliability

Authorized:

J.W. Ames
J. W. Ames
Chief of Equipment Design

ENGINEERING DIVISION

AVRO AIRCRAFT LIMITED, MALTON, ONTARIO