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ENGINE MONITORING ACCESSORY KIT

CIRRUS SR20 & SR22 Series

Part Number 570-1210
Revision D

October 2, 2001

REVISIONS

Rev	Description	Date	Approval
A	Release	April, 2001	LJ
B	Update and Changes due to first field Installation	May, 2001	LJ
C	Add K factor Procedure and Differences between the SR-20 and SR22.	July, 2001	
D	More Detail Drawings needed Define Factory EGT and CHT Pass-Thru SR20/SR22 capability.	October, 2001	LJ

Table of Contents

1. INTRODUCTION

Accessory Kit

Title:

ARNAV EMM-35 (Engine Monitoring Module) Installation and Interface to ARNAV ICDS 2000 Multi-Function Display

Effectivity: CIRRUS MODELS SR20 AND SR22 SERIES

Descriptions:

This accessory kit provides parts and instructions for installation of the ARNAV EMM-35 (Engine Monitoring Module - P/N 453-5030-00) in Cirrus SR20 and SR22 aircraft.

The function of the EMM-35 and the other accessory items listed below is for engine monitoring and gauge display.

Installation Requirements:

When installing the ARNAV EMM-35 Module, you must have a working knowledge of Aircraft Electronics Installation and be a holder of a FAA Repairman's Certificate. Due to wiring and configuration differences between the SR20 and SR22, there is a need to know the Cirrus model (SR20 SR22) and aircraft serial number.

Devices:

Description	ARNAV P/N
EMM-35	453-5030-00
Outside Air Temperature Sensor	116-5030
EGT Thermocouple Probes	116-5450-01
CHT Thermocouple Probes	116-5460

Interface to SR-20 – SR22 Indicators

Tach Indicator	Refer to Cirrus Data
Oil Temp-Oil Pressure Indicator	Refer to Cirrus Data
Manifold Pressure / Fuel Flow Indicator	Refer to Cirrus Data
EGT / CHT Indicator	Refer to Cirrus Data

Approvals:

FAA TSO approval has been obtained for the EMM-35. An STC on a single engine piston aircraft has included the other accessory component technical data. The components in this accessory kit are manufactured under PMA and TSO.

References:

- Model SR20 & SR22 Maintenance Manual (Cirrus)
- Model SR20 & SR22 Wiring Diagram (Cirrus)
- IO-360 Series Maintenance and Operations Manual (Cirrus)
- ARNAV Systems Cirrus ETM Wiring Diagram (P/N ENG-4971)
- Operations Manual, ARNAV ICDS 2000 Operations Manual (P/N 572-0550)
- Engine Monitor Supplement (572-0181)
- WX500 Stormscope Installation Manual (BF Goodrich)

Change in Weight and Balance

Model	Cirrus SR20 & SR22	
Weight Increase	2.3	Lbs.
Resultant	198.0	Inch Pounds
Moment/1000	232.80	

Overview:

The main tasks for this installation are listed below:

1. Installation of the main Internal (rear of firewall) Harness (611-0600) to the Firewall.
2. Route Internal Harness (611-0600) to appropriate areas for final connection.
3. Installation and Mounting of the EMM-35.
4. Connection of Internal Harness to Oil Temperature / Oil Pressure Indicator
5. Connection of Internal Harness to Tach Indicator

6. Connection of Internal Harness to Manifold Pressure Fuel Flow Indicator
7. Connection of Internal Harness to EGT / CHT Indicator
8. Preparation of the ICDS 2000 Serial Data connection to the EMM-35 (with or without Stormscope WX500 and Sandel HSI).
9. Add new Circuit Breaker and Connect Power Wire.
10. Installation of the Outside Air Temperature Probe (OAT).
11. Connection of main Internal harness (611-0600) to EMM-35.
12. Installation of CHT and EGT probes
13. Route External harness (611-0602)(forward of firewall) and connections to EGT/CHT probes.
14. Secure all harnesses.
15. Installation of Engine Monitoring software and Data Recording Cards.
16. Installation testing.
17. Finalize Installation.

Accomplishment Instructions:

Note:

Read the accomplishment instructions and review the manuals in their entirety, before performing this procedure.

Retain all serviceable components and attaching hardware removed during these procedures, for re-installation.

These accomplishment instructions include references to specific sections and figures in the Wiring Diagrams and Installation Manuals.

Harnesses are marked per FAA Advisory Circular 43.13-1B/2A.

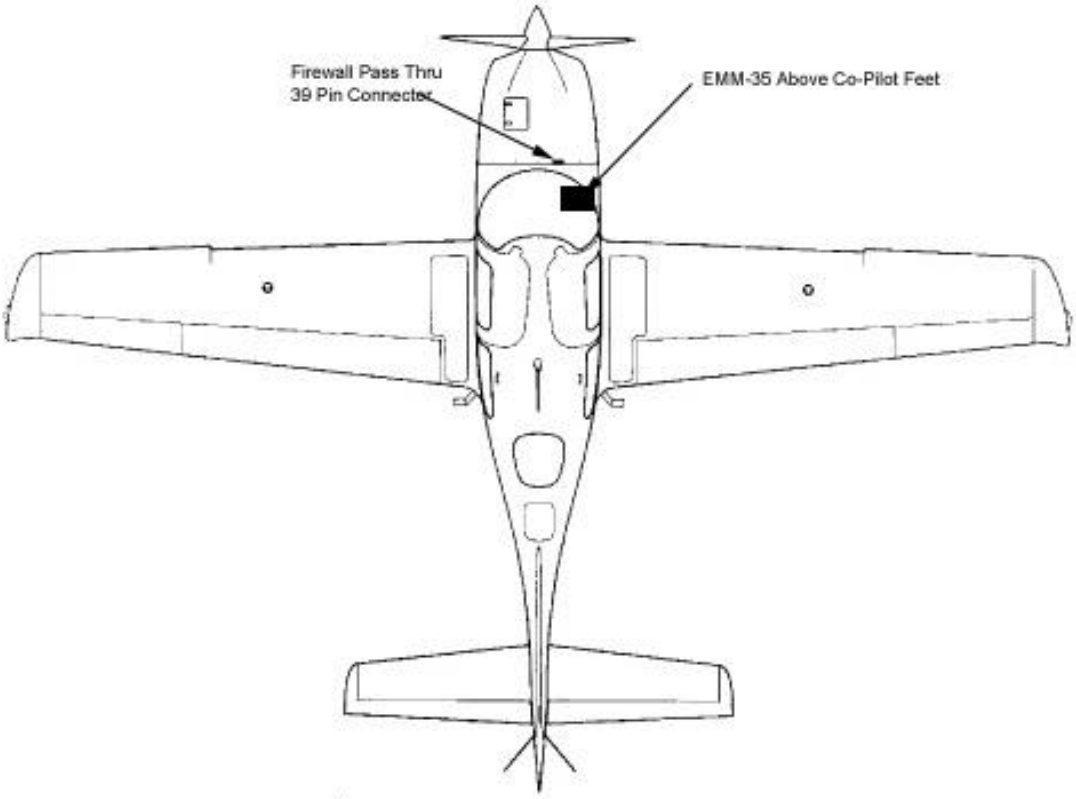
Disconnect all electrical power from the airplane.

Attach maintenance warning tags with the following wording:

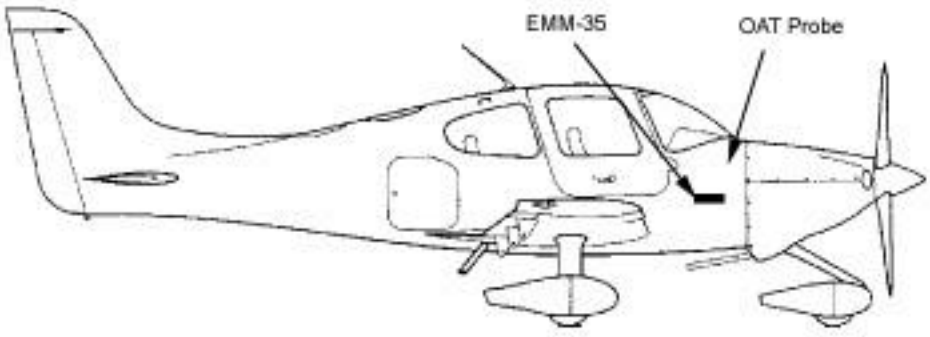
DO NOT CONNECT ELECTRICAL POWER – MAINTENANCE IN PROGRESS

Overall Equipment Placement:

Top View



Side View



2. MATERIAL INFORMATION

The following assemblies and parts are required for a single installation:

Part Number	Quantity	Description
455-0600-00	**1**	**Installation Kit, Cirrus**
116-5030	1	Sensor Assembly, OAT
116-5450-01	5	Transducer, EGT
116-5460	5	Transducer, CHT
116-5464	5	CHT Bayonet Adapter
118-0600	1	Breaker, 5A
125-6001-01	1	Data Card, Retrieval
427-0550-02	1	Database Card
452-0600	1	Hardware Kit, Cirrus – Internal
452-0602	1	Hardware Kit, Cirrus – External
453-5030-00	1	Main Assembly, EMM-35 “Single”
572-0550	1	Operations Manual, ICDS 2000
572-0181	1	ICDS Engine Supplement
591-4520	1	Placard, “Down Load Port”
611-0600	1	Harness Assembly, Internal
611-0602	1	Harness Assembly, External
611-0603	1	Harness Assembly, ICDS 2000 Comm.
201-0447	24	Screw. PHP 4-40 x 3/16 SS
241-0447	24	“K” Locknut ¼x 4-40 SS
452-0600	**1**	**Hardware Kit, Cirrus Internal**
150-1893	1	Connector, DB-9 “M”
150-1894	1	Connector, DB-9 “F”
151-6252	2	Shroud, DB-9 STR. w/Clamp
151-6627	3	Crimp Contact, “M”
151-6671	3	Crimp Contact, “F”
182-1010	5	Cable Tie, Small
183-0074	1	Gasket, Silicon Rubber
204-0404	8	Screw, PHP 4-40x1/4 SS
241-0446	2	Locknut, Hex 4-40x1/4 SS
253-0406	2	Spacer, 3/16 Hex M/F 4-40x3/16
241-0634	4	Locknut, Hex 6-32x1/4 SS
204-0603	4	Screw, PHP 6-32x1/4 SS Black
255-1422	1	Terminal Ring, Power lead
402-3324	1	Reducer, Pass Thru
452-0602	**1**	**Hardware Kit, Cirrus External**
182-1010	22	Cable Tie
183-0008	10	Clamp, #7 Insulator - Adel
183-0009	10	Clamp, #15 Insulator – Adel
208-0010	10	Bolt, ANS-5A
242-0002	10	Nut, MS21045-3
248-1002	10	Washer, AN960-10
610-2150	5	Fiberglass Sleeve, ½

Tooling:

In addition to the Engine Monitoring Kit, the following materials, or equivalent, are required to accomplish the installation of this accessory kit.

Name	Number	Manufacturer	Use
Hole Saw	1 3/8”	Commercially Available	Installation
Drill Bit	.377” (V)	Commercially Available	Installation
DB-9 Hole Punch	Standard	Commercially Available	Installation
Allen Wrench	5/64”	Commercially Available	Installation
Socket	1 9/16”	Commercially Available	Installation
Center Punch	-	Commercially Available	Installation

3. INSTALLATION OF INTERNAL HARNESS (P/N 611-0600) TO FIREWALL

Equipment Used:

- Main Internal Harness – 611-0600
- Firewall Pass-thru Reducer – 402-3324
- Pass-thru reducer gasket – 183-0074

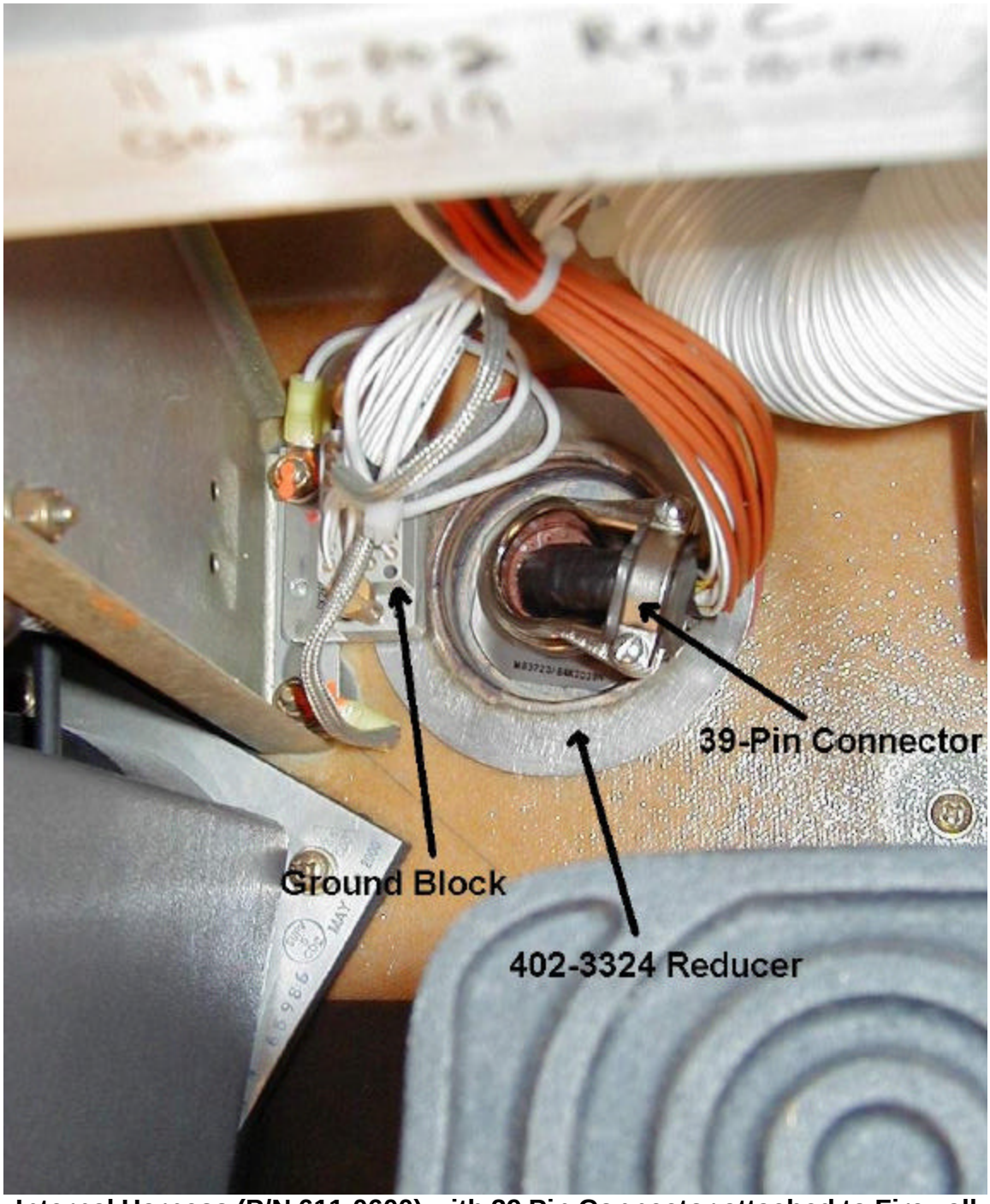
In this step you will prepare the hole through the firewall for the 39-pin connector on the harness 611-0600. You will then secure the connector through the firewall in preparation for routing the harness on the inside of the airplane.

Procedure
Step Action

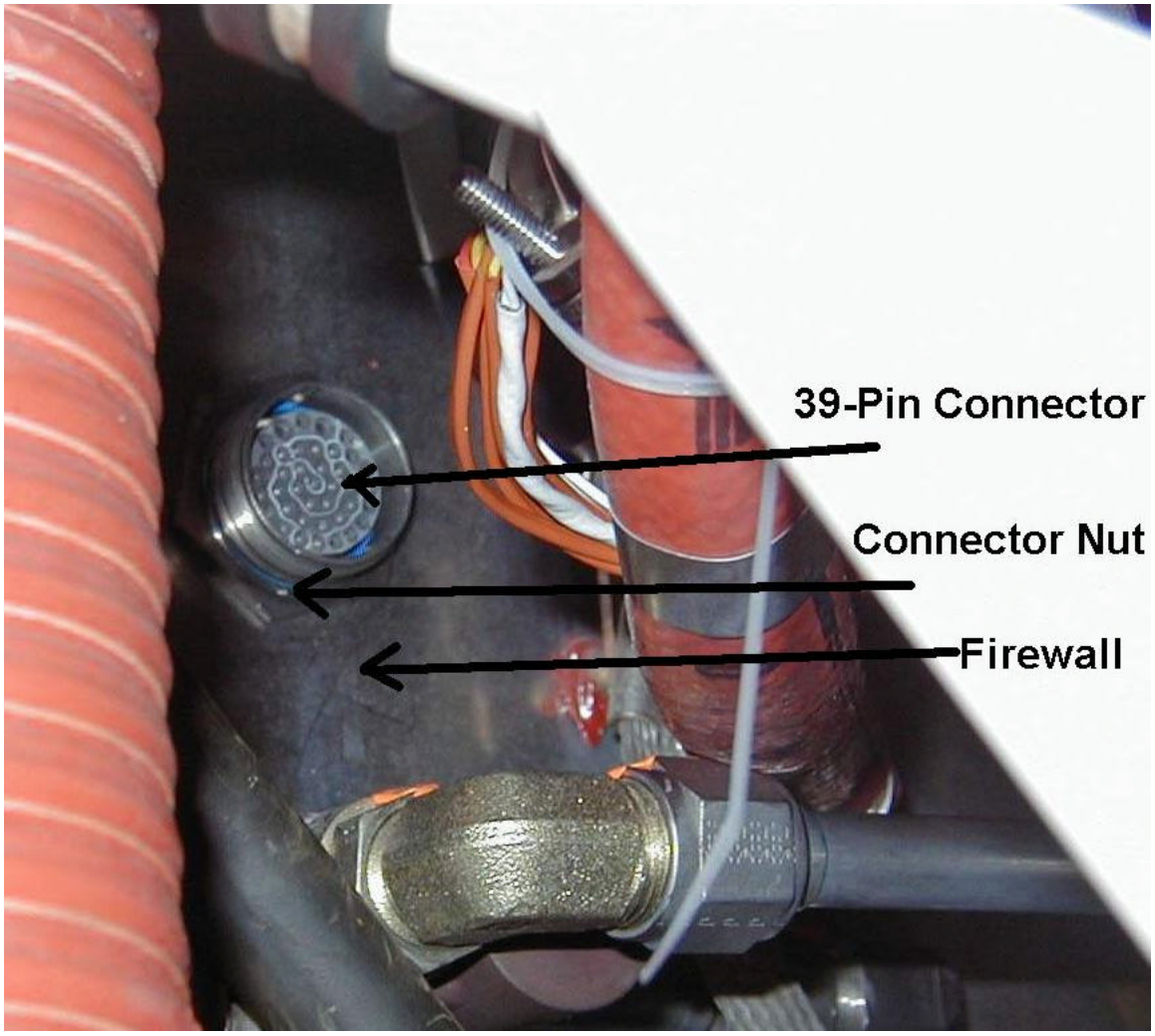
1. Remove gear slot covers and top and bottom engine cowling from the front of aircraft.
2. Remove the Kick Panel above the foot pedals on the copilot's side. There are (Qty 7) #2 Phillips screws that mount the Kick Panel. Refer to **Figure 5-1**.
3. Remove the vent hose that is attached to the Kick Panel. Refer to **Figure 5-1**.
4. On the co-pilot's side behind and above the rudder pedals, locate the unused firewall pass-thru immediately adjacent to the grounding block. (See **Figure 3-1**)
5. There is a bolt that goes thru the firewall and a blanker reducer. On the forward side of the firewall the bolt and nut are covered with silicone sealer. Remove the silicone sealer, the clamping bolt and the pass-thru blanker reducer with its gasket (183-0074) (the grounding block may have to be loosened).
6. From the inside of the cockpit, use the hole saw and enlarge the clamping bolt hole through the firewall to 1 3/8" and de-burr the hole.
7. Place the ARNAV supplied reducer (P/N 402-3324) with gasket into position in the pass-thru hole.
8. Install the 39-pin circular connector from the internal harness (P/N 611-0600) through the firewall taking care not to dislodge the O-ring seal on the interior face of the connector. (See **Figure 3-1**).
9. Secure the connector through the firewall with the connector nut from the engine side of the firewall. Once the nut and connector are

properly installed and tight, secure the nut with safety wire. (See **Figure 3-2**)

If the ground block was removed or loosened, re-secure the ground block. **(Failure to secure ground block may cause avionics problems after installation)**



Internal Harness (P/N 611-0600) with 39 Pin Connector attached to Firewall
Figure 3-1



External Firewall 39 Pin Connector
Figure 3-2

4. ROUTE INTERNAL HARNESS ASSEMBLY (P/N 611-0600)

Equipment Used:

- Main Internal Harness – 611-0600 – Already attached to firewall from inside.

In this step you will route the various branches of the internal harness (611-0600) to the areas of the cockpit where connection will be done.

Procedure
Step Action

1. Familiarize yourself with the main internal harness by referring to **Figure 4-1**.
2. Remove the four internal hex screws holding the Cirrus center console decorative cover below the ICDS 2000 with a 5/64" Allen wrench.
3. Remove ICDS 2000 from panel by loosening the 6 DZUS fasteners. Pull the ICDS 2000 partially out of the panel until you can disconnect the 100-pin connector then sit the ICDS 2000 carefully aside. (The large hole in the panel where the ICDS 2000 goes will provide access for later cable routing and connection to indicators and existing harnesses).
4. Route the individual segments of harness 611-0600 to the general areas depicted in **Figure 4-2**. Route the harness segments along other harnesses or mechanical structures so they can be secured after the connection procedures.

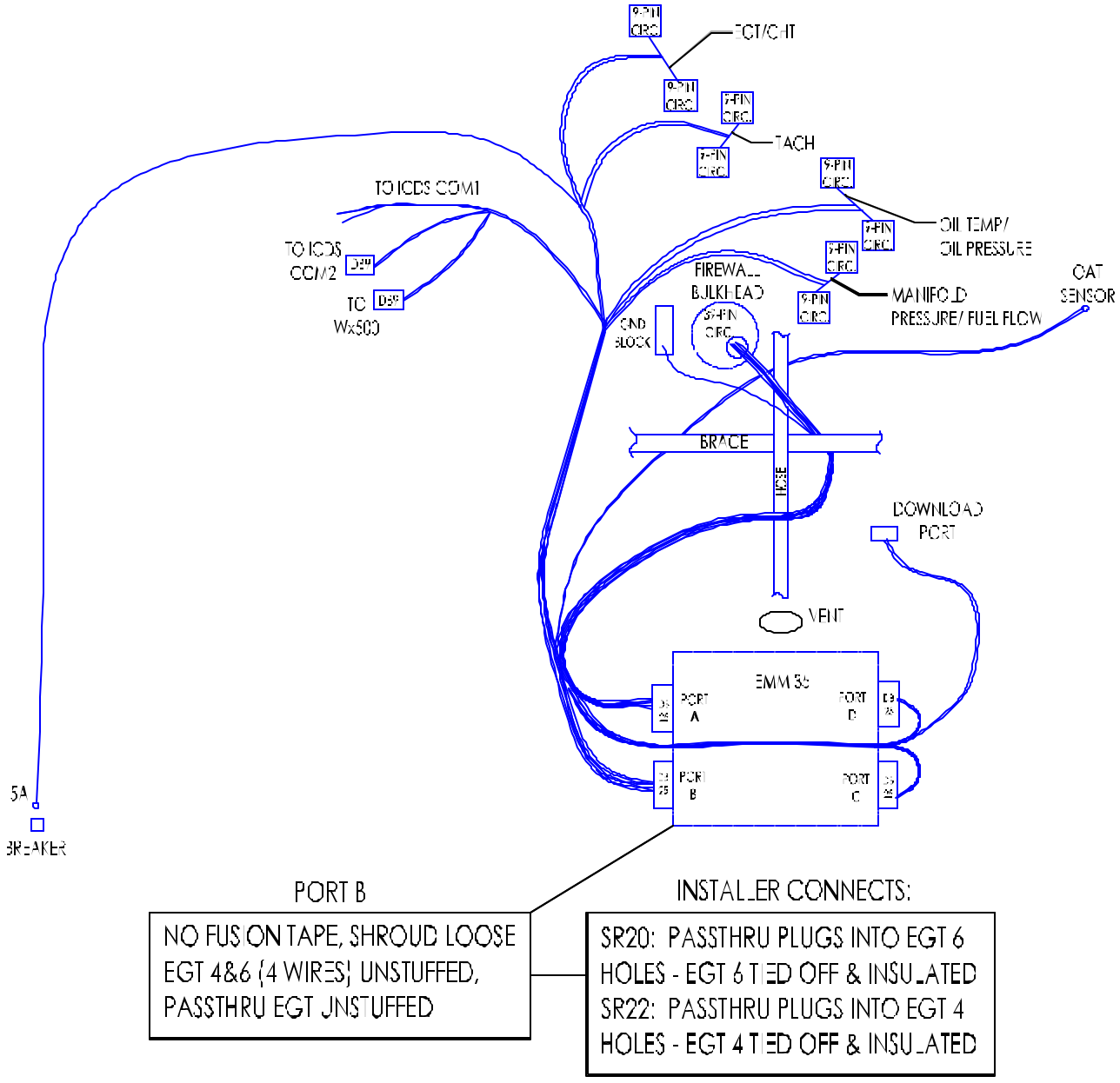

TO ICDS COM1
TO ICDS COM2
TO Wx500
TACH
OIL TEMP/
OIL PRESSURE
FIREWALL
BULKHEAD
MANIFOLD
PRESSURE/ FUEL FLOW
CAT
SENSOR
GND
BLOCK
BRACE
DOWNLOAD
PORT
VENT
EMM 3S
PORT
A
PORT
B
PORT
C
PORT
D
5A
BREAKER
PORT B
NO FUSION TAPE, SHROUD LOOSE
EGT 4&6 (4 WIRES) UNSTUFFED,
PASSTHRU EGT UNSTUFFED
INSTALLER CONNECTS:
SR20: PASSTHRU PLUGS INTO EGT 6
HOLES - EGT 6 TIED OFF & INSULATED
SR22: PASSTHRU PLUGS INTO EGT 4
HOLES - EGT 4 TIED OFF & INSULATED

Figure 4-1

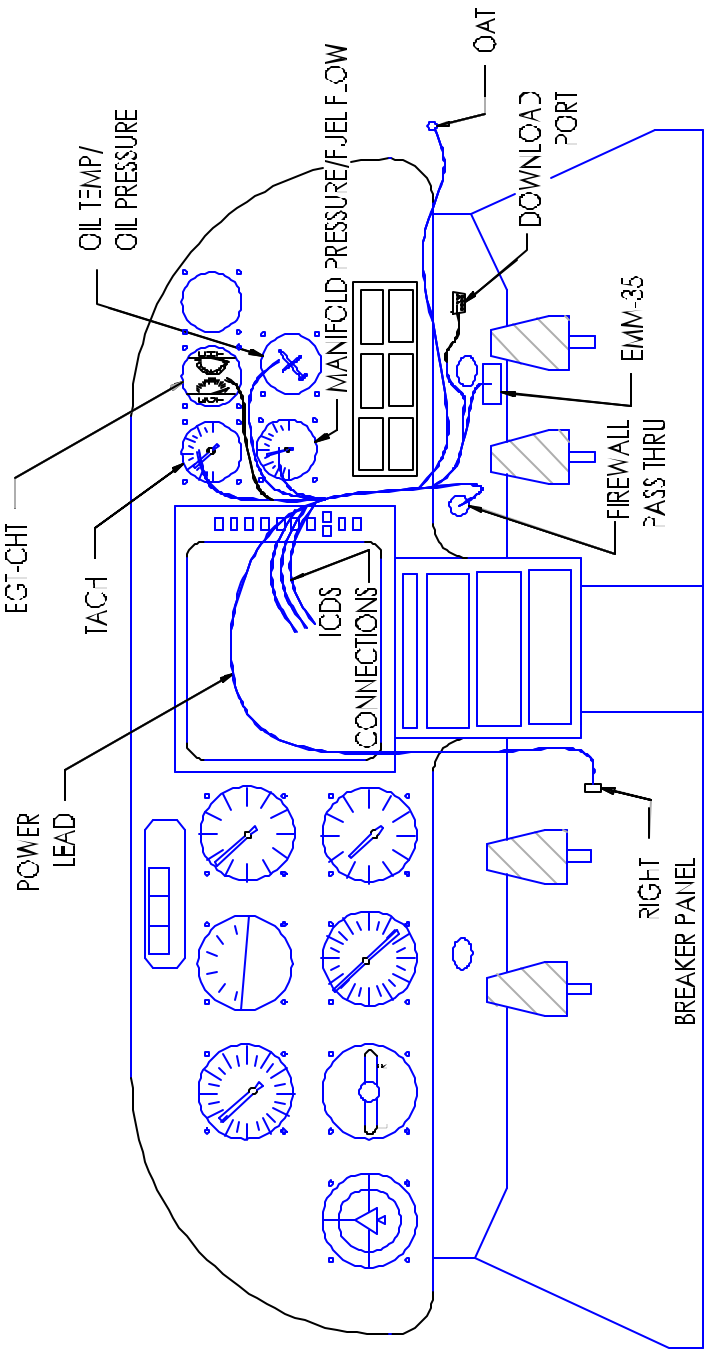

OAT
OIL TEMP/
OIL PRESSURE
MANIFOLD PRESSURE/FUEL FLOW
DOWNLOAD
PORT
EMM-35
FIREWALL
PASS THRU
EGT-CHT
TACH
ICDS
CONNECTIONS
POWER
LEAD
RIGHT
BREAKER PANEL

Figure 4-2

5. EMM-35 MOUNTING AND INSTALLATION

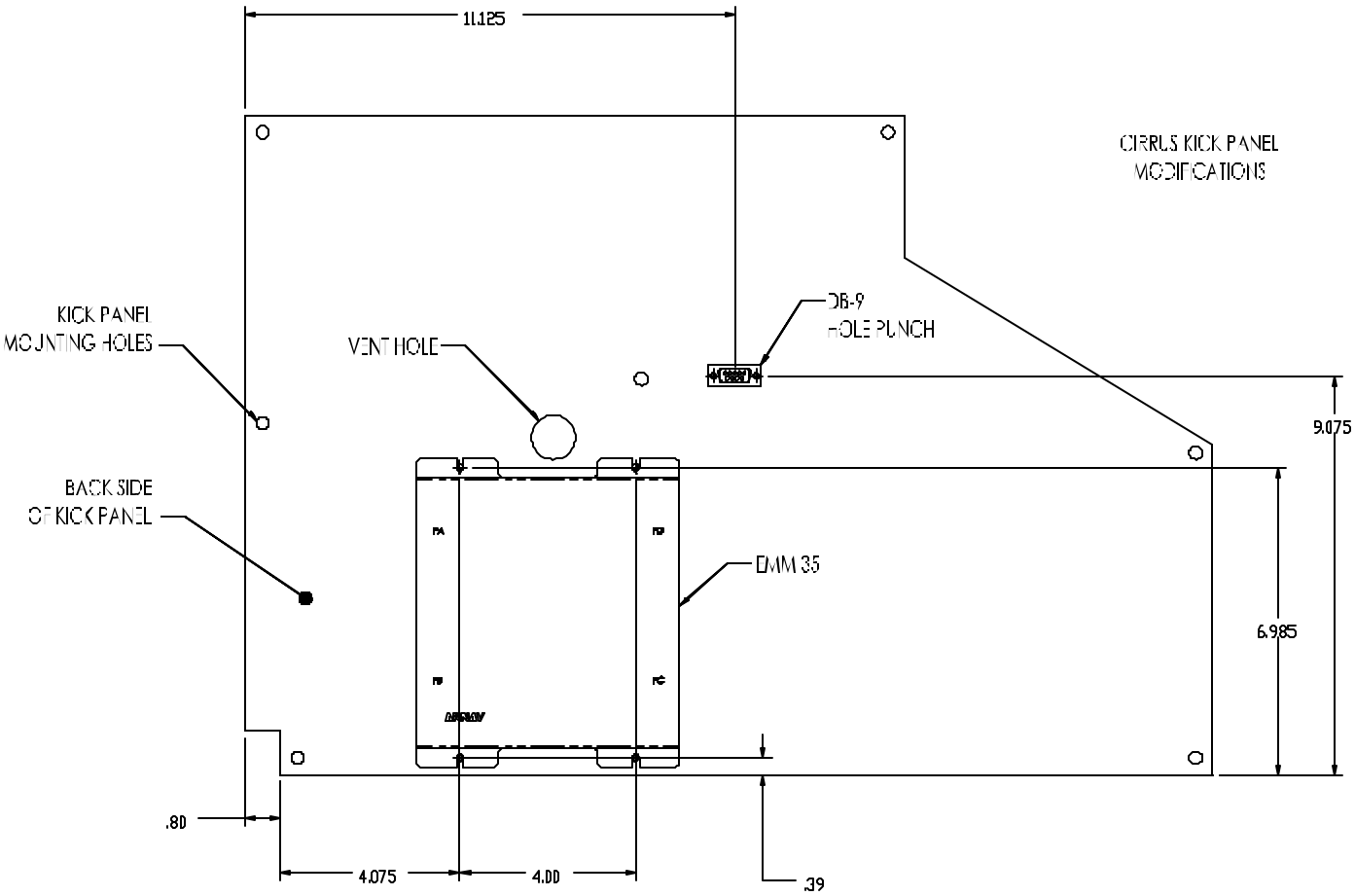
Equipment Used:

- ARNAV EMM-35 – Part Number 453-5030-00
- EMM-35 Mounting hardware - P/N 204-0603 – quantity 4 and 241-0634 – quantity 4
- DB9 connector mounting hardware – 253-0406(2 – Hex spacer screws) and 241-0446(2 – lock nuts)
- Placard " Download Port" – 591-4520

In this step you will prepare the Kick panel above the co-pilot foot well for EMM-35 mounting by drilling mounting holes and punching a DB9 connector hole. You will then mount the EMM-35 to the Kick panel.

Procedure
Step Action

1. Remove EMM-35 and all installation hardware referenced above from the shipping box.
2. Using a DB-9 connector punch, per **Figure 5-1**, punch a hole to mount the DB-9 connector that is attached to the harness assembly (P/N 611-0600).
3. Using the EMM-35 as a mounting template, drill the four mounting holes and mount the EMM-35 to the Kick Panel with the supplied mounting screws and nuts. P/N 204-0603 and 241-0634. (See **Figure 5-1**). Make sure you mount the EMM-35 in the right direction on the panel to avoid confusion on the reference drawings when connecting the harness later.
4. Attach the Serial Download Harness DB-9 connector to the Kick Panel with the included hardware. (Secure the shield terminator for the DB9 under one of the mounting nuts)
5. Attach the placard "Download Port" to the side of the Kick Panel opposite the EMM-35 and next to the DB9 connector mounted through the panel.
6. This completes the mounting of the EMM 35 to the Kick Panel.



- **EMM 35 Mounting Hole Size 0.147”**

CIRRUS Kick Panel

Figure 5-1

6. CONNECT INTERNAL HARNESS TO OIL TEMPERATURE / OIL PRESSURE INDICATOR

Equipment Used:

- Main Internal Harness – 611-0600

In this step you will connect the segment of the internal harness (611-0600) associated with Oil Temperature and Oil Pressure to the existing Cirrus Oil Temperature / Oil Pressure Indicator. You will work through the large hole in the panel where the ICDS 2000 was removed to connect to the back of the gauge.

Procedure
Step Action

1. Locate the Oil Temp Indicator on the right side of the instrument panel.
2. On the 611-0600, Internal Harness, locate the segment labeled “Oil Temp / Oil Pressure” (previously routed behind the indicator section of the instrument panel)
3. Disconnect the existing 9-pin circular connector from the Indicator.
4. Connect the 9 pin circular connector from the 611-0600 harness (identified in step 2 above) to the Indicator.
5. Connect the other 9-pin connector of the 611-0600 harness to the 9-pin connector that was removed from the indicator. (Refer to **Figure 6-1**).

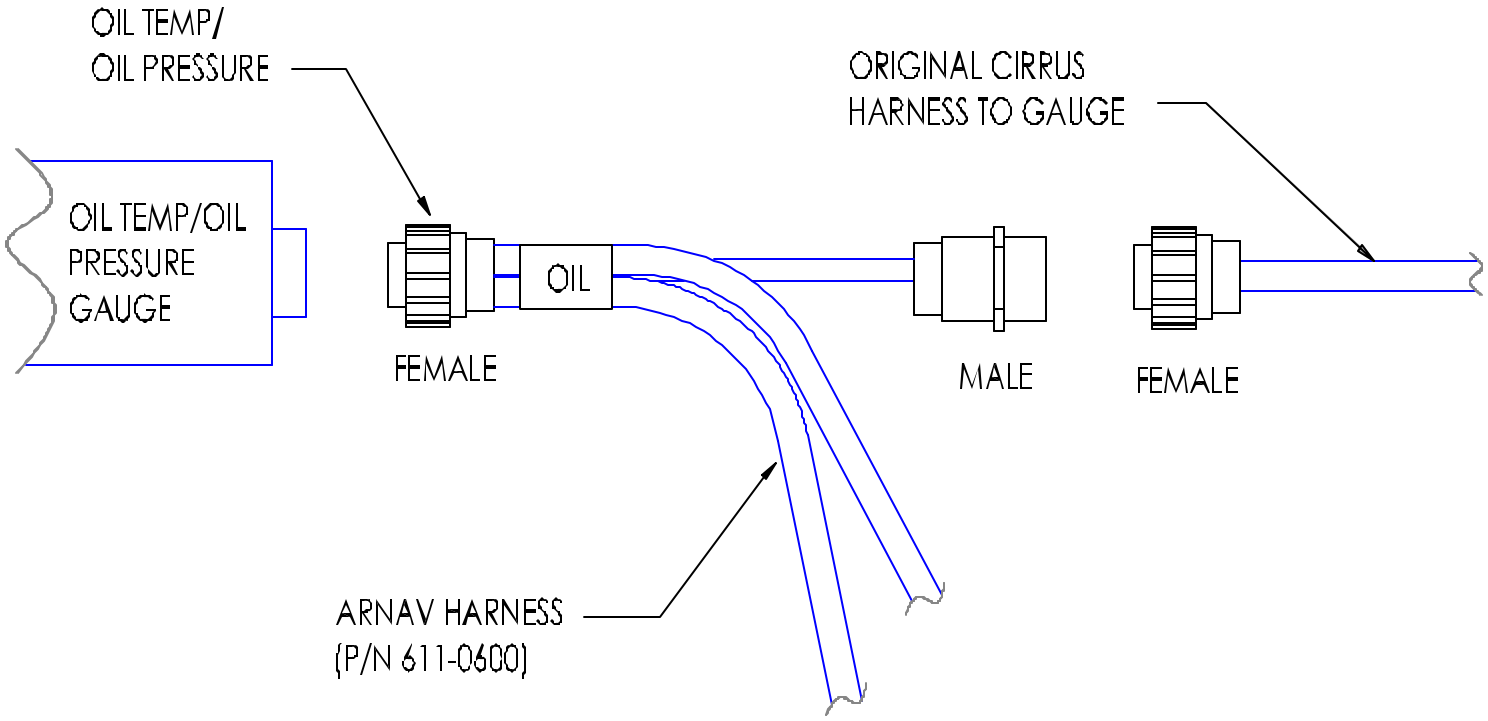

OIL TEMP/
OIL PRESSURE
ORIGINAL CIRRUS
HARNESS TO GAUGE
OIL TEMP/OIL
PRESSURE
GAUGE
OIL
FEMALE
MALE
FEMALE
ARNAV HARNESS
(P/N 611-0600)

Figure 6-1

7. CONNECTION OF INTERNAL HARNESS TO RPM INDICATOR

Equipment Used:

- Main Internal Harness – 611-0600

In this step you will connect the segment of the internal harness (611-0600) associated with RPM (tachometer) to the existing Cirrus RPM Indicator.

Procedure
Step Action

1. Locate the RPM Indicator on the right side of the instrument panel.
2. On the 611-0600, Internal Harness, locate the segment labeled "TACH" (previously routed behind the indicator section of the instrument panel)
3. Disconnect the existing 9-pin circular connector from the Indicator.
4. Connect the 9 pin circular connector from the 611-0600 harness (identified in step 2 above) to the Indicator.
5. Connect the other 9-pin connector of the 611-0600 harness to the 9-pin connector that was removed from the indicator. (Refer to **Figure 7-1**).

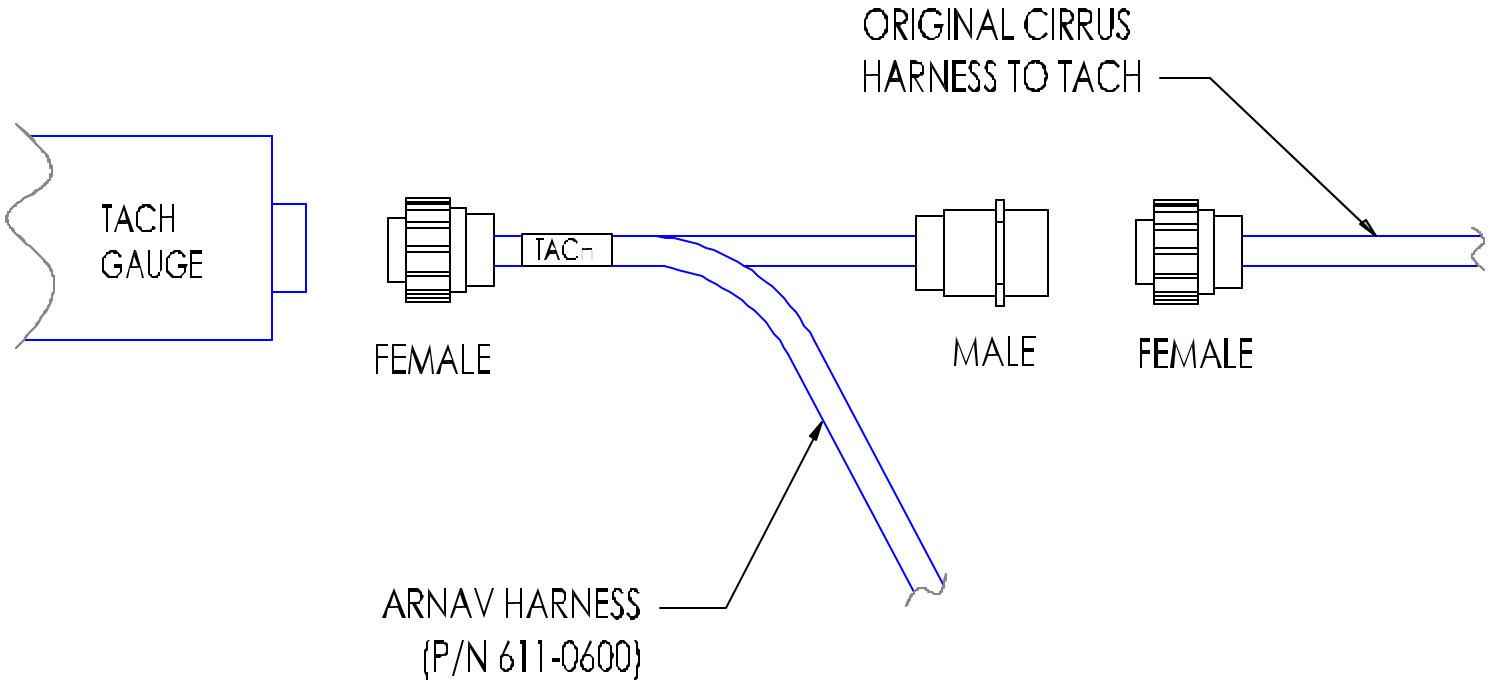

ORIGINAL CIRRUS
HARNESS TO TACH
TACH
GAUGE
TAC-
FEMALE
MALE
FEMALE
ARNAV HARNESS
(P/N 611-0600)

Figure 7-1

8. CONNECTION OF INTERNAL HARNESS TO MANIFOLD PRESSURE FUEL FLOW INDICATOR

Equipment Used:

- Main Internal Harness – 611-0600

In this step you will connect the segment of the internal harness (611-0600) associated with manifold pressure and fuel flow to the existing Cirrus Manifold Pressure / Fuel Flow Indicator.

Procedure
Step Action

1. Locate the Manifold Pressure / Fuel Flow Indicator on the right side of the instrument panel.
2. On the 611-0600, Internal Harness, locate the segment labeled “Man Pressure / Fuel Flow” (previously routed behind the indicator section of the instrument panel)
3. Disconnect the existing 9-pin circular connector from the Indicator.
4. Connect the 9 pin circular connector from the 611-0600 harness (identified in step 2 above) to the Indicator.
5. Connect the other 9-pin connector of the 611-0600 harness to the 9-pin connector that was removed from the indicator. (Refer to **Figure 8-1**).

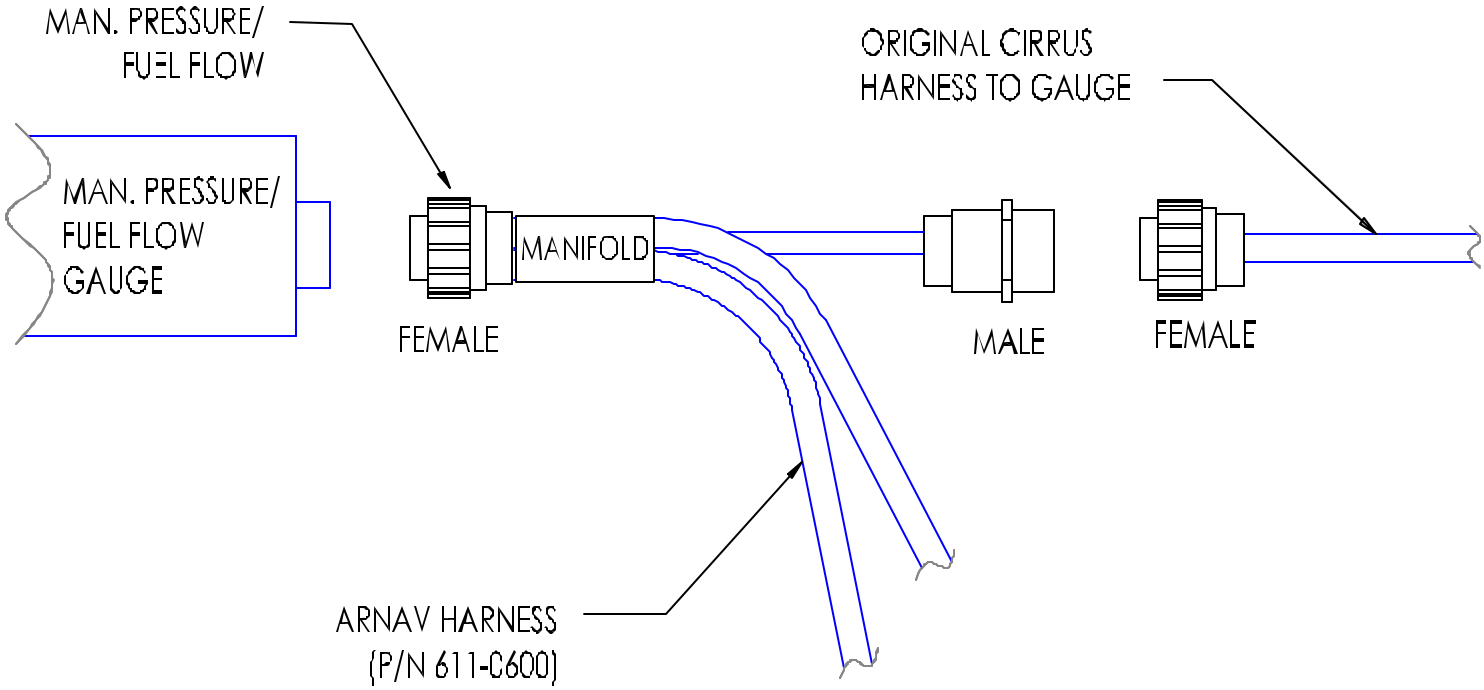

MAN. PRESSURE/
FUEL FLOW
MAN. PRESSURE/
FUEL FLOW
GAUGE
MANIFOLD
FEMALE
ORIGINAL CIRRUS
HARNESS TO GAUGE
MALE
FEMALE
ARNAV HARNESS
(P/N 611-0600)

Figure 8-1

9. CONNECTION OF INTERNAL HARNESS TO EGT / CHT INDICATOR

Equipment Used:

- Main Internal Harness – 611-0600

In this step you will connect the segment of the internal harness (611-0600) associated with EGT and CHT to the existing Cirrus Manifold EGT / CHT Indicator.

Procedure
Step Action

1. Locate the EGT / CHT Indicator on the right side of the instrument panel.
2. On the 611-0600, Internal Harness, locate the segment labeled “EGT / CHT” (previously routed behind the indicator section of the instrument panel)
3. Disconnect the existing 9-pin circular connector from the Indicator.
4. Connect the 9 pin circular connector from the 611-0600 harness (identified in step 2 above) to the Indicator.
5. Connect the other 9-pin connector of the 611-0600 harness to the 9-pin connector that was removed from the indicator. (Refer to **Figure 9-1**).

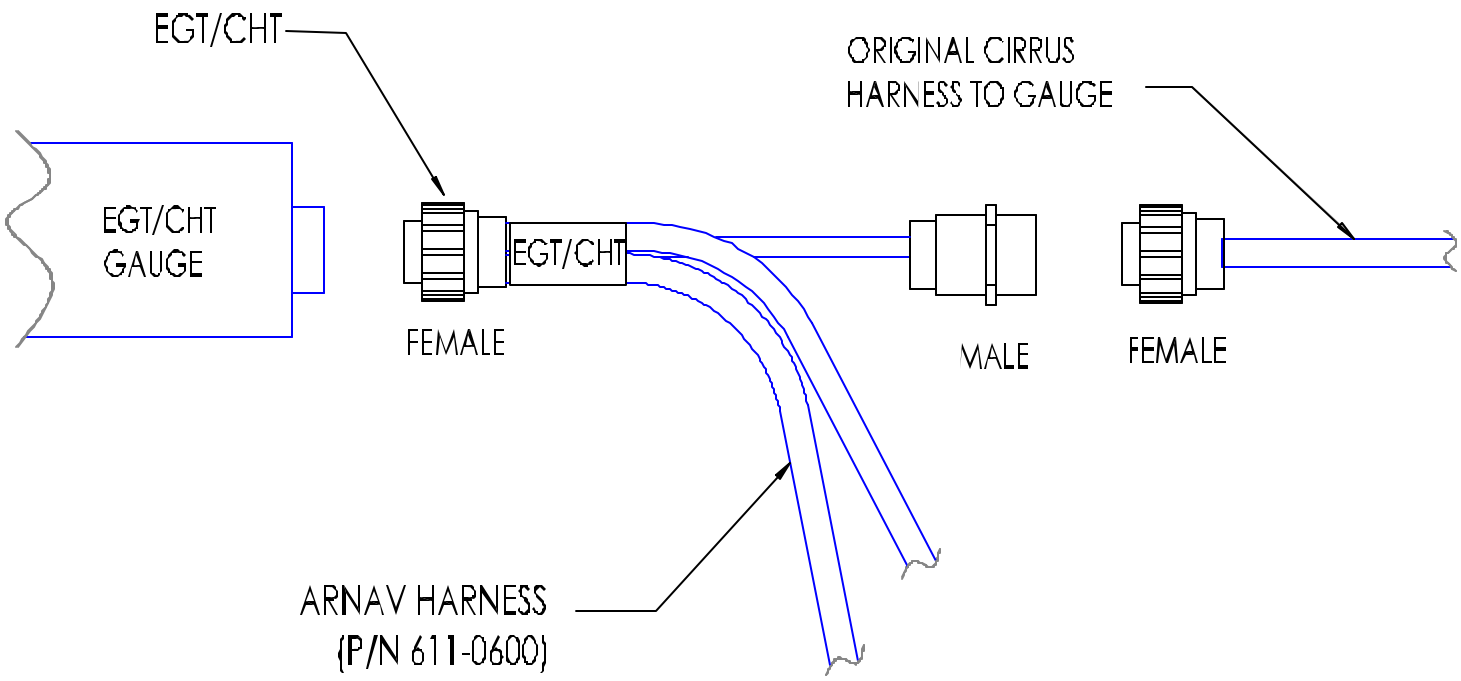

EGT/CHT
ORIGINAL CIRRUS
HARNESS TO GAUGE
EGT/CHT
GAUGE
EGT/CHT
FEMALE
MALE
FEMALE
ARNAV HARNESS
(P/N 611-0600)

Figure 9-1

10. ICDS 2000 SERIAL DATA CONNECTIONS

Equipment Used:

- Main Internal Harness – 611-0600
- Short cable with DB9 – 611-0603
- DB9 Male Connector - 150-1893
- DB9 Female Connector -150-1894
- Solder Sleeves – 610-2026
- Wire Splices (butt splice) – 151-9101
- Tie wraps – 182-1010

In this step you will prepare for connection of the EMM-35 data interface to the ICDS 2000 by modifying the existing harness connected to the ICDS 2000. You will then connect the segments of the internal harness (611-0600) associated with ICDS 2000 serial data.

NOTE:
In this section there will be choices of instructions to follow based on the existing equipment in the airplane. Aircraft that have the optional WX500 Stormscope or the Sandel HSI will require different harness modifications. Make sure you follow the instructions for the configuration of the airplane you have.

Procedure
Step Action

1. Loosen the strain relief of ICDS 2000 100-pin connector to prepare for pin insertion and harness modification.
2. On the segment of harness 611-0600 labeled 'Download Port', install the single pin (labeled 'ICDS pin-9) of the shielded twisted pair into the Pin-9 hole of the ICDS 2000 connector. If the aircraft is Stormscope equipped, connect the white/blue wire to ICDS 2000 Pin-8 (and insulate if needed), and tighten the strain relief. If the aircraft is not Stormscope equipped leave the strain relief and white/blue wire until step **10.1-3**.
3. The next step is to modify the existing harness to the ICDS 2000 connector. This harness will be different and require different changes based on the equipment in the airplane. If there is a WX500 Stormscope or a Sandel HSI there are different modification instructions. In the three sections below you will find different instructions for each configuration. **You should follow only one of these sections.**

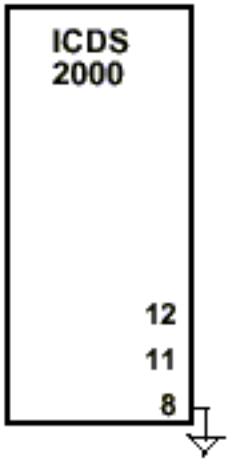
- **Without** Stormscope and **Without** Sandel HSI: Perform Section **10.1** only.
- **With** Stormscope but **Without** Sandel HSI: Perform Section **10.2** only.
- **With** Stormscope and **With** Sandel HSI: Perform Section **10.3** only.

10.1. ICDS 2000 WITHOUT Stormscope and WITHOUT Sandel HSI.

Procedure
Step Action

1. Locate the separate, short cable labeled '611-0603'.
2. Refer to **Figure 10.1.2** and install the pins (labeled 'ICDS Pin-11' and 'ICDS Pin-12') on the end opposite the DB9 connector into the corresponding holes of the 100-pin ICDS 2000 connector.
3. Connect the white/black ground wire of 611-0603 and the white/blue ground wire from the Download Port from step **10.0-2** to the signal ground wire from ICDS 2000 Pin-8 (insulate if needed).
4. Tighten strain relief on the ICDS 2000 100-pin connector.
5. Plug the DB9 end of 611-0603 (the 'ICDSCOM2' cable) into the 611-0600 connector marked 'TO ICDS' (Refer to **Figure 10.1.3**)
6. Tie wrap both shrouds mounting holes together and tie wrap the new 611-0600 harness to the existing ICDS 2000 harness.
7. Tie wrap the unconnected DB9 labeled 'TO WX500' from harness 611-0600 to the existing ICDS 2000 harness (for future Stormscope install),.

Cirrus SR-20/22 without Stormscope without Sandel HSI



Original Cirrus Harness

Figure 10.1.1

Cirrus SR-20/22 without Stormscope without Sandel HSI

Harness Modification

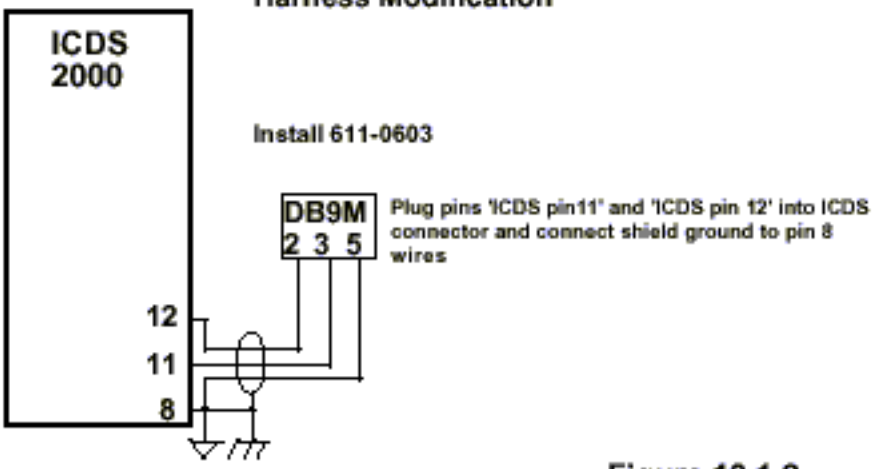


Figure 10.1.2

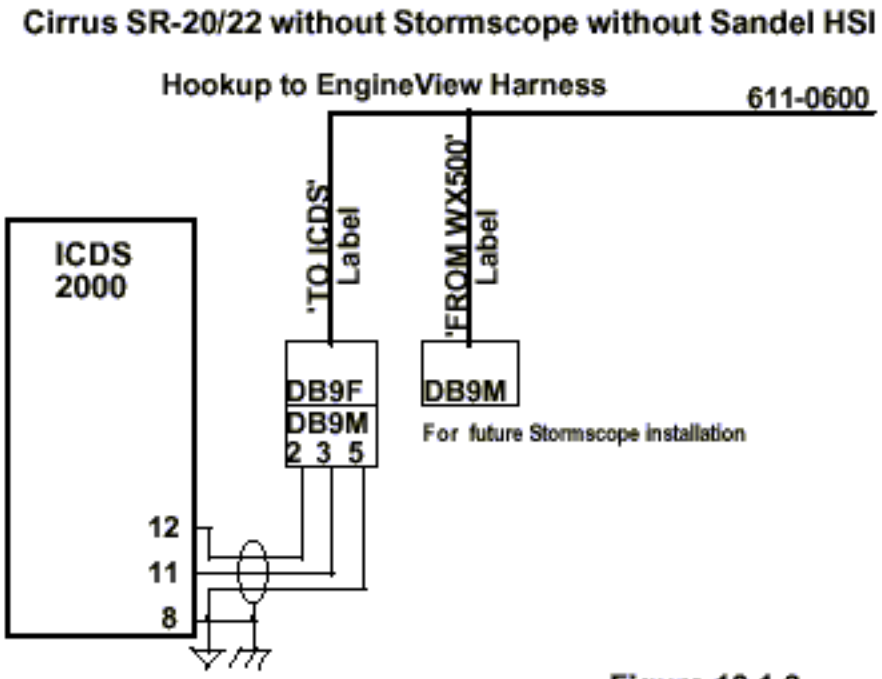

Cirrus SR-20/22 without Stormscope without Sandel HSI
Hookup to EngineView Harness
611-0600
ICDS
2000
'TO ICDS'
Label
'FROM WX500'
Label
DB9F
DB9M
2 3 5
DB9M
For future Stormscope installation
12
11
8

Figure 10.1.3

10.2. ICDS 2000 WITH Stormscope but WITHOUT Sandel HSI.

Procedure
Step Action

1. Aircraft equipped with Stormscope require modification of the original Cirrus ICDS 2000 harness (As per **Figure 10.2.1**). The RS232 data lines from the ICDS 2000 to the Stormscope (Cirrus harness label ANSS-801-22) must be cut and have DB9 connectors installed on each new end created by the cut, and then the new connectors are plugged in to the 611-0600 harness.
2. Locate the shielded 3-conductor cable on the Cirrus harness that leads to the ICDS 2000 100-pin connector, pins 11 and 12.
3. Cut this wire 7" from the connector, strip the jacket and shield from both ends and install the supplied shield termination solder sleeves.
4. Install the supplied DB9 male connector on the wire leading to the ICDS 2000 by connecting DB9 Pin-2 to ICDS 2000 Pin-12; Connect DB9 Pin-3 to ICDS 2000 Pin-11; Connect DB9 Pin-5 to shield termination and to ICDS 2000 Pin-8.
5. Install the supplied DB9 female connector to the wire leading to the Stormscope by connecting DB9 Pin-3 to Stormscope J3 Pin-8 (the same wire color code as ICDS 2000 Pin-11); Connect DB9 Pin-2 to Stormscope J3 Pin-20 (the same wire color code as ICDS 2000 Pin-12); Connect DB9 pin 5 to shield termination and to Stormscope J2 Pin-5. (Refer to **Figure 10.2.2**)
6. Plug the new male DB9 connector now coming from the ICDS 2000 into the 611-0600 harness segment DB9 labeled 'To ICDS Com 2' (Refer to **Figure 10.2.3**)
7. Plug the new female DB9 connector now coming from the Stormscope into the 611-0600 harness segment DB9 labeled 'From Wx500'. (Refer to **Figure 10.2.3**)
8. Tie wrap both pair of DB9 shroud mounting holes together and tie wrap the new 611-0600 wiring harness to the existing ICDS 2000 harness.

Cirrus SR-20/22 with Stormscope without Sandel HSI

Original Cirrus Harness

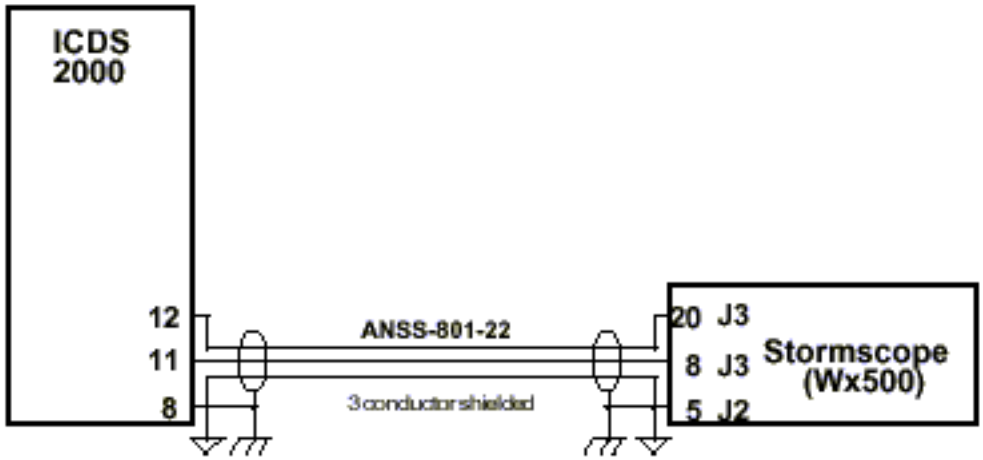


Figure 10.2.1

Cirrus SR-20/22 with Stormscope without Sandel HSI

Harness Modification

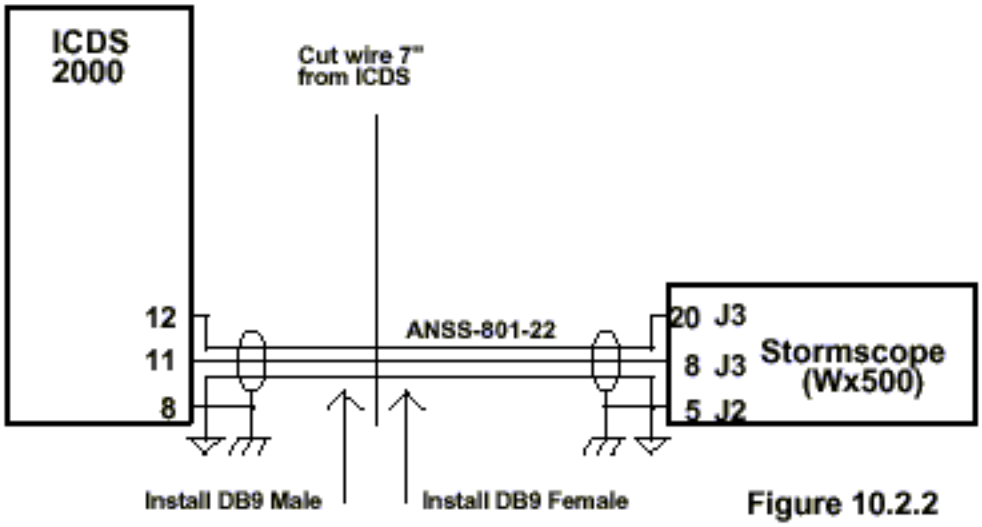


Figure 10.2.2

Cirrus SR-20/22 with Stormscope without Sandel HSI

Hookup to EngineView Harness

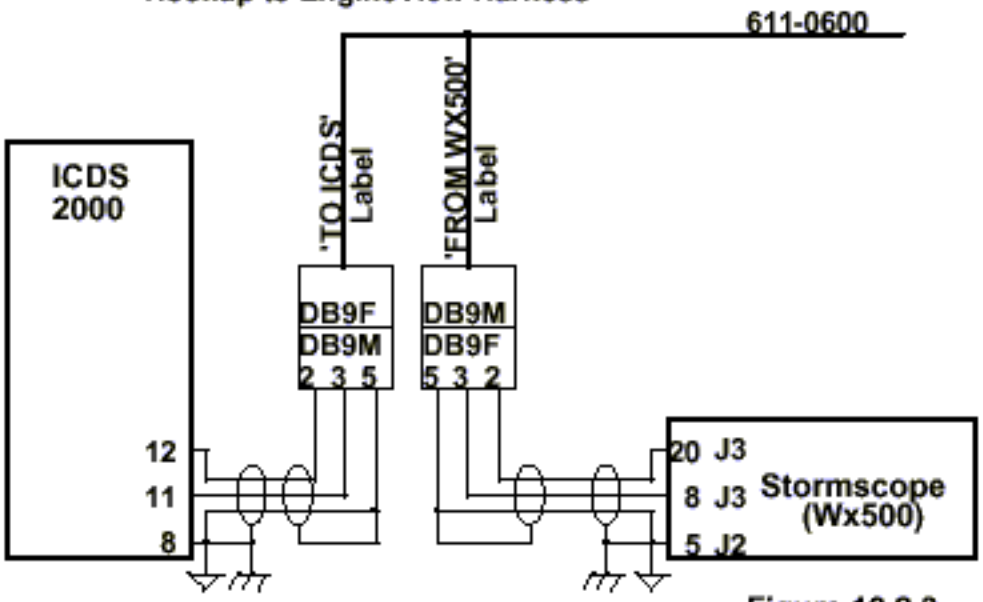


Figure 10.2.3

10.3. ICDS 2000 WITH Stormscope and WITH Sandel HSI.

Procedure
Step Action

1. Aircraft equipped with both a Stormscope and the Sandel HSI have the Stormscope data signal daisy-chained from the Stormscope to the ICDS 2000 to the Sandel Data Loader (1/4“ phone jack) then to the Sandel HSI. (As per **Figure 10.3.1**)
2. Locate the shielded single conductor cable routed to the ICDS 2000 100-pin connector from the Sandel Data Loader phone jack (Cirrus harness ANSS-899-22)
3. Cut the wire from step 2 above 7 inches from the ICDS 2000 100-pin connector.
4. The remaining 7-inch length of single conductor from the ICDS 2000 100-pin connector must be insulated and tied off.
5. Strip and install the supplied solder sleeve shield terminator to the single conductor (ANSS-899-22) from the Sandel Data Loader phone jack. This wire will be added to the DB9 female connector detailed below.
6. Locate the shielded 3-conductor cable on the Cirrus harness that leads to the ICDS 2000 100-pin connector, pins 11 and 12. (Cirrus label ANSS-801-22)
7. Cut this wire 7” from the connector, strip the jacket and shield from both ends and install the supplied shield termination solder sleeves.
8. Install the supplied DB9 male connector on the wire leading to the ICDS 2000 by connecting DB9 Pin-2 to ICDS 2000 Pin-12; Connect DB9 Pin-3 to ICDS 2000 Pin-11; Connect DB9 Pin-5 to shield termination and to ICDS 2000 Pin-8.
9. Install the supplied DB9 female connector to the wire leading to the Stormscope by connecting DB9 Pin-3 to Stormscope J3 Pin-8 (the same wire color code as ICDS 2000 Pin-11); Using the supplied splices, connect DB9 Pin-2 to Stormscope J3 Pin-20 (the same wire color code as ICDS 2000 Pin-12) and to the single conductor from the Sandel Data Loader phone jack from step5 above; Using the supplied splices, connect DB9 pin 5 to the shield terminations from the Stormscope and from the Sandel Data Loader single conductor and from the Stormscope J2 Pin-5 (same color code as ICDS 2000 Pin-8). (Refer to **Figure 10.3.2**)
10. Plug the new male DB9 from the ICDS 2000 into the 611-0600 harness DB9 labeled ‘To ICDS Com 2’ (Refer to **Figure 10.3.3**)

11. Plug the new female DB9 from the Stormscope into the 611-0600 harness DB9 labeled ‘From Wx500’. (Refer to **Figure 10.3.3**)
12. Tie wrap both pair of DB9 shroud mounting holes together and tie wrap the new 611-0600 harness to the existing ICDS 2000 harness.

Cirrus SR-20/22 with Stormscope and Sandel HSI

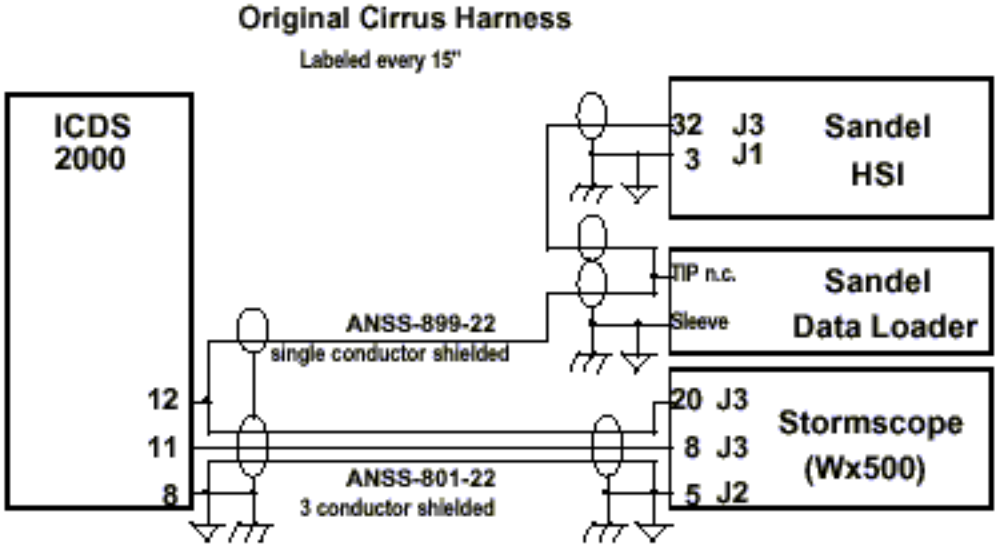


Figure 10.3.1

Cirrus SR-20/22 with Stormscope and Sandel HSI

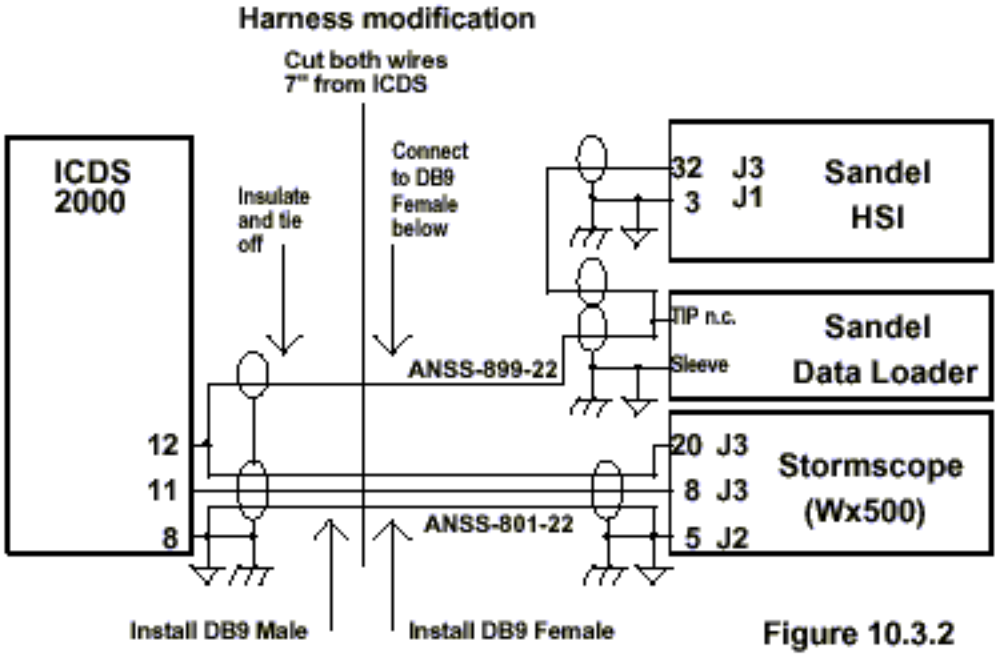


Figure 10.3.2

Cirrus SR-20/22 with Stormscope and Sandel HSI

Hookup to EngineView Harness

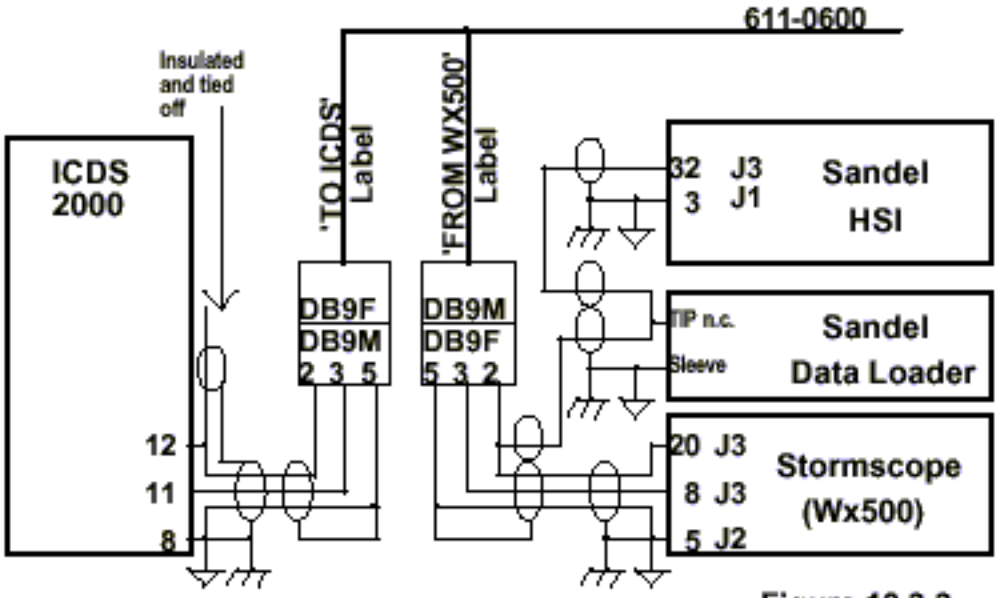


Figure 10.3.3

11. ADD NEW CIRCUIT BREAKER AND CONNECT POWER

Equipment Used:

- Main Internal Harness – 611-0600 – Power Wire Segment.
- Power lead Crimp Ring – P/N 255-1422
- Circuit Breaker – 5-Amp 118-0600

Procedure
Step Action

1. Locate the wire of the 611-0600 Internal Harness marked “Power”. This wire should have previously been routed to the area of the breaker panel.
2. Add the crimp ring power terminal (P/N 255-1422) to wire and install onto breaker.
3. Install the breaker into a free breaker spot on the Avionics bus.
4. Label the breaker “EMM-35”.

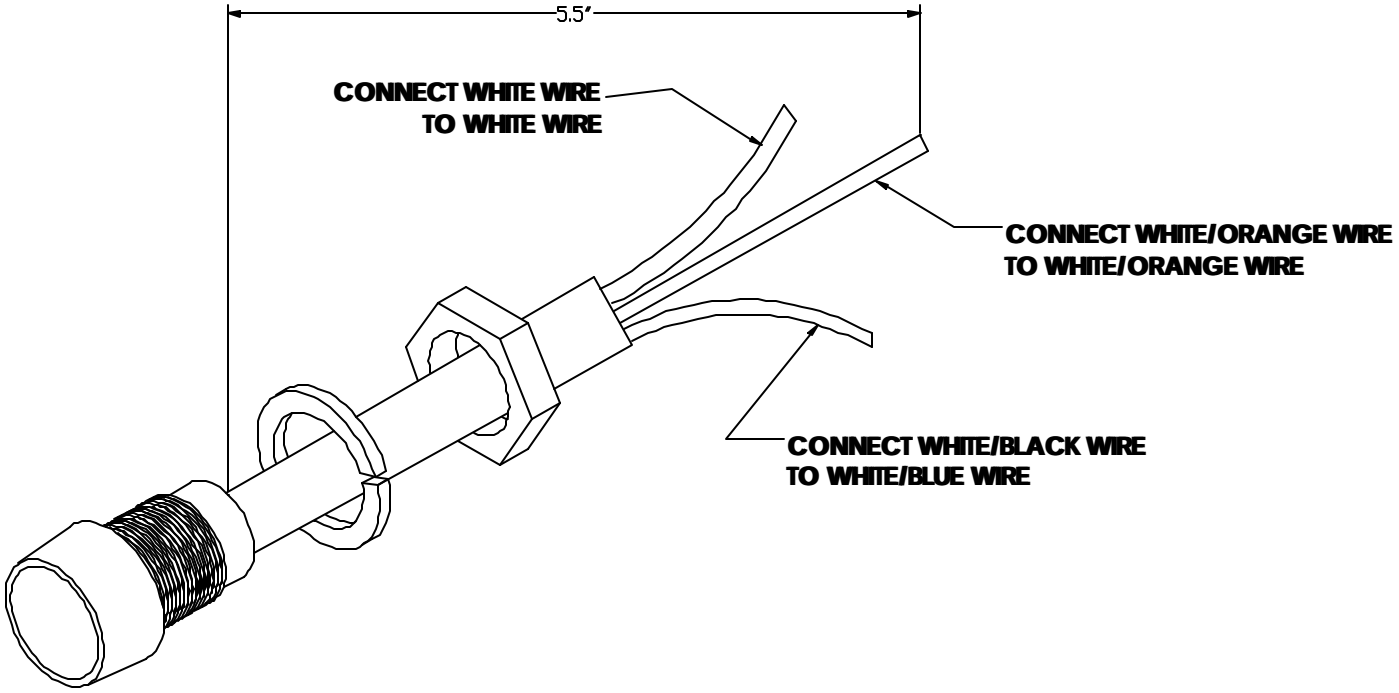
12. OUTSIDE AIR TEMPERATURE SENSOR INSTALLATION

Equipment Used:

- Outside Air Temp Sensor – 116-5030
- Wire splice (butt splice) – 151-9101 (3)
- Tie Wraps – 182-1010 (5)

Procedure
Step Action

1. Remove OAT Sensor (Outside Air Temperature) from the shipping kit. (116-5030) (See **Figure 12-1**)
2. The OAT location is on the right side of the aircraft at a position that is a mirror image of the factory Cirrus sensor. This is a thin spot (approx. 1/8") in the composite body that is part of the CAPS shroud line rip-out panel. The actual hole center can be as much as 0.250" off in any direction without compromising the CAPS.
3. Mounting hole. Measure (using photo (**Figure 12-2**) and diagram (**Figure 12-3**) below) and mark the location for the OAT. Pilot drill through the composite and then finish drill to 0.377". De-burr the hole prior to installing the sensor.
4. OAT Mounting. Feed the OAT leads through the mounting hole from the outside of the airplane. Apply a light coating of silicone sealer to the flange of the OAT and insert the OAT in the mounting hole. Feed the nut and lock washer up the leads from the inside of the airplane and secure the OAT. Wipe off the excess sealant.
5. OAT harness routing. Route the OAT harness to the firewall, along the closest wiring bundle then to the right side of the avionics stack near the area where the EMM-35 is mounted to the Kick panel.
6. Splice the OAT leads to the short leads of the 611-0600 harness labeled 'OAT' with the supplied butt splice connectors. Connect white-to-white, white/orange to white/orange and white/blue to white/black.
7. Tie wrap to 611-0600 harness.



OAT Sensor
Figure 12-1

OAT Sensor Mounting Location Photo
Figure 12-2

OAT Placement

OAT Location - Copilot's Side

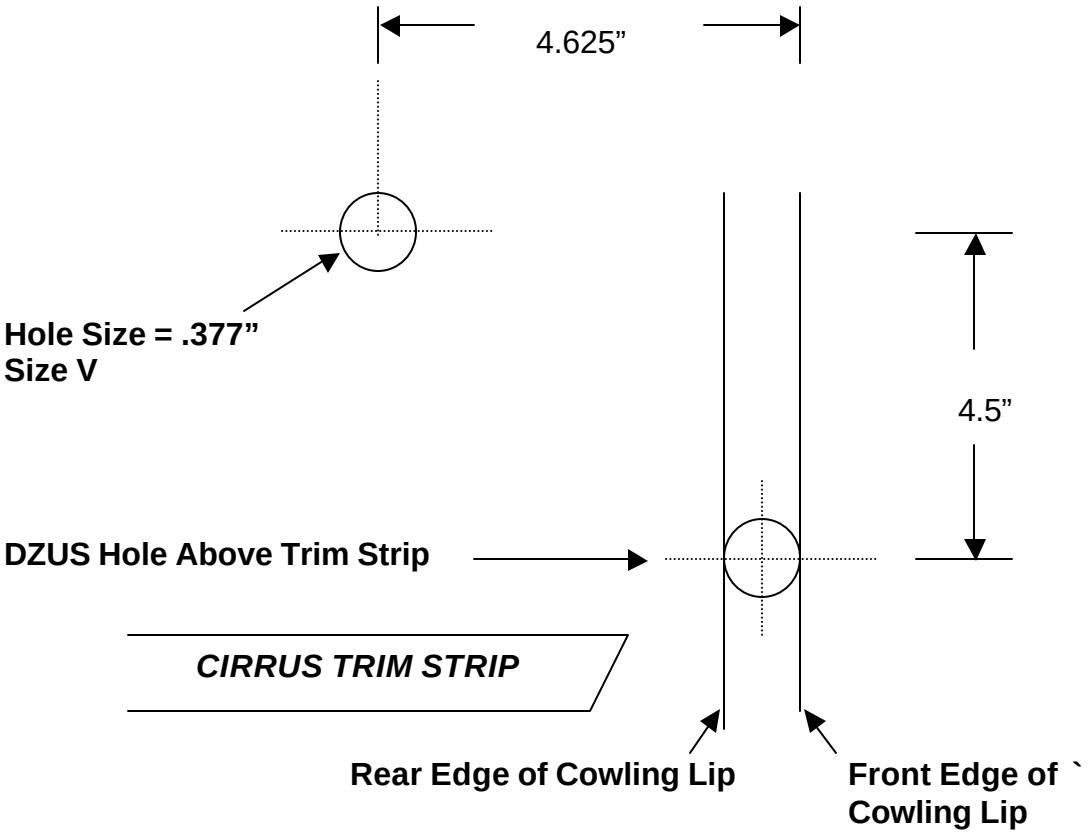


Figure 12-3

13. CONNECTION OF MAIN INTERNAL HARNESS (611-0600) TO EMM-35

Equipment Used:

- Tie Wraps – 182-1010
- 4-40 Screws – 204-0404 (8)

In this section you will finalize the internal wiring by connecting the 611-0600 harness to the EMM-35. There are 4 connectors on the EMM-35 labeled PA, PB, PC, and PD. There are shield terminations on connectors A, C, and D on harness 611-0600. Using the screws that secure the connector to the EMM-35 you will ground the harness shield terminations.

Connector B has 3 pair of thermocouple wire with pins on them that have not been inserted into the connector. The pins to insert into the B connector are determined by airplane type (SR20 or SR22). The reason for this selection is because the different configurations of airplane have the factory EGT on different cylinders. In the instructions below and on the drawings there is information on which pins to insert into the B connector prior to securing the connector to the EMM-35.

Procedure
Step Action

1. Secure connector A from harness 611-0600 to EMM-35 PA. Attach the two shield terminators to the EMM-35 with the screws that secure the connector. (Refer to **Figure 13-1**)
2. Secure connector D from harness 611-0600 to EMM-35 PD. Attach the shield terminator to the EMM-35 with one of the screws that secure the connector. (Refer to **Figure 13-1**).
3. Secure connector C from harness 611-0600 to EMM-35 PC. Attach the shield terminator to the EMM-35 with one of the screws that secure the connector. (Refer to **Figure 13-1**).
4. You will now insert the pins from the appropriate thermocouple wires into the B connector. Use **Caution** to make sure you insert the pins into the correct location. There are two sections of instructions below. You should perform only one set of instructions based on airplane type.

SR20 EMM-35 Connector B Wiring

1. Insert the Yellow wire from the pair labeled EGT4 into connector B Pin-4. (Refer to **Figure 13-1**)
2. Insert the Red wire from the pair labeled EGT4 into connector B Pin-17. (Refer to **Figure 13-1**)
3. Insert the Yellow wire from the pair labeled GUAGE into connector B Pin-6. (Refer to **Figure 13-1**)
4. Insert the Red wire from the pair labeled GUAGE into connector B Pin-19. (Refer to **Figure 13-1**)
5. Insulate and tie off the pair labeled EGT6 – it will not be used.
6. Secure the connector back shell on connector B.
7. Secure connector B to EMM-35 PB. (Refer to **Figure 13-1**)

SR22 EMM-35 Connector B Wiring

1. Insert the Yellow wire from the pair labeled EGT6 into connector B Pin-6. (Refer to **Figure 13-1**)
2. Insert the Red wire from the pair labeled EGT6 into connector B Pin-19. (Refer to **Figure 13-1**)
3. Insert the Yellow wire from the pair labeled GUAGE into connector B Pin-4. (Refer to **Figure 13-1**)
4. Insert the Red wire from the pair labeled GUAGE into connector B Pin-17. (Refer to **Figure 13-1**)
5. Insulate and tie off the pair labeled EGT4 – it will not be used.
6. Secure the connector back shell on connector B.
7. Secure connector B to EMM-35 PB. (Refer to **Figure 13-1**)

FIREWALL

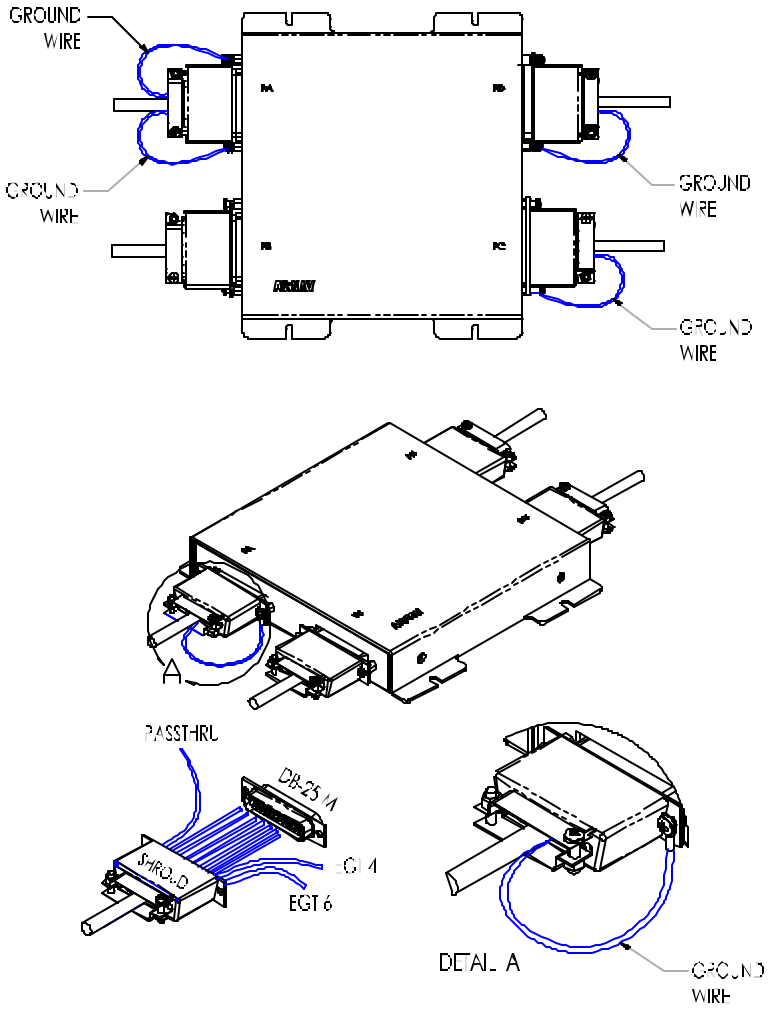
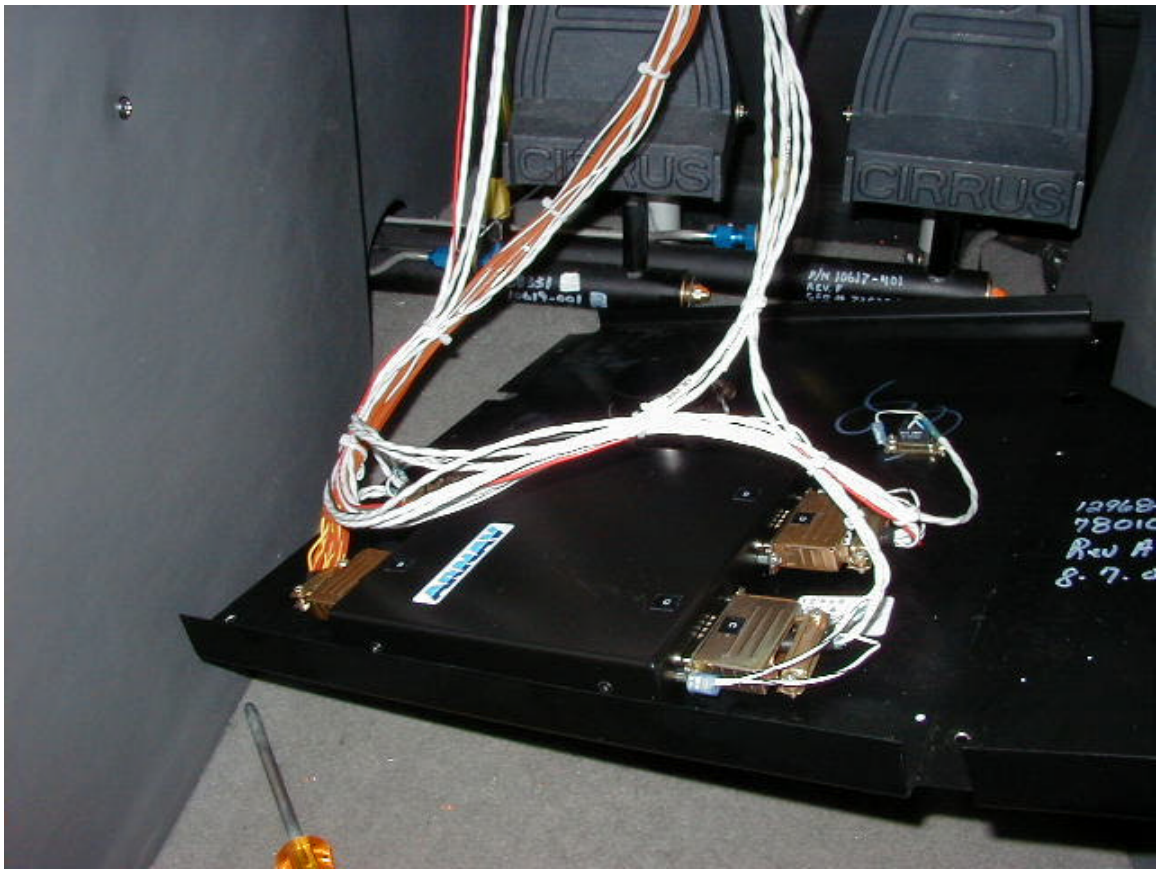


Figure 13-1



Kick Panel With EMM-35 and All Connections Final

14. INSTALLATION OF EGT AND CHT PROBES

Equipment Used:

- EGT Probes – 116-5450-01 (5)
- CHT Probes – 116-5460 (5)
- CHT Bayonet Adaptor – 116-5464 (5)

In this section you install the EGT probes in the exhaust pipes of each cylinder except the one that has the factory EGT. You will then install CHT bayonet adaptors into the cylinder head for each cylinder except the one that has the factory CHT. You will then insert the CHT bayonet probes into the cylinder adaptors.

EGT Procedure Step Action

1. Prepare each exhaust for probe installation by mounting the EGT probe clamp loosely on exhaust pipe.
2. Keeping the center of the clamp 3” down from the exhaust pipe flange, rotate the clamp until the adjusting screw is easily accessible. Confirming that the center of the clamp is still 3” down from the flange, tighten the clamp into position.
3. Select a probe location on the centerline of the clamp that will allow access for the drill and still provide good probe clearance and lead routing.
4. Center punch the location on the clamp and then drill both clamp and pipe with a 0.129” bit. (Refer to **Figure 14-1**)
5. Loosen the clamp enough to install seal washer, thimble, and probe (As per **figure 14-2 and 14-3**)
6. Assure proper placement and alignment of EGT probe and tighten the clamp securely.
7. Repeat steps 1 through 6 for all exhausts except:

    - Cirrus SR-20 has the factory EGT probe at ‘EGT6’. Do not install a probe on cylinder 6 on the SR20.

- Cirrus SR-22 has the factory EGT probe at ‘EGT4’. Do not install a probe on cylinder 4 on the SR22.

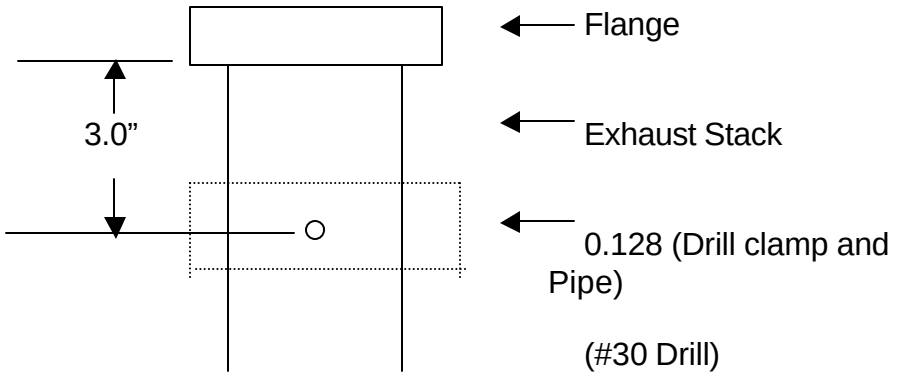


Figure 14-1

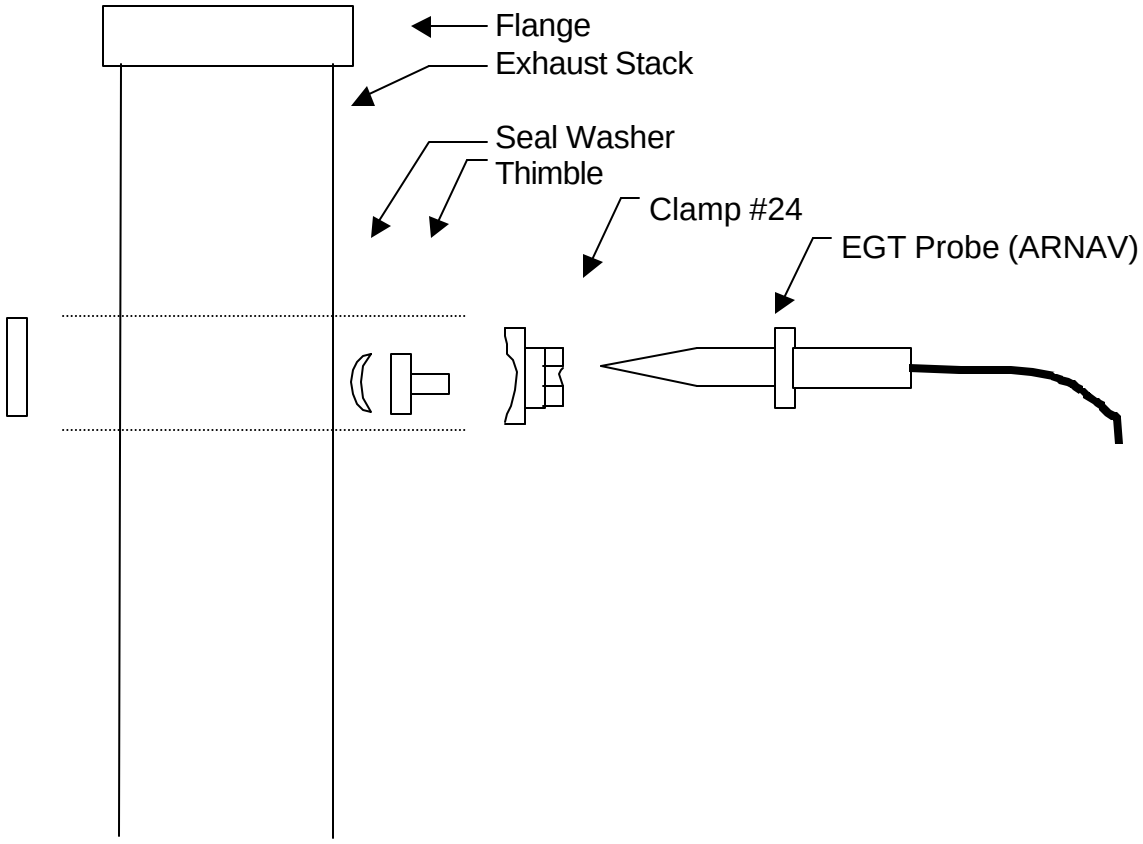
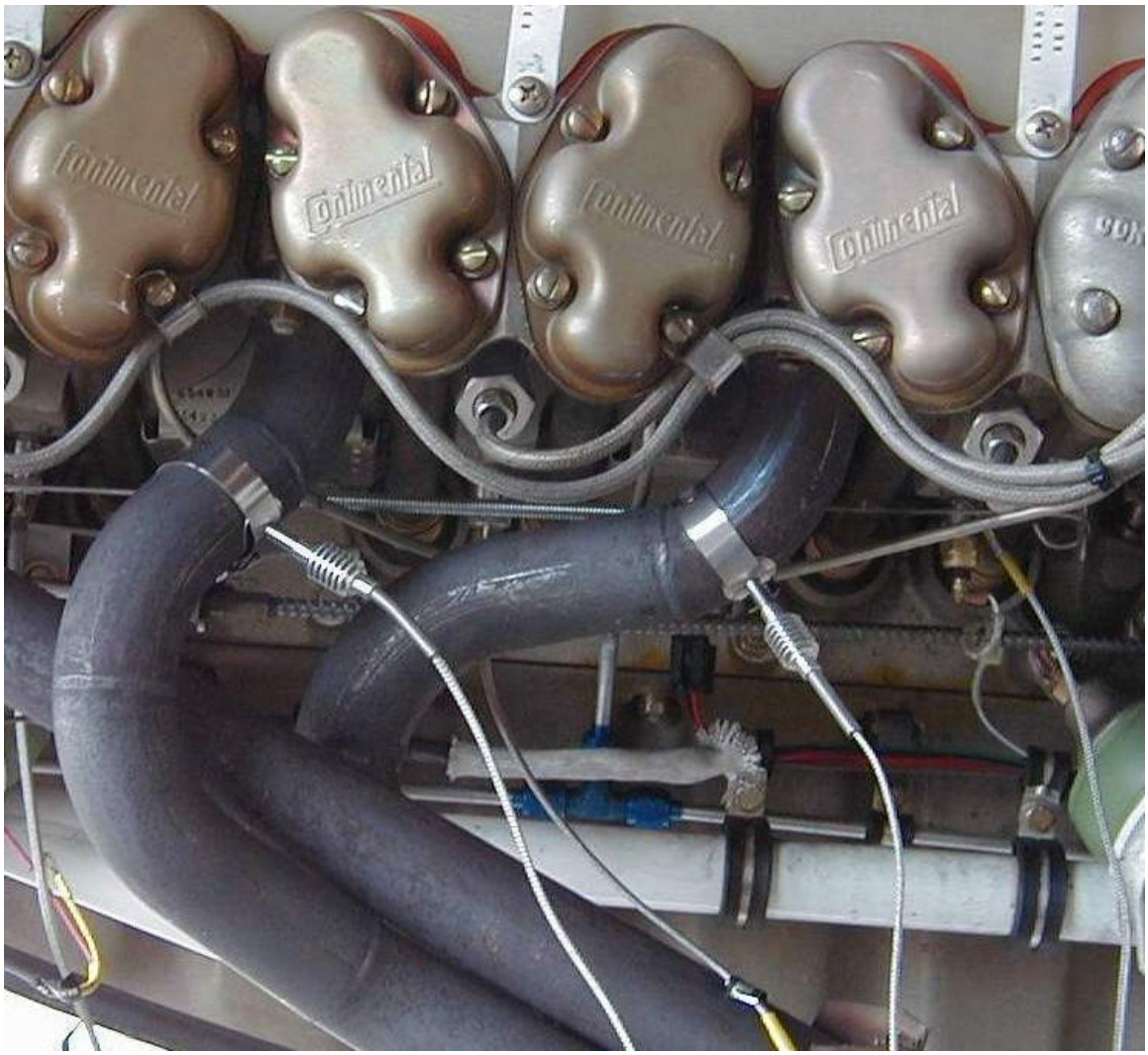


Figure 14-2



EGT Clamps and Probes on two Exhaust Pipes

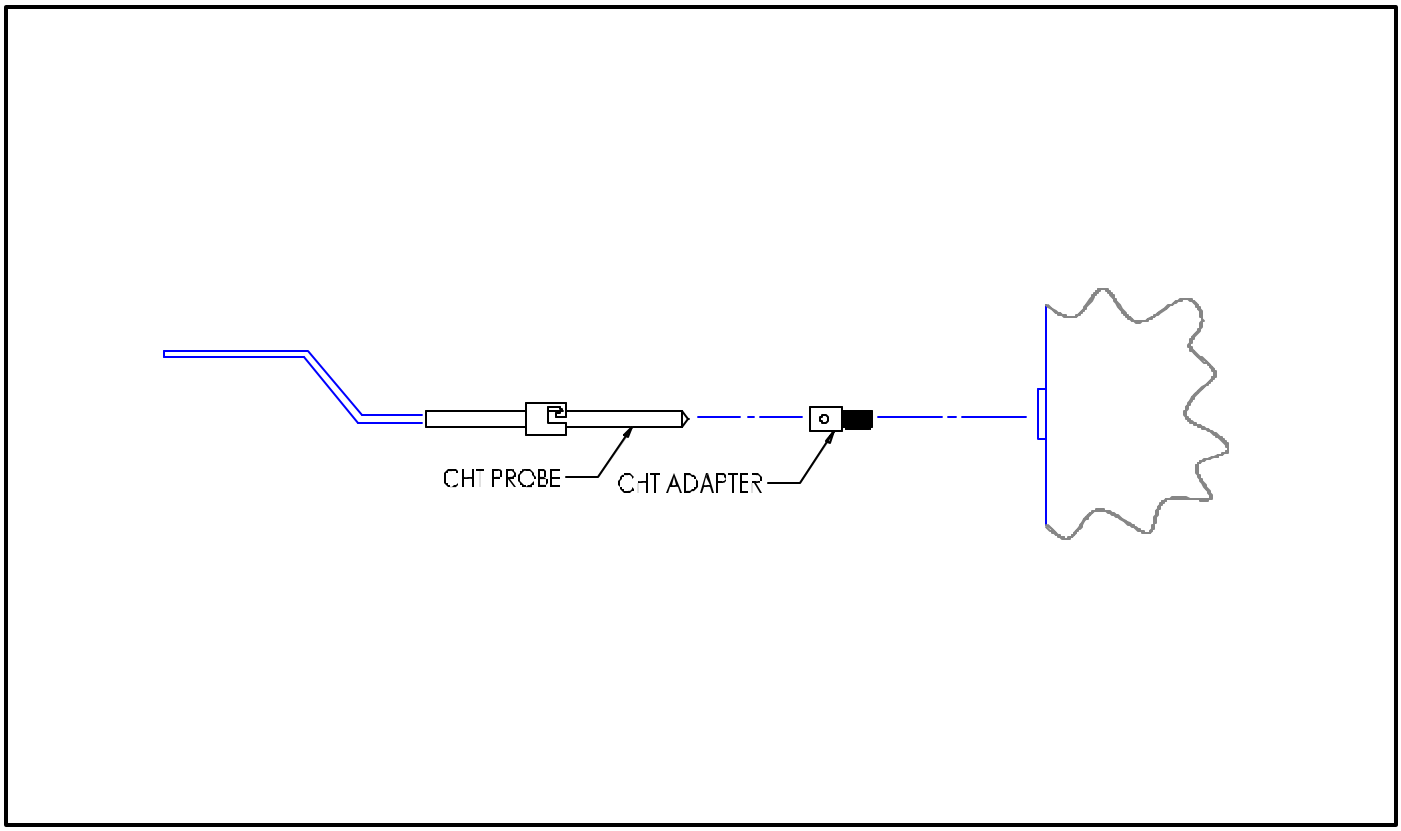
Figure 14-3

CHT
Procedure
Step Action

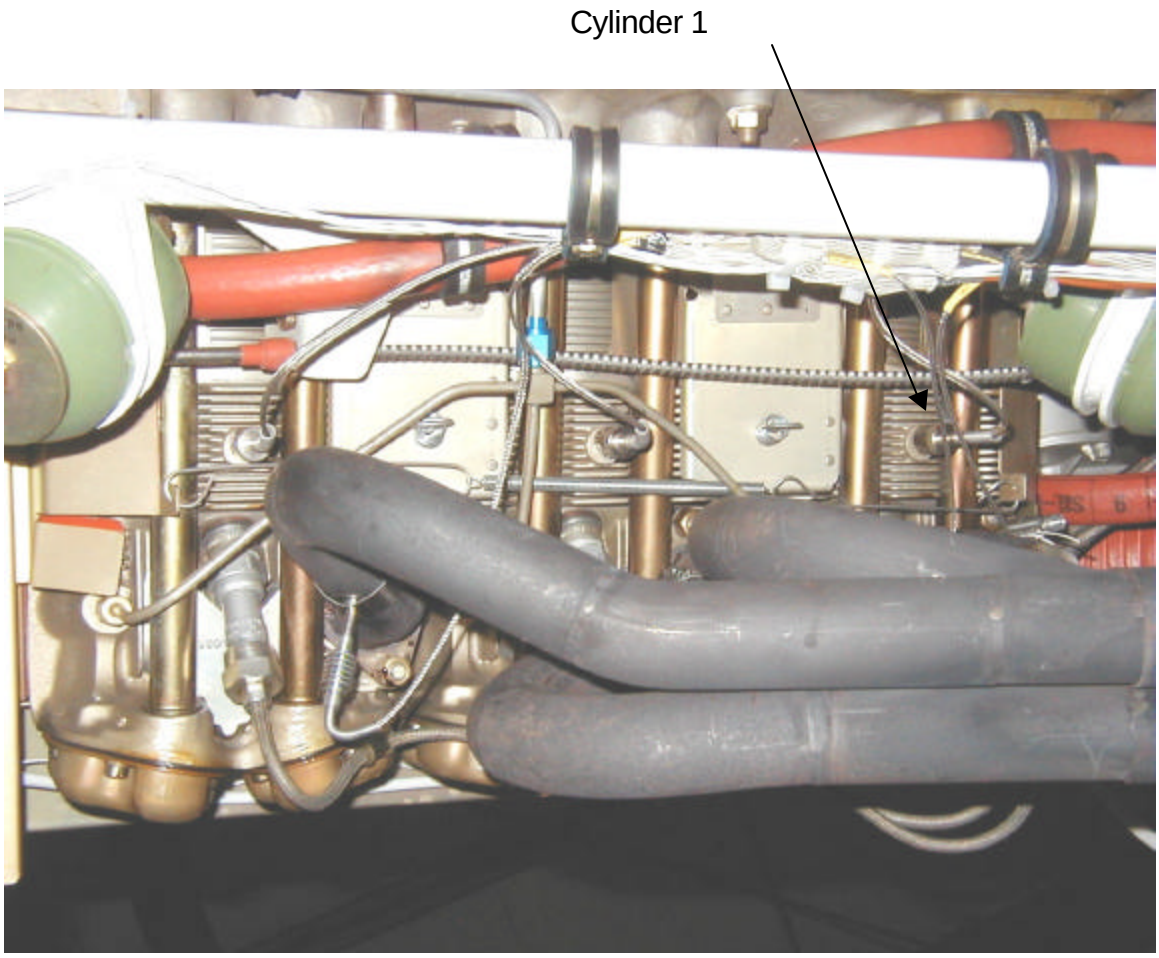
1. Prepare each cylinder for CHT probe installation (except as noted below) by inserting the bayonet adaptor into the threaded probe location in the cylinder head on the bottom of the cylinder. (Refer to **Figure 14-4 and 14-5**)

   - Cirrus SR-20, Serial # 1047 or earlier, will not use the 'CHT2' location. This spot has the factory CHT probe installed.
   - Cirrus SR-20, Serial # 1048 or later, will not use the 'CHT3' location. This spot has the factory CHT probe installed.
   - Cirrus SR-22, all, will not use the 'CHT6' location. This spot has the factory CHT probe installed.

2. Tighten the bayonet adaptors into the cylinder head.
3. Insert a CHT bayonet probe into each (5) adaptor using a Push-Twist-Lock action.
4. The CHT and EGT wires will be connected to the external harness (611-0602) later.



CHT Bayonet Probe – Bayonet Adaptor – Cylinder Head
Figure 14-4



View from underneath aircraft showing CHT probe location
Figure 14-5

15. ROUTE EXTERNAL HARNESS (611-0602) AN CONNECT EGT AND CHT PROBES

Equipment Used:

- Fiberglass Sleeve – 610-2150
- Screws for ring terminal splice – 201-0403
- Locking Nuts for ring terminal splice – 241-0447
- Heat Shrink Tubing – In probe package

In this section you will connect the external harness (611-0602) to the 39-pin firewall connector installed earlier. You will then route the harness consisting of thermocouple extension wire pairs to the two sides of the engine for connection to the EGT and CHT probes installed in the previous section.

The cylinder numbers are identified on the engine as described below (Left and Right as referenced from the pilot seat:

Right Side – Back to Front – Cylinder 1 – Cylinder 3 – Cylinder 5

Left Side – Back to Front – Cylinder 2 – Cylinder 4 – Cylinder 6

Procedure
Step Action

1. Lay out the 611-0602 harness (Refer to **Figure 15-1 and Figure 15-2**). Separate the wire pairs into left side and right side groupings by bunching pairs labeled CHT or EGT cylinders 2,4, and 6 for left side and cylinders 1,3, and 5 for right side.
2. Attach the 39-pin connector to the firewall pass through connector installed earlier.
3. Secure the 39-pin connector using safety wire to the firewall nut.
4. Route the left side bundle along the engine mount structures to the general area of the EGT and CHT probes on the left side. The bundles will be secured later.
5. Route the right side bundle along the engine mount structures to the general area of the EGT and CHT probes on the right side. The bundles will be secured later.

6. There will be one CHT wire pair and one EGT wire pair on the harness that will not be used. The pair not used is based on airplane type (SR20 or SR22) and in the case of the SR20, the serial number of the airplane. The table below identifies the unused wire pairs. They will be insulated and tied off later.

   - Cirrus SR20, Serial # 1047 or earlier, will not use the 'CHT2' TC pair. Insulate and tie off this pair.
   - Cirrus SR20, Serial # 1048 or later, will not use the 'CHT3' TC pair. Insulate and tie off this pair.
   - Cirrus SR20, all, will not use the 'EGT6' TC pair. Insulate and tie off this pair.

   - Cirrus SR22, all, will not use the 'CHT6' TC pair. Insulate and tie off this pair.
   - Cirrus SR22, all, will not use the 'EGT4' TC pair. Insulate and tie off this pair.

EGT Section of Harness 611-0602

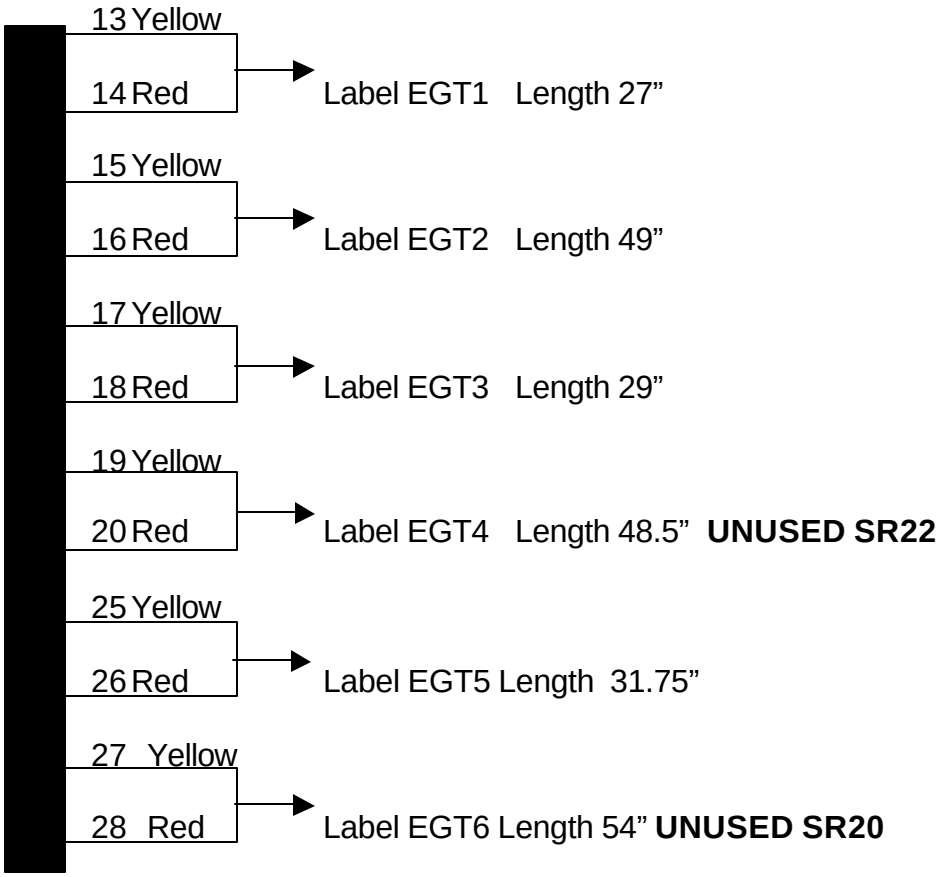


Figure 15-1

CHT Section of Harness 611-0602

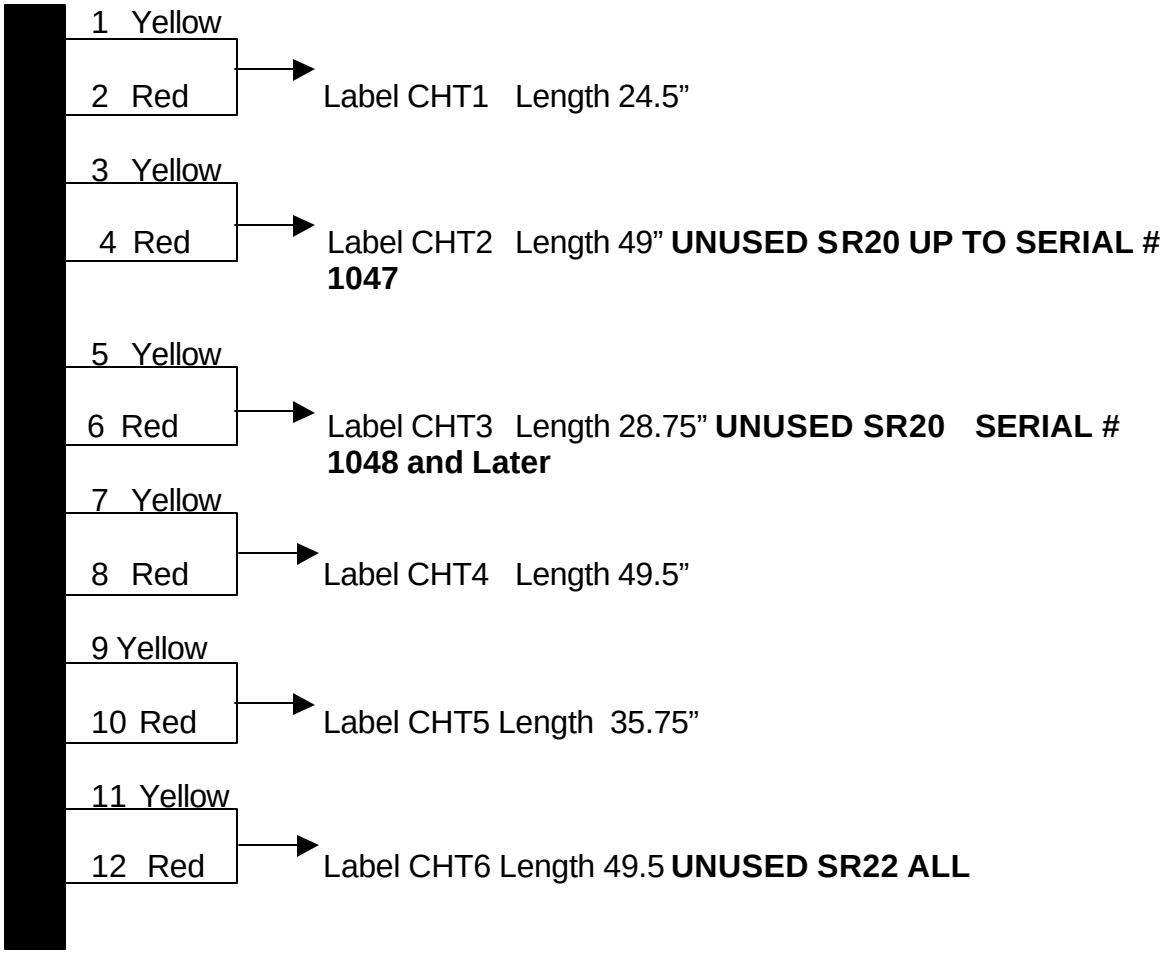


Figure 15-2

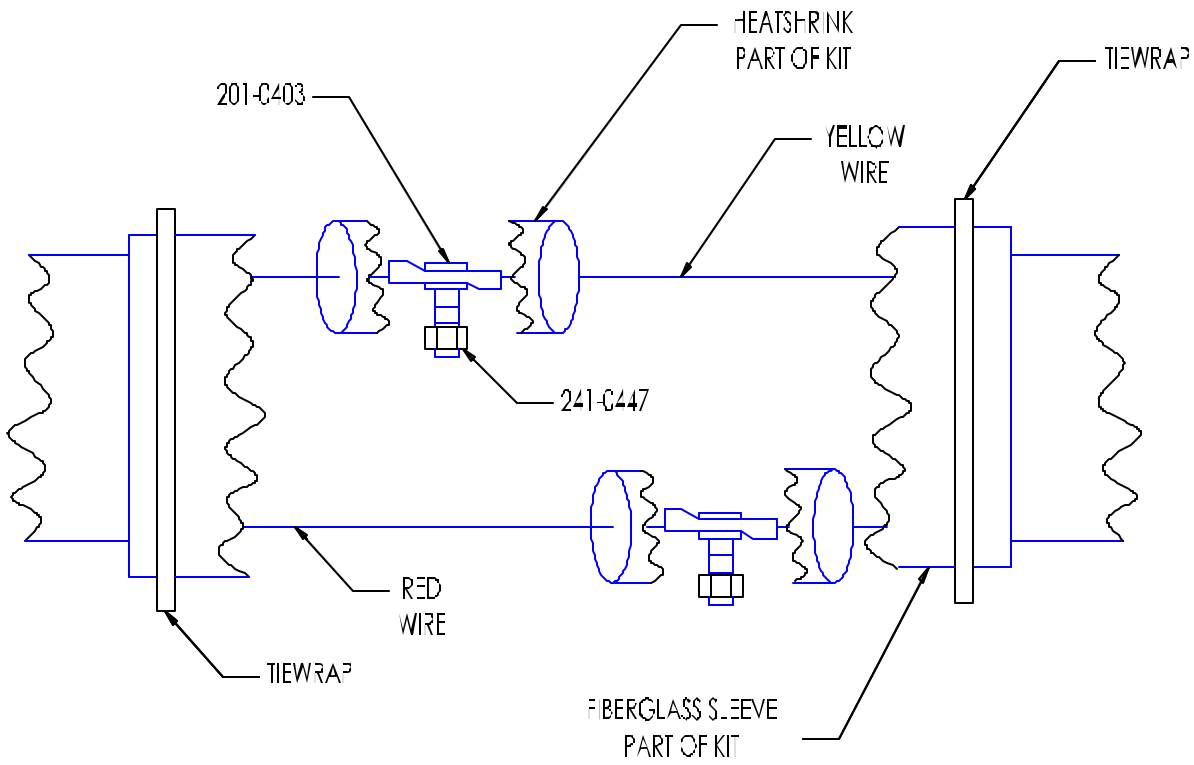
EGT Probe Connection

Procedure
Step Action

1. Locate the thermocouple (TC) pair labeled ‘EGT1’ on the harness P/N 611-0602.
2. Route the ‘EGT1’ pair to the EGT installed in the number 1 exhaust of the aircraft (closest to battery) do not clamp or tie to harness yet.
3. Slip a fiberglass braided sleeve over the wire pair in preparation for connecting the EGT probe to the harness.
4. Slip heat shrink over each ring terminal wire in preparation for connecting the EGT probe to the harness
5. Once routed, connect the EGT probe and the 611-0602 harness pair together with the ring terminal splice, as shown in **Figure 15-3** below.
6. After connecting the ring terminals together, make sure the screw/nut combination is tight.
7. Cover the ring terminal connections with the heat shrink and shrink for insulation.
8. Slide the fiberglass sleeve over the splice junction and secure it to the harness with tie-wraps.
9. **Repeat steps 1 through 8** for each of the other 4 added EGT probes.
10. After connecting all probes to the 611-0602 harness there will be one EGT wire pair that has not been used (which pair depends on airplane type – SR20 or SR22). The unused EGT wire pair should be insulated and tied back out of the way.

Note: Do not secure Harness P/N 611-0602 with cable ties and clamps at this time.

This step is will be done when all probes and sensors have been installed.



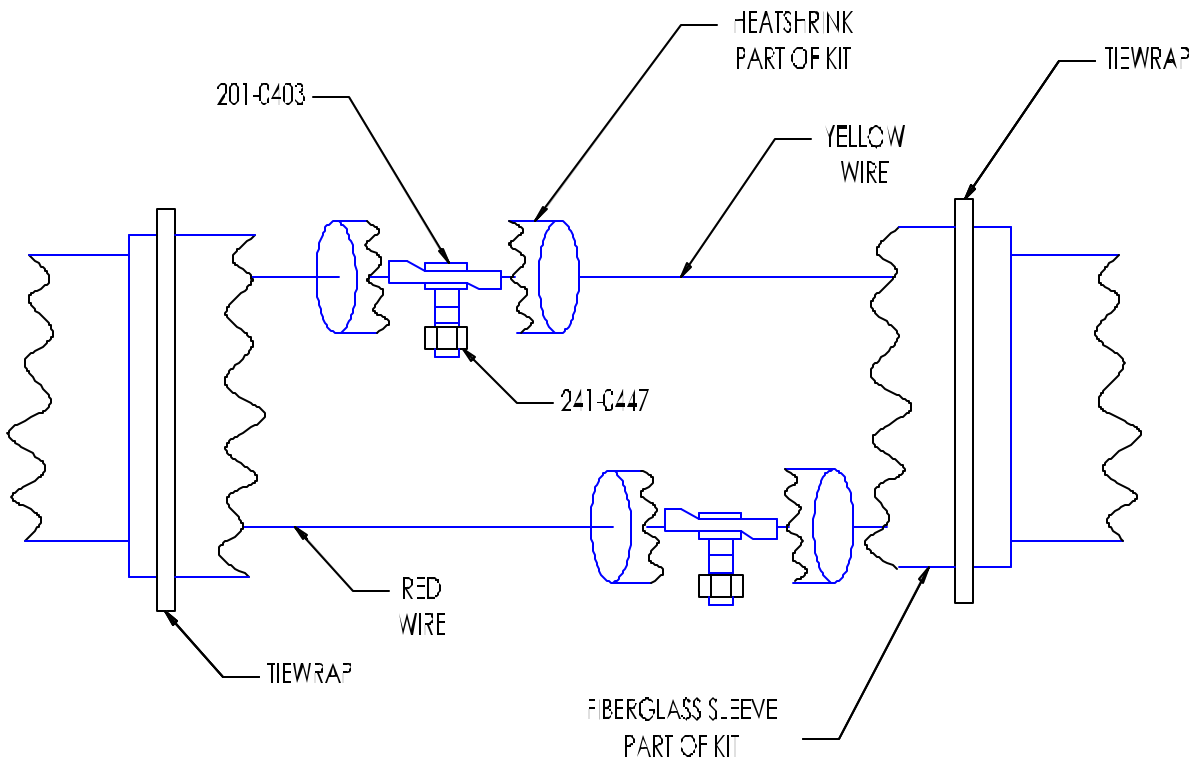
EGT Probe and TC Extension Wire Ring Terminal Splice
Figure 15-3

CHT Probe Connection

Procedure
Step Action

1. Locate the thermocouple (TC) pair labeled ‘CHT1’ on the harness P/N 611-0602.
2. Route the ‘CHT1’ pair to the CHT installed in the number 1 cylinder of the aircraft (closest to battery) do not clamp or tie to harness yet.
3. Slip a fiberglass braided sleeve over the wire pair in preparation for connecting the CHT probe to the harness.
4. Slip heat shrink over each ring terminal wire in preparation for connecting the CHT probe to the harness.
5. Once routed, connect the CHT probe and the 611-0602 harness pair together with the ring terminal splice, as shown in **Figure 15-4** below.
6. After connecting the ring terminals together, make sure the screw/nut combination is tight.
7. Cover the ring terminal connections with the heat shrink and shrink for insulation.
8. Slide the fiberglass sleeve over the splice junction and secure it to the harness with tie-wraps.
9. **Repeat steps 1 through 8** for each of the other 4 added CHT probes.
10. After connecting all probes to the 611-0602 harness there will be one CHT wire pair that has not been used (which pair depends on airplane type – SR20 or SR22). The unused CHT wire pair should be insulated and tied back out of the way.

Note: Do not secure Harness P/N 611-0602 with cable ties and clamps at this time.
This step is will be done when all probes and sensors have been installed.



CHT Probe and TC Extension Wire Ring Terminal Splice
Figure 15-4

16. SECURE THE 611-0602 HARNESS

Equipment Used:

- Adel Clamps for engine mount frame (large) – 183-0010
- Adel Clamps for wire bundles (small) – 183-0008
- Tie Wraps – 182-1010

In this section you will clean up the routing of the harness (611-0602) and use Adel Clamps and wire ties to secure the harness to the engine mount tubing and other harnesses and hoses. When finished with this step the engine side of the installation will be complete.

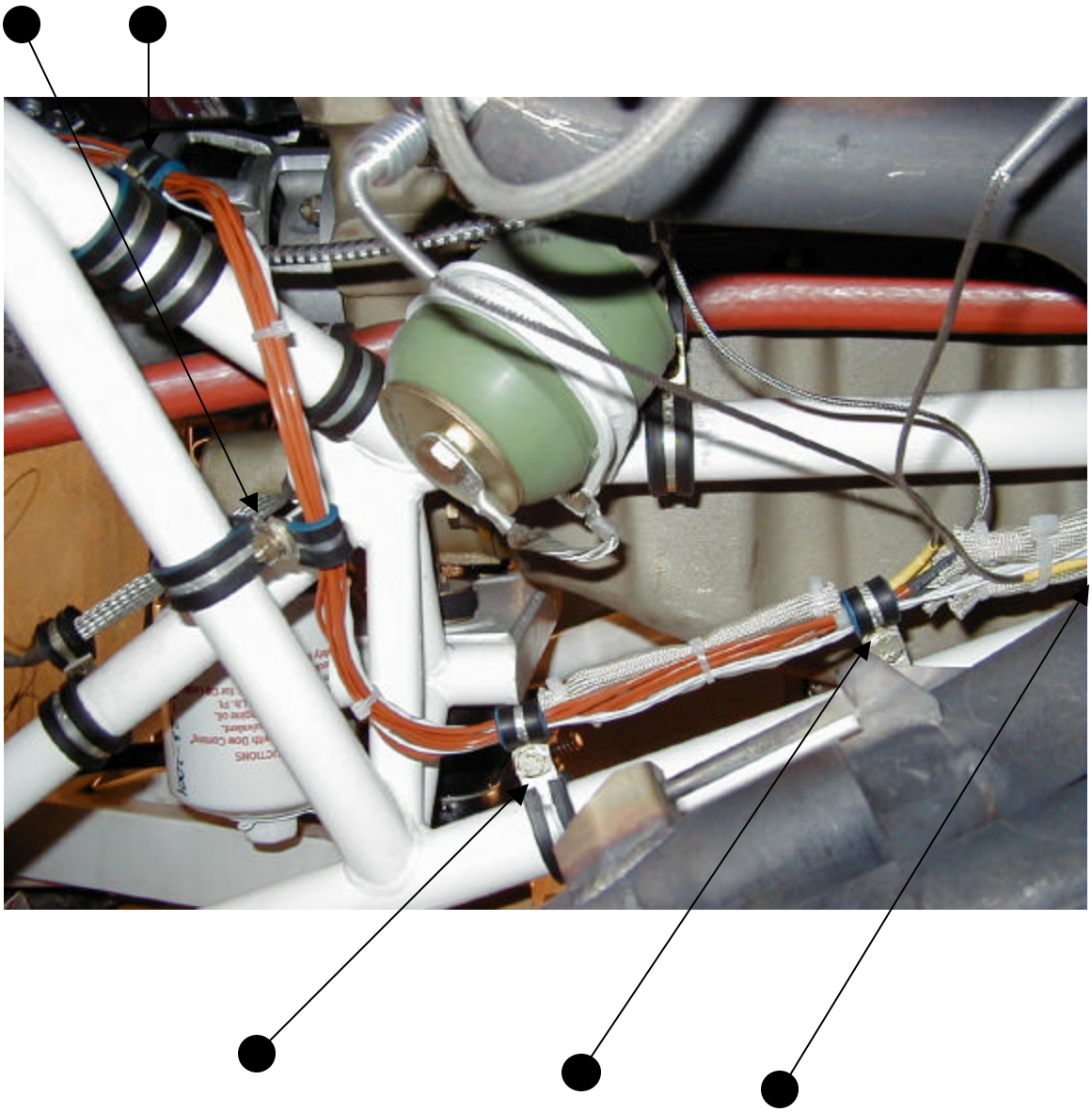
Securing Cables

Refer to **Figure 16-1** below for proper placement of Adel Clamps for securing the External Harness (P/N 611-0602).

Note: **Figure 16-1** can be used for either side of the aircraft.

Use any additional wire ties to clean up the wire harness and assure that everything is secure. Review the wire routing to make sure there is nothing that will rub on an exhaust pipe or other part.

● = Clamp Placement



Adel Clamp Locations and Wire Routing
Figure 16-1

17. INSTALLATION AND SETUP OF ICDS 2000 NEW SOFTWARE CARD

Equipment Used:

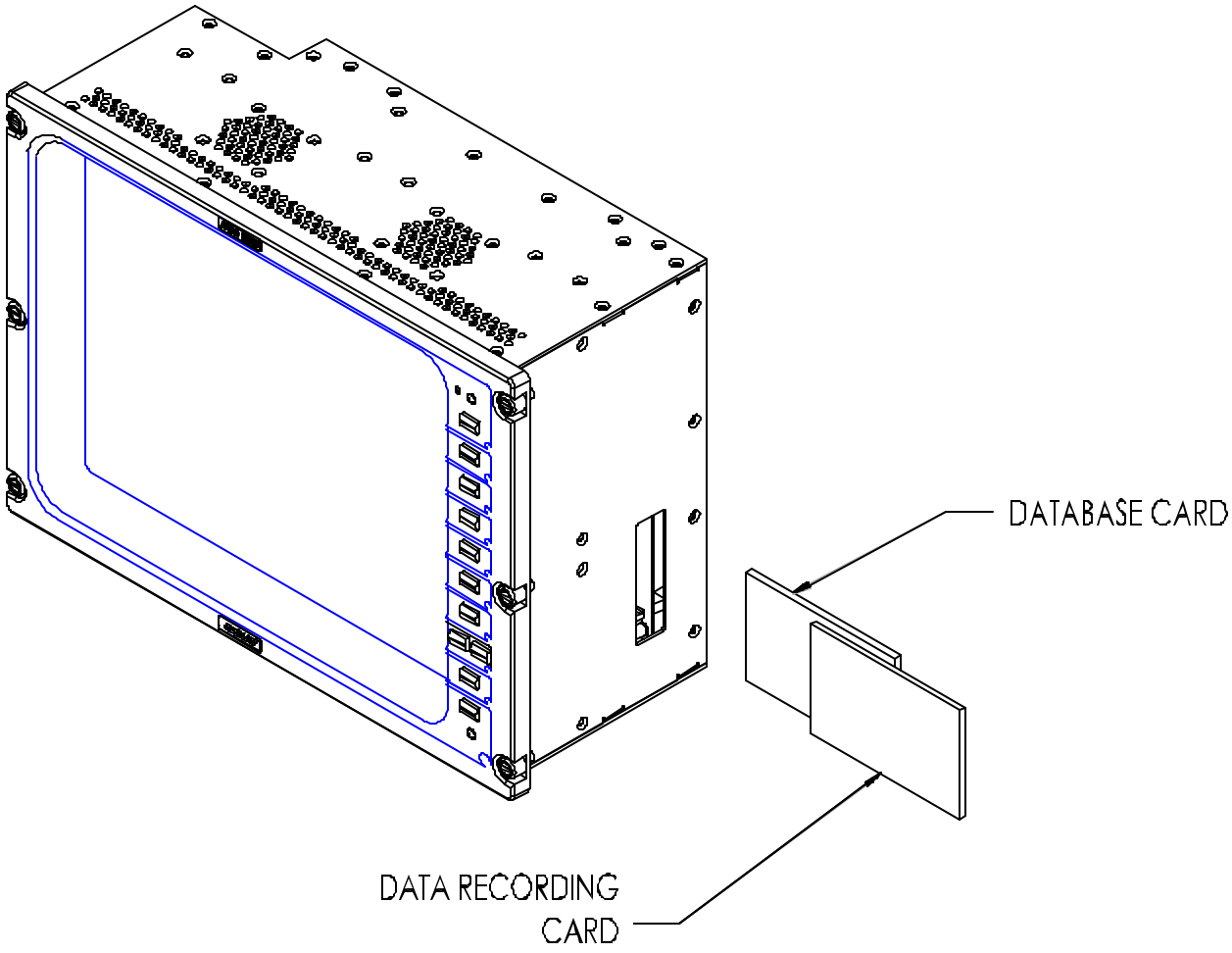
- ICDS 2000 – removed from panel earlier
- Database Card – 427-0550-00 or 427-0550-001
- Optional Data Recording Card – 125-6001-01

In this section you will insert the new Program (database) card into the ICDS 2000. If the customer has ordered the optional Data Recording Card you will also insert that card into the ICDS 2000. After putting the cards in the ICDS 2000 you will put the ICDS 2000 back into the panel then power up the system and perform the required setup configuration changes using the ICDS 2000 front panel.

17.1. Install New Software Cards:

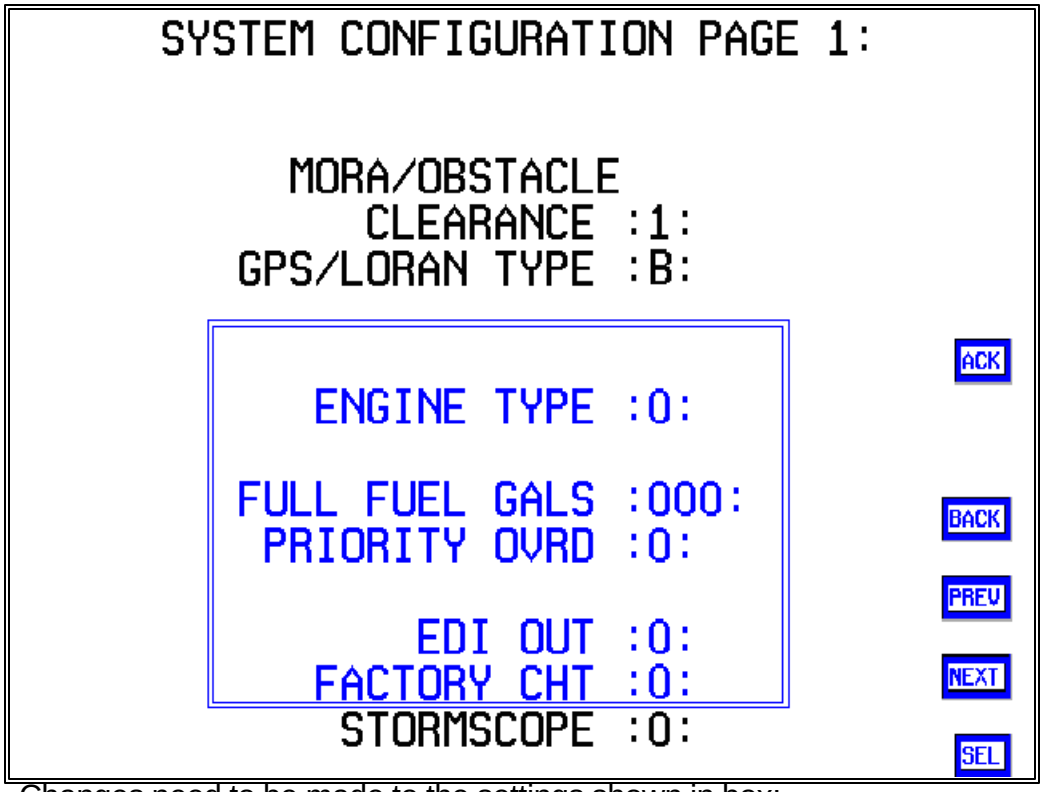
Procedure
Step Action

1. Remove existing card(s) from the right hand side of the ICDS 2000 (Be sure to return the removed card to ARNAV to avoid a core charge).
2. Insert the card labeled: V920AG (or later version) database into the card slot nearest to the back of the ICDS. (Refer to **Figure 17-1**)
3. Insert the Data Recording card (if used) into the card slot nearest to the front of the ICDS 2000 (Refer to **Figure 17-1**).
4. Connect the 100-pin connector to the ICDS 2000 and insert the unit back into the instrument panel.
5. Turn on the Battery and Avionics power switches to start the ICDS 2000.
6. When the display first powers up push the line select key on the ICDS 2000 that lines up with the menu option for **"Setup / User Graphics"**.
7. In the Setup menu press the key for **"System Configuration".**
8. Perform the Setup procedures as defined below.
9. After performing the setup / configuration changes and system checkout described below you will secure the DZUS fasteners to secure the ICDS 2000 back in the panel.



ICDS 2000 Database and Data Recording Card Installation
Figure 17-1

17.2. Setup - System Configuration:



Changes need to be made to the settings shown in box:

Note: Full Fuel Gals Information – See Step 5

Procedure
Step Action

1. Power on ICDS 2000.
2. Select **SETUP**.
3. Select SYSTEM CONFIGURATION.
4. Press **ACK** until the cursor is in the **ENGINE TYPE** field. Press **NEXT** until the engine type is **A for SR20** or **B for SR22**. Then press **ACK**.
5. Change Full Fuel Gals to **056 for the SR20** and **081 for the SR22**. If the first number is not 0, then press **NEXT** until it is 0. Then press

SEL. Press **NEXT** until cursor is 5 (8 for SR22), and then press **SEL**. Press **NEXT** until cursor is 6 (1 for SR22). Then press **ACK**.

6. Change PRIORITY OVRD to 1. Press **NEX**T until it is 1, then press **ACK.**
7. Change FACTORY CHT using the **NEXT** key to indicate which CHT is the factory installed probe.
8. Press **ACK** through the rest of the prompts.
9. When prompted **ALL INFORMATION CORRECT YES/NO**, use the arrow keys to highlight **YES** and then press **SEL**.

Set Data Recording Interval:

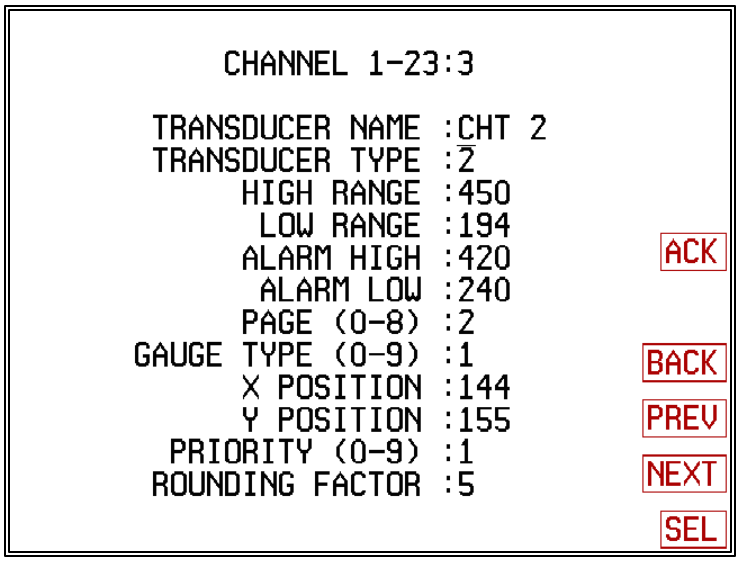
Procedure
Step Action

1. From the **SETUP** Menu, select **AUX FEATURES**.
2. Select DATA RECORDING SETUP.
3. Use the **NEXT** key to set the **RECORD INTERVAL** to 60 seconds. Press **NEXT** until cursor is a 6, and then press **SEL**. Press **NEXT** until cursor is 0, and then press **ACK**.
4. When prompted **ALL INFORMATION CORRECT YES/NO**, use the arrow keys to highlight **YES** and the press **SEL**.
5. Power off the ICDS 2000.

If this is an SR20 install and the factory CHT is not cylinder 2 (SR20 with serial number 1048 or later), then the following additional setup needs to be done.

Procedure
Step Action

1. Power on ICDS 2000.
2. Select Diagnostics.
3. Select Engine Monitoring/Transducer Setup
4. Select Setup Transducers.
5. Use **NEXT** key to enter 3 for the Channel. Press **ACK**. The screen shown below will display.
6. Press **SEL** until the cursor is under the 2 in CHT 2. Press the **NEXT** key to change 2 to 3. Press **ACK**.
7. Press **ACK** until the cursor is in the X Position field. Change 144 to 232. Use the **NEXT** key to change 1 to 2. Press **SEL**. Use the **PREV** key to change 4 to 3. Press **SEL**. Use **PREV** key to change 4 to 2. Press **ACK**.
8. Press **ACK** through remaining prompts.
9. When prompted **ALL INFORMATION CORRECT YES/NO**, use the arrow keys to highlight **YES** and the press **ACK**.



17.3. Verify Operation of the System

The completed installation will be tested in two steps, the hangar test for communication ports and non-engine sensors and the powered test for engine sensors.

Hangar Test:

Initial Power-up

1. The following steps require that the previous ICDS 2000 Setup instructions and card replacement have been completed. If installing on an SR20 you may wish to disable the Boost Pump by pulling the breaker out before powering the aircraft in the hangar to conserve battery power (and reduce noise).

2. Turn on Battery Power and Avionics Power, confirming that the new EMM-35 circuit breaker does not trip and that the ICDS 2000 power indicator and key backlights are on.

3. The ICDS 2000 will come up to the System Menu, (MAPPING; DIAGNOSTICS; SETUP / USER GRAPHICS). When this appears, immediately select **DIAGNOSTICS**.

Confirm ICDS 2000 to Stormscope Connection

Only run this test if there is a Stormscope installed. This test confirms a good connection from the Stormscope through the EMM-35 to the ICDS 2000.

From the **DIAGNOSTICS** menu do the following:

1. On the DIAGNOSTICS menu select **STORMSCOPE**.
2. On the STORMSCOPE menu select **SW VERSION PAGE**.
3. You should see the message 'Sending request…' displayed briefly followed within a few seconds by Stormscope model and version information. If the model and version appear, the Stormscope interface is communicating correctly with the ICDS 2000.
4. Press any key to exit from the SW VERSION PAGE.
5. Press the **EXIT** and **END** keys to get back to the System Menu.

Confirm ICDS to EMM-35 Connection

This test will confirm that the ICDS 2000 to EMM-35 connection is good.

Press **DIAGNOSTICS** and do the following:

1. On the DIAGNOSTICS menu select **EMM-35 TEST/CONFIGURATION**
2. On the EMM-35 TEST/CONFIGURATION menu select **DISPLAY EMM-35 CHANNELS**
3. On the DISPLAY EMM-35 CHANNELS menu select **NODE 1**
4. You should see data on the screen if the EMM-35 is operating properly. In the first column on the far left find the **'volt'** field. The number after 'volt' indicates the current battery voltage.
5. If data is being displayed, then the EMM-35 to ICDS 2000 communication channel is okay.
6. Press any key to take you back to the **EMM-35 TEST/CONFIGURATION** menu.
7. On the EMM-35 TEST/CONFIGURATION menu, select the **QUERY EMM-35 SOFTWARE VERSION**.
8. The software version for the EMM-35 should be displayed. It should be **V810X**. Where 'X' is the current version of software.
9. If the version was displayed, then the ICDS to EMM-35 communication channel is okay.
10. Press any key to exit. Then **END** and **EXIT** back to the Main Menu Screen.

Confirm Engine Data

1. From the main menu screen select **MAPPING**.
2. The screen will display the full engine page. The EGTs, CHTs, and OILTM will read the current Fahrenheit reading of what it is measuring (If EGT and CHT is below 200 degrees F the display will read "- - -").
3. If the plane has been setting for 3 hours or more, then the EGT and CHT readings should be dashed out since the ICDS 2000 will not show EGT and CTH temperatures lower than 200 degrees. These reading will have to be verified during the engine running tests.
4. With the engine off the OILPR, RPM, and FLOW should all read Zero. MP should read slightly less than 30in/hg.

5. Check the OIL TEMP/OIL PRESSURE, TACH, and MAN PRESS/FUEL FLOW indicators are displaying the same data as the ICDS 2000.
6. Press the **OVRD** key and then select **MAP**. Press the **ENGINE MONITORING** icon, bottom right button, until the OAT comes on the screen. Confirm that the OAT temperature matches the ambient temperature. The OAT is reading in Fahrenheit.

Confirm GPS to ICDS 2000 Connection

1. Make sure the Garmin GPS is on and in track. If the connection is good, a white aircraft symbol should display on the ICDS 2000 mapping screen located at your current position. If you see a white box with a cross through it or if the **'Acquiring…'** message persists, then the ICDS 2000 is not getting a good position from the Garmin GPS.

Powered Test:

Tests after startup

1. Start the aircraft.
2. Confirm RPM, Manifold Pressure, Fuel Flow, Oil Pressure, and Oil Temperature gauges are functioning and acceptably close to the factory gauge readings. The fuel flow indicator will not reliably show flow until the fuel flow is in the active area of the indicator.

Tests while warming up

1. Confirm that Oil Temperature and all EGTs and CHTs are increasing as expected.
2. Check for Comm Radio interference by watching for gauge fluctuations while keying the mike or broadcasting short messages on both Comm1 and Comm2 at various frequencies.

Tests after warm (10 minutes running @ 1200 RPM)

1. Confirm that the EGTs, CHTs, RPM, Manifold Pressure, Fuel Flow, Oil Pressure and Oil Temperature are acceptably close to the factory gauges.

Procedure to verify ICDS 2000 is performing data recording functions.

1. Power on the ICDS 2000
2. Allow unit to go into full engine display page.
3. Verify that the word **DATA** is displayed next to LSK-4 (Line Select Key – 4).
4. Above **DATA**, two green numbers should display. The top number is the number of recorded records. The lower number is a percent of usage on the data-recording card.
5. Verify that the top number is incremented as often as the data-recording interval that was previously entered into the ICDS 2000. Our recommended interval was 60 seconds.
6. Record top number and power off the ICDS 2000.
7. Power the ICDS 2000 back on.
8. Allow unit to go into full engine page.
9. Verify that the top number above **DATA** matches the number before power off.
10. Verify that it increments again.

18. FINALIZE INSTALLATION

Equipment Used:

- Wire Ties – 182-1010

In this section you will finalize the installation and prepare aircraft for customer.

1. Secure ICDS 2000 into panel with 6 DZUS fasteners.
2. Re-attach the decorative panel on the center console below the ICDS 2000.
3. Double check all connections on the EMM-35 to make sure back shells are on the connectors and that the connectors are secured to the EMM-35 with shield wires properly terminated.
4. Secure loose wire harness segments around the EMM-35 and harness 611-0600 with wire ties.
5. Attach the air vent hose back to the Kick panel with the EMM-35 on it.
6. Secure the Kick panel back where it is supposed to be.
7. Double check all EGT and CHT probes, connections, joint sleeves are correctly secured. Make sure there are no mechanical interferences or wires rubbing on exhaust pipes.
8. Check all Adel clamps to make sure they are tight.
9. Double check that the 39-pin connector on the firewall is secure and has safety wire attached.
10. Put the bottom section of the airplane cowling and the gear slot covers on.
11. Put the top section of the airplane cowling on.

Installation finished.

Appendix

- Wiring Diagram - SR-20 / EMM-35 - ICDS 2000 / WX-500 Installation
- Sample Form 337

Sensor Signal Pass Through Cables

Oil Temp - Oil Pressure Indicator

J1 — AMP 206708-1 — P1 — AMP 206705-2

- Oil Temp A-5
- Ground A-18
- Oil Pressure A-1
- Ground A-14

TACH Indicator

J2 — AMP 206708-1 — P2 — AMP 206705-2

- Tach C-12
- Ground C-25

Man Press Fuel Flow Indicator

J3 — AMP 206708-1 — P3 — AMP 206705-2

- Fuel Flow C-10
- Ground C-23
- Man Pressure A-2
- Ground A-15

CHT/EGT Indicator

J7 — AMP 206708-1 — P4 — AMP 206705-2

- CHT A-3
- Ground A-16

ICDS Download Port

J4 — DB9 F

- To ICDS Com 1 Tx (pin 9)
- To ICDS Com 1 Gnd (pin 8)

P-EMM-A — DB25 M

Pin	
1	
14	
2	
15	
3	
16	
4	
17	
5	
18	
6	
19	
7	
20	
8	
21	
9	OAT(+)
22	OAT(-)
10	
23	
11	
24	
12	
25	
13	

J-EMM-C — DB25 F

Pin	
1	
14	
2	
15	
3	
16	
4	
17	
5	
18	
6	
19	
7	
20	
8	
21	
9	
22	
10	
23	
11	
24	
12	
25	
13	

Split ICDS to Wx500 Harness

P5 — DB9 M

Pin	
1	
6	
2	ICDS Pin 12
7	ICDS Pin 11
3	
8	
4	
9	
5	Shield

J6 — DB9 F

Pin	
1	
6	
2	Wx500 Pin 8
7	
3	Wx500 Pin 20
8	
4	
9	
5	Shield

To ICDS Com2

J5 — DB9 F

Pin	
1	
6	
2	Tx1
7	
3	Rx1
8	
4	
9	
5	

From Wx500

P6 — DB9 M

Pin	
1	
6	
2	Tx2
7	
3	Rx2
8	
4	
9	
5	

Aircraft Power — 5A

Aircraft Ground

J-EMM-D — DB25 F

Pin	
1	
14	
2	
15	
3	
16	
4	
17	
5	
18	
6	
19	
7	
20	
8	
21	
9	
22	
10	
23	
11	
24	
12	
25	
13	

P-EMM-B — DB25 M

Pin				
1	EGT1(Y)			
14	EGT1(R)			
2	EGT2(Y)			
15	EGT2(R)			
3	EGT3(Y)			
16	EGT3(R)			
4			SR20 EGT4(Y)	
17	A	Note 1	SR20 EGT4(R)	C
5	EGT5(Y)			
18	EGT5(R)			
6			SR22 EGT6(Y)	
19	B	Note 1	SR22 EGT6(R)	D
7	CHT1(Y)			
20	CHT1(R)			
8	CHT2(Y)			
21	CHT2(R)			
9	CHT3(Y)			
22	CHT3(R)			
10	CHT4(Y)			
23	CHT4(R)			
11	CHT5(Y)			
24	CHT5(R)			
12	CHT6(Y)			
25	CHT6(R)			
13				

SR20 EGT6 or SR22 EGT4 (Y) (R) — E

Note 1

For SR20 - Connect: A to C and B to E

For SR22 - Connect: B to D and A to E

Pins 4 and 6 yellow
Pins 17 and 19 red

OAT

Orange	Aircraft(+)	v+	
White	OAT(+)	out	
Blue	OAT(-)	gnd	

P950 — CON39

Pin	
1	CHT1(Y)
2	CHT1(R)
3	CHT2(Y)
4	CHT2(R)
5	CHT3(Y)
6	CHT3(R)
7	CHT4(Y)
8	CHT4(R)
9	CHT5(Y)
10	CHT5(R)
11	CHT6(Y)
12	CHT6(R)
13	EGT1(Y)
14	EGT1(R)
15	EGT2(Y)
16	EGT2(R)
17	EGT3(Y)
18	EGT3(R)
19	EGT4(Y)
20	EGT4(R)
21	
22	
23	
24	
25	EGT5(Y)
26	EGT5(R)
27	EGT6(Y)
28	EGT6(R)
29	
30	
31	
32	
33	
34	
35	
36	
37	
38	
39	

Inside Firewall Connector

APPROVED BY

ARNAV Systems, Inc.

16923 Meridian East
Puyallup, WA 98373

Title: **Cirrus SR20 EMM-35 Install Back Of Firewall**

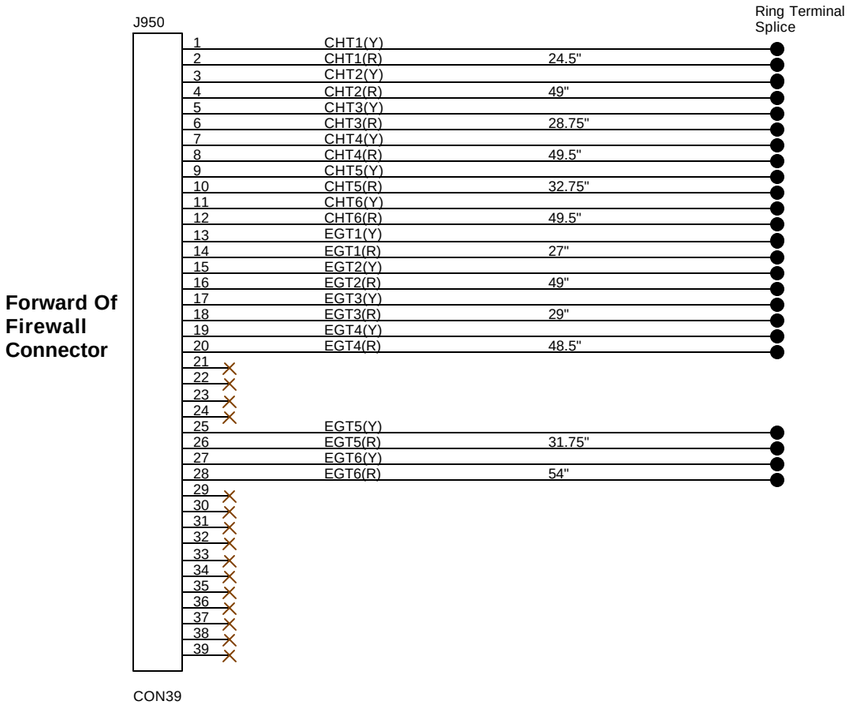
Size	Document Number	Rev
B	**ENG-4971**	B

Date: **Friday, September 07, 2001** Sheet **1** of **2**

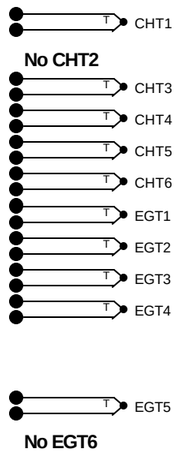
CHT Part Number 116-5460 (5 each)

EGT Part Number 116-5450 (5 each)

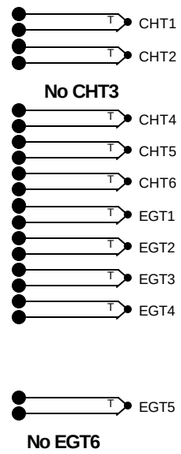
Thermocouple Extension Wire Length



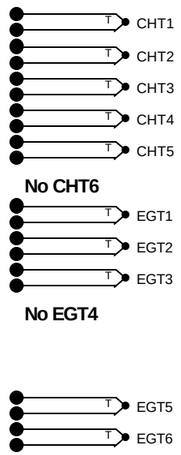
For SR20 Thru SN1047



For SR20 After SN1047



For SR22



At install - add the CHT and EGT probes for each aircraft type and serinal number as shown above and then tie off unused thermocouple extension wires on the harness

APPROVED BY

ARNAV Systems, Inc.

16923 Meridian East
Puyallup, WA 98373

Title
Cirrus SR20 EMM-35 Install Forward Of Firewall

Size	Document Number	Rev
B	**ENG-4971**	B

Date: **Friday, September 07, 2001** Sheet **2** of **2**

US Department of Transportation
Federal Aviation Administration

MAJOR REPAIR AND ALTERATION
(Airframe, Powerplant, Propeller, or Appliance)

Form Approved
OMB No. 2120-0020

For FAA Use Only
Office Identification

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed $1,000 for each violation (Section 901 of Federal Aviation Act of 1958).

1. Aircraft	Make: Cirrus	Model: SR 20
	Serial No.: 1062	Nationality and Registration Mark: N365DP
2. Owner	Name *(As shown on registration certificate)*: Delta Papa Ltd	Address *(As shown on registration certificate)*: PO Box 483, Preston, WA 98050-0483

3. For FAA Use Only

THE DATA/ALTERATION IDENTIFIED HEREIN COMPLIES WITH APPLICABLE AIRWORTHINESS REQUIREMENTS AND IS APPROVED ONLY FOR THE ABOVE DESCRIBED AIRCRAFT SUBJECT TO CONFORMITY INSPECTION BY A PERSON AUTHORIZED IN FAR 43.7.

AVIONICS
4/11/2001 — Date
FAA Inspector, NM-FSDO-01

THE DATA/ALTERATION IDENTIFIED HEREIN COMPLIES WITH APPLICABLE AIRWORTHINESS REQUIREMENTS AND IS APPROVED ONLY FOR THE ABOVE DESCRIBED AIRCRAFT SUBJECT TO CONFORMITY INSPECTION BY A PERSON AUTHORIZED IN FAR 43.7.

STRUCTURES
4-11-2001 — Date
FAA Inspector, NM-FSDO-01

4. Unit Identification				5. Type	
Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	~~~~~~~~~~ (As described in Item 1 above) ~~~~~~~~~~				X
POWERPLANT					
PROPELLER					RECEIVED MAR 26 2001 SEATTLE FSDO-A
APPLIANCE	Type				
	Manufacturer				

6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency	C. Certificate No.
AEROCENTER 16923-B MERIDIAN EAST PUYALLUP, WA 98375	( ) U.S. Certificated Mechanic ( ) Foreign Certificated Mechanic (X) Certified Repair Station ( ) Manufacturer	BBURO71K

D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Date: 3-16-2001
Signature of Authorized Individual:

7. Approval for Return To Service

Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is [X] APPROVED [ ] REJECTED

BY						
	FAA Flt. Standards Inspector		Manufacturer	X	Inspection Authorization	Other *(Specify)*
	FAA Designee		Repair Station		Person Approved by Transport Canada Airworthiness Group	

Date of Approval or Rejection	Certificate or Designation No.	Signature of Authorized Individual
4/16/2001	A&P 2643016 IA	

FAA Form 337 (12-88)

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

Installed, with the assistance of Arnav engineering staff, an Arnav EMM-35 engine trend monitoring system to provide supplemental engine parameter monitoring through the existing, Cirrus factory-installed Arnav ICDS display system. This is a supplemental engine monitoring system and is placarded "For reference only".

The system consists of an EMM-35 processor unit PN: 453-5030, six Arnav part. no. 116-5450 type K EGT probes, five Arnav pn: 116-5460 type K CHT probes, one Arnav pn: 116-5050 CHT probe an Arnav fabricated wiring harness with "Y" adaptors to connect the EMM-35 to the existing engine tachometer, oil pressure guage, oil temperature guage, and manifold pressure guage and an outside air temperature probe, Arnav pn: 116-5030.

This EMM-35 engine trend monitoring system was previously approved via STC #SA02165AK for installation in Cessna models 208 and 180.

The EMM-35 processor unit was mounted as shown in the attached photographs, on the upper surface of the copilot side lower instrument panel kick panel. The mounting was tested for compliance with the part 23 inertial load requirements by application of static forces equivalent to not less than 12 Gs of inertial force along all three axis. No permanent distortion of the kick panel or the structure to which it is mounted occured.

Power was supplied to the EMM-35 unit through a new 7277-2-5 circuit breaker mounted in the aircraft circuit breaker panel. Wiring was accomplished in accordance with attached Arnav wiring schematic, dwg. no. ENG-4971, using a harness pre-fabricated by Arnav. Wiring layout forward of the firewall, and firewall wiring pass-through were accomplished in accordance with Cirrus drawing 13749 pages 10, 11 and 12 (attached), and Arnav drawing ENG-4971, using a Cirrus-supplied multiconductor firewall pass-through connector.

Installation of the EGT and CHT probes was accomplished in accordance with Cirrus drawing 13749 pages 14, 15 and 16 (attached) and the EGT and CHT probe manufactuers installation instruction sheets supplied with the probes. EGT / CHT extension wiring was routed and secured as shown on pages 11 and 12 of the Cirrus drawing 13749. Shown also in an attached photograph.

An electrical load analysis shows the total continuous electrical load to be less than 60% of the single alternator generating capacity for the aircraft.
The aircraft compass was checked and found not to be affected by the alteration.
The aircraft weight and balance data and equipment list were revised to reflect this alteration.

The Arnav ICDS / EMM-35 aircraft flight manual supplement was provided to the aircraft owner, and the ICDS pilot operating handbook EMM-35 supplement was inserted into the ICDS operators manual.

The aircraft was extensively ground tested to check the operation of both the primary and secondary engine monitoring instruments and both systems were found to operate normally.
A flight test was performed, and again, both engine monitoring systems performed normally.

This installation meets the requirements of Title 14 CFR, part 23.1301 function and installation, part 23.1309 equipment, systems and installations. Part 23.1351 (a) and (b) electrical equipment general, Part 23.1357 circuit protection devices, part 23.1365 electrical cables, Part 23.1381 instrument lights, Part 23.1431 (a) and (b) electronic equipment, and Part 23.1529 instructions for continued airworthiness.
INSTRUCTIONS FOR CONTINUED AIRWORTHINESS:
These appliances are to maitained on an "on condition" basis. Except for visual inspection of the EGT / CHT probes during the aircraft annual inspection, no periodic maintenance of this system is required.

☐ Additional Sheets are Attached