

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
00	RELEASE PER ECO 03-175	6/27/03	

SENSOR INPUT INFORMATION

PARAMETER	RANGE / UNIT	FACTOR	CALIBRATION DATA									TOLERANCE OVER ENTIRE RANGE		SENSOR INFORMATION
												NORMAL TEMP	EXTREME TEMP	
MAP	0.0 TO 35.0 IN-HG	VDC / IN-HG	0.50 / 0.0	0.696 / 5.0	0.893 / 10.0	1.089 / 15.0	1.285 / 20.0	1.482 / 25.0	1.679 / 30.0	1.875 / 35.0		±0.3 IN-HG	±0.7 IN-HG	KAVLICO PART NUMBER P165-50A-E1A
RPM	0 TO 3500 RPM	HZ / RPM	0.00 / 0	12.50 / 500	25.00 / 1000	37.5 / 1500	50.00 / 2000	62.50 / 2500	75.00 / 3000	87.50 / 3500		±35 RPM	±70 RPM	PENNY AND GILES 1.5 PPR
EGT	500 TO 1650 °F	mV / °F (CJ = ICE)	10.561 / 500	26.978 / 1200	29.315 / 1300	31.628 / 1400	33.912 / 1500	36.166 / 1600	37.281 / 1650			±16 °F	±33 °F	TYPE K THERMOCOUPLE WATLOW PART NUMBER AF1136601
FUEL FLOW	0.0 TO 30.0 GPH	HZ / GPH	0.00 / 0.0	40.565 / 5.0	81.11 / 10.0	121.666 / 15.0	162.222 / 20.0	202.777 / 25.0	243.333 / 30.0			±0.3 GPH	±0.6 GPH	FLOSCAN, PART NUMBER 201-030-00 (201B-6) K-FACTOR 29,200 PPG
CHT	100 TO 500 °F	OHMS / °F	114.69 / 100	125.35 / 150	135.85 / 200	146.44 / 250	167.00 / 350	177.33 / 400	187.56 / 450	197.71 / 500		±5 °F	±10 °F	WATLOW PART NUMBER RF1035401 OUTPUT PER DIN-IEC-751 PLATINUM RTD
OP	0 TO 100 PSI	VDC / PSI	0.500 / 0	1.033 / 20	1.566 / 40	2.100 / 60	2.633 / 80	3.166 / 100				±1 PSI	±2 PSI	KAVLICO PART NUMBER P165-150G-E4B
OT	0 TO 250 °F	OHMS / °F	84.49 / 0	91.88 / 40	97.92 / 80	107.97 / 120	116.72 / 160	125.97 / 200	138.29 / 250			±2 °F	±5 °F	NORWICH PART NUMBER 102-00000 (MS-28034-1) OUTPUT PER MIL-T-7990B
AMPS (ALTERNATOR 1)	0 TO 100 AMPS	mV / AMPS	0.00 / 0	5.00 / 10	10.00 / 20	20.00 / 40	30.00 / 60	40.00 / 80	50.00 / 100			±1 AMP	±2 AMPS	LEE AIR MS91586-6
AMPS (ALTERNATOR 2)	0 TO 100 AMPS	mV / AMPS	0.00 / 0	5.00 / 10	10.00 / 20	20.00 / 40	30.00 / 60	40.00 / 80	50.00 / 100			±1 AMP	±2 AMPS	LEE AIR MS91586-6
AMPS (BATTERY)	-100 TO 100 AMPS	mV / AMPS	-50.00 / -100	-30.00 / -60	-10.00 / -20	0.00 / 0	10.00 / 20	20.00 / 40	30.00 / 60	50.00 / 100		±1 AMP	±2 AMPS	LEE AIR MS91586-6
VDC (MAIN)	0.0 TO 36.0 VDC	VDC / VDC	0.00 / 0.0	10.00 / 10.0	15.00 / 15.0	20.00 / 20.0	25.00 / 25.0	28.00 / 28.0	36.00 / 36.0			±0.4 VOLTS	±0.7 VOLTS	AIRCRAFT BUS
OAT	-40 TO 60 °C	OHMS / °C	77.39 / -40	83.77 / -20	90.38 / 0	97.31 / 20	104.60 / 40	112.28 / 60				±1 °C	±2 °C	NORWICH PART NUMBER 102-00002 (MS-28034-3) OUTPUT PER MIL-T-7990B
FUEL QTY LEFT & RIGHT	0 TO 33 US GAL EACH	VDC / GAL	SEE FUEL QUANTITY CALIBRATION CALIBRATION CHART									±1 GAL	±2 GAL	PRINCETON ELECTRONICS PART NUMBER (TBD)

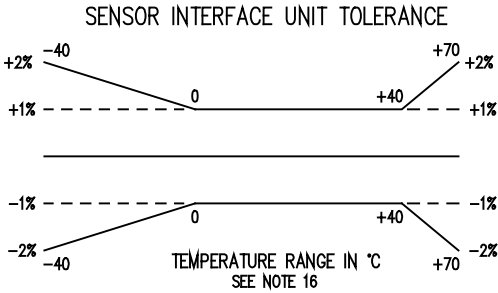
FUEL QUANTITY
CALIBRATION CHART

GAL	VDC	GAL	VDC
0	0.0118	17	2.60
1	0.2278	18	2.75
2	0.468	19	2.93
3	0.644	20	3.08
4	0.776	21	3.23
5	0.907	22	3.34
6	1.02	23	3.50
7	1.13	24	3.65
8	1.24	25	3.80
9	1.39	26	3.93
10	1.52	27	4.04
11	1.72	28	4.17
12	1.87	29	4.34
13	2.05	30	4.52
14	2.18	31	4.72
15	2.31	32	4.94
16	2.42	33	4.98

RS232 DATA FORMAT		
HEADER NAME	RESOLUTION	PARAMETER
AC (SEE NOTE 1)	NA	AIRCRAFT TYPE
E1	1 DEGREE	EXHAUST GAS TEMPERATURE (EGT) IN °F, CYLINDER 1
E2	1 DEGREE	EXHAUST GAS TEMPERATURE (EGT) IN °F, CYLINDER 2
E3	1 DEGREE	EXHAUST GAS TEMPERATURE (EGT) IN °F, CYLINDER 3
E4	1 DEGREE	EXHAUST GAS TEMPERATURE (EGT) IN °F, CYLINDER 4
E5	1 DEGREE	EXHAUST GAS TEMPERATURE (EGT) IN °F, CYLINDER 5
E6	1 DEGREE	EXHAUST GAS TEMPERATURE (EGT) IN °F, CYLINDER 6
C1	1 DEGREE	CYLINDER HEAD TEMPERATURE (CHT) IN °F, CYLINDER 1
C2	1 DEGREE	CYLINDER HEAD TEMPERATURE (CHT) IN °F, CYLINDER 2
C3	1 DEGREE	CYLINDER HEAD TEMPERATURE (CHT) IN °F, CYLINDER 3
C4	1 DEGREE	CYLINDER HEAD TEMPERATURE (CHT) IN °F, CYLINDER 4
C5	1 DEGREE	CYLINDER HEAD TEMPERATURE (CHT) IN °F, CYLINDER 5
C6	1 DEGREE	CYLINDER HEAD TEMPERATURE (CHT) IN °F, CYLINDER 6
OILT	1 DEGREE	OIL TEMPERATURE IN °F
OILP	1 PSI	OIL PRESSURE
RPM	10 RPM	TACHOMETER
OAT	1 DEGREE	OUTSIDE AIR TEMPERATURE IN °C
MAP	0.1 IN-HG	MANIFOLD PRESSURE
FF	0.1 GPH	FUEL FLOW
USED	0.1 GALLON	FUEL USED (CALCULATED)
AMP1	1 AMP	ALTERNATOR 1 CURRENT SENSE
AMP2	1 AMP	ALTERNATOR 2 CURRENT SENSE
AMPB	1 AMP	BATTERY CURRENT SENSE
MBUS	0.1 VDC	MAIN BUS VOLTAGE
FQL	1 GAL	FUEL QUANTITY LEFT
FQR	1 GAL	FUEL QUANTITY RIGHT

RS232 INTERFACE NOTES:

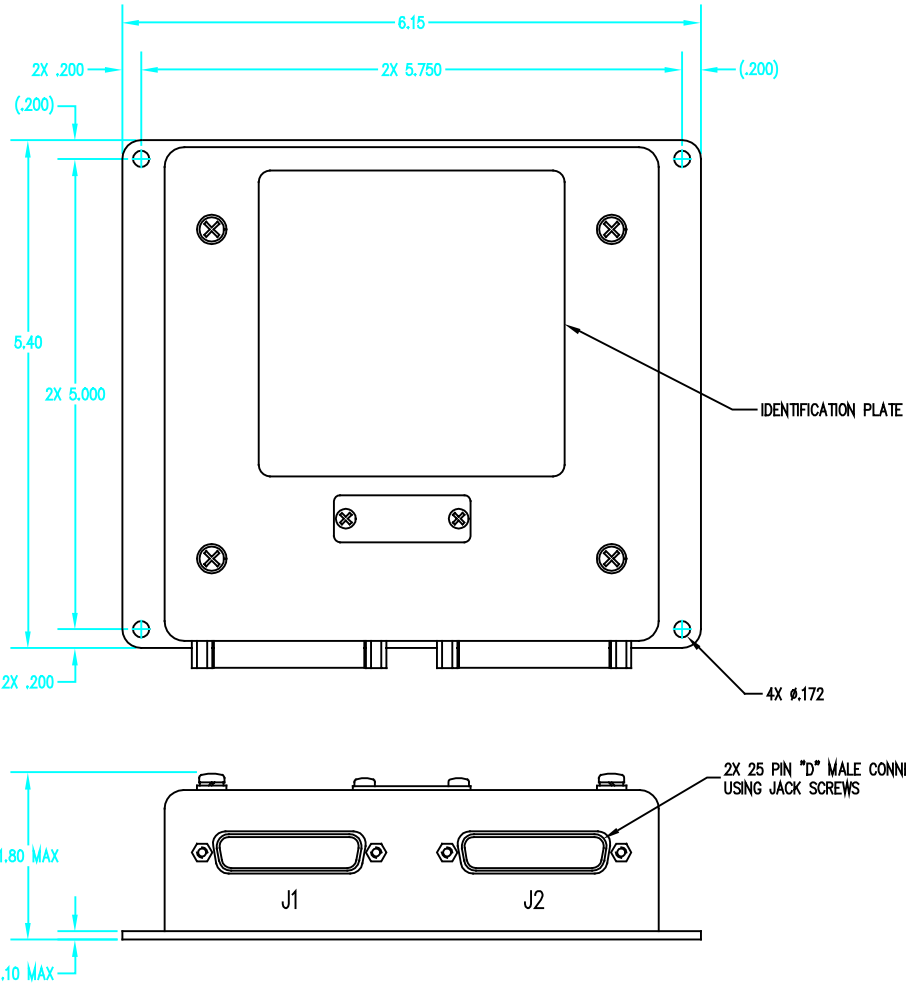
- AIRCRAFT TYPE DESIGNATOR: 3 = LEGACY.
- HEADER EXAMPLE: "AC","E1","E2","E3","E4","E5","E6","C1","C2","C3","C4","C5","C6","OILT",
"OILP","RPM","OAT","MAP","FF","USED","AMP1","AMP2","AMPB","MBUS","FQL","FQR",<checksum><cr><lf>
- DATA EXAMPLE: 3,1290,1300,1350,1260,1410,1390,385,320,362,384,330,365,192,80,2250,40
21.6,12.0,23.8,35.2,9.7,-1.1,22.6,33,33,<checksum><cr><lf>
- ONE RS232 INTERFACE SHALL BE UTILIZED BY THE SENSOR INTERFACE UNIT.
- THE RS232 TRANSMISSION OF THE DATA FROM THE SENSOR INTERFACE UNIT TO THE
MULTI-FUNCTION DISPLAY SHALL BE 6 HZ.
- THE RS232 INTERFACE SHALL BE CAPABLE OF OPERATING UP TO 9600 BPS, NO PARITY,
8 BITS, 1 STOP BIT.
- THE DATA OUTPUT SHALL BE ASCII, COMMA DELIMITED TEXT.
- THE OUTPUT SHALL TRANSMIT AN ASCII HEADER EVERY 15 TRANSMISSIONS.
- A 16-BIT ADDITIVE CHECKSUM SHALL BE USED FOR SERIAL TRANSMISSION ERROR CHECKING
FOR EACH TRANSMISSION (4 DIGIT HEX).
- THE MINIMUM SAMPLING RATE OF SENSOR DATA SHALL BE 2 SECONDS.



SPECIFICATION CONTROL DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS ± 1/32 DECIMALS ± .005 ANGLES ± .5° MATERIALS FINISH DO NOT SCALE DRAWING	AVIDYNE CORPORATION PROPRIETARY INFORMATION		AVIDYNE CORPORATION 55 Old Bedford Road Lincoln, MA 01773	
	APPROVALS	DATE	ENGINE INSTRUMENTS, LANCAIR KIT	
	DRAWN BY L. WRIGHTSON	6/27/03		
	CHECKED M. COLALILLO	6/27/03	SIZE D	DWG. NO. 200-00038-000
			SCALE	REV. 00
			SHEET 1 OF 2	

REVISIONS			
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00	RELEASE PER ECD 03-175	6/27/03	



DO-160D ENVIRONMENTAL QUALIFICATION TESTS		
ENVIRONMENTAL TESTS	RTCA/DO-160D SECTION	CONDUCTED TEST CATEGORY
TEMPERATURE AND ALTITUDE		
LOW TEMPERATURE	4.5.1	EQUIPMENT TO BE TESTED TO CATEGORY B1
HIGH TEMPERATURE	4.5.2 AND 4.5.3	EQUIPMENT TO BE TESTED TO CATEGORY B1
IN-FLIGHT LOSS OF COOLING	4.5.4	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST PERFORMED
ALTITUDE	4.6.1	EQUIPMENT TO BE TESTED TO CATEGORY B1
DECOMPRESSION	4.6.2	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST PERFORMED
COMPRESSION	4.6.3	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST PERFORMED
TEMPERATURE VARIATION	5	EQUIPMENT TO BE TESTED TO CATEGORY B
HUMIDITY	6	EQUIPMENT TO BE TESTED TO CATEGORY A
OPERATIONAL SHOCKS AND CRASH SAFETY	7	EQUIPMENT TO BE TESTED TO CATEGORY B
VIBRATION	8	EQUIPMENT TO BE TESTED TO CATEGORY S, CURVE M
EXPLOSIVE PROOFNESS	9	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST PERFORMED
WATER PROOFNESS	10	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST PERFORMED
FLUIDS SUSCEPTABILITY	11	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST PERFORMED
SAND AND DUST	12	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST PERFORMED
FUNGUS RESISTANCE	13	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST PERFORMED
SALT SPRAY	14	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST PERFORMED
MAGNETIC EFFECTS	15	EQUIPMENT CLASS IS A
POWER INPUT	16	EQUIPMENT TO BE TESTED TO CATEGORY B
VOLTAGE SPIKE	17	EQUIPMENT TO BE TESTED TO CATEGORY B
AUDIO FREQUENCY CONDUCTED SUSCEPTABILITY	18	EQUIPMENT TO BE TESTED TO CATEGORY B
INDUCED SIGNAL SUSCEPTABILITY	19	EQUIPMENT TO BE TESTED TO CATEGORY A
RADIO FREQUENCY SUSCEPTABILITY	20	EQUIPMENT TO BE TESTED TO CATEGORY W
EMISSION OF RADIO FREQUENCY ENERGY	21	EQUIPMENT TO BE TESTED TO CATEGORY M
LIGHTNING INDUCED TRANSIENT SUSCEPTABILITY	22	EQUIPMENT TO BE TESTED TO CATEGORY A3E3
LIGHTNING DIRECT EFFECTS	23	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST PERFORMED
ICING	24	EQUIPMENT IDENTIFIED AS CATEGORY X, NO TEST PERFORMED
ELECTRO STATIC DISCHARGE	25	EQUIPMENT IDENTIFIED AS CATEGORY A

J1 PIN CONNECTIONS

- 1) +28VDC POWER INPUT HIGH
- 2) POWER INPUT RETURN
- 3) MAP SIGNAL INPUT HIGH
- 4) MAP SIGNAL INPUT RETURN
- 5) AMP ALTERNATOR 2 SIGNAL INPUT HIGH
- 6) AMP ALTERNATOR 2 SIGNAL INPUT LOW
- 7) AMP BATTERY SIGNAL INPUT HIGH
- 8) AMP BATTERY SIGNAL INPUT LOW
- 9) SPARE - NO CONNECTION
- 10) OIL TEMPERATURE SIGNAL INPUT HIGH
- 11) FUEL FLOW SIGNAL INPUT HIGH
- 12) FUEL FLOW SIGNAL INPUT RETURN
- 13) SPARE - NO CONNECTION
- 14) EGT CYLINDER 6 SIGNAL INPUT - ALUMEL, RED (-)
- 15) EGT CYLINDER 6 SIGNAL INPUT - CHROMEL, YELLOW (+)
- 16) EGT CYLINDER 5 SIGNAL INPUT - ALUMEL, RED (-)
- 17) EGT CYLINDER 5 SIGNAL INPUT - CHROMEL, YELLOW (+)
- 18) EGT CYLINDER 4 SIGNAL INPUT - ALUMEL, RED (-)
- 19) EGT CYLINDER 4 SIGNAL INPUT - CHROMEL, YELLOW (+)
- 20) EGT CYLINDER 3 SIGNAL INPUT - ALUMEL, RED (-)
- 21) EGT CYLINDER 3 SIGNAL INPUT - CHROMEL, YELLOW (+)
- 22) EGT CYLINDER 2 SIGNAL INPUT - ALUMEL, RED (-)
- 23) EGT CYLINDER 2 SIGNAL INPUT - CHROMEL, YELLOW (+)
- 24) EGT CYLINDER 1 SIGNAL INPUT - ALUMEL, RED (-)
- 25) EGT CYLINDER 1 SIGNAL INPUT - CHROMEL, YELLOW (+)

J2 PIN CONNECTIONS

- 1) FUEL QTY RIGHT SIGNAL INPUT HIGH
- 2) CHT (ALL) SIGNAL INPUT RETURN
- 3) CHT CYLINDER 1 SIGNAL INPUT HIGH
- 4) CHT CYLINDER 2 SIGNAL INPUT HIGH
- 5) CHT CYLINDER 3 SIGNAL INPUT HIGH
- 6) CHT CYLINDER 4 SIGNAL INPUT HIGH
- 7) CHT CYLINDER 5 SIGNAL INPUT HIGH
- 8) CHT CYLINDER 6 SIGNAL INPUT HIGH
- 9) VDC MAIN BUS SIGNAL INPUT HIGH
- 10) RS232 GROUND
- 11) RS232 TRANSMIT
- 12) RS232 RECEIVE
- 13) RS232 SHIELD
- 14) OIL PRESSURE SIGNAL INPUT HIGH
- 15) OIL PRESSURE SIGNAL RETURN
- 16) AMP ALTERNATOR 1 SIGNAL INPUT HIGH
- 17) AMP ALTERNATOR 1 SIGNAL INPUT LOW
- 18) FUEL QTY LEFT SIGNAL INPUT HIGH
- 19) OAT SIGNAL INPUT HIGH
- 20) OAT SIGNAL INPUT RETURN
- 21) PROP RPM SIGNAL INPUT HIGH
- 22) PROP RPM SIGNAL INPUT RETURN
- 23) FUEL QTY LEFT SIGNAL INPUT RETURN
- 24) FUEL QTY RIGHT SIGNAL INPUT RETURN
- 25) SPARE - NO CONNECTION

NOTES:

1. SENSOR INTERFACE UNIT PART NUMBER IS A1180.
2. WEIGHT: 1.40 LBS. MAX.
3. POWER INPUT: 10 TO 33 VDC.
4. POWER CONSUMPTION: 3.5 WATTS MAX.
5. STORAGE TEMPERATURE RANGE: -55 °C TO +85 °C.
6. OPERATING TEMPERATURE RANGE: -40 °C TO + 70 °C.
7. OPERATING ALTITUDE RANGE: 25,000 FEET ABOVE SEA LEVEL.
8. THE SENSOR INTERFACE UNIT COMPLIES TO DO-160D AS LISTED IN THE TABLE.
9. THE SENSOR INTERFACE UNIT COMPLIES WITH DO-178B, LEVEL D.
10. THE SENSOR INTERFACE UNIT MAINTAINS ITS CONFIGURATION AND CALIBRATION DATA WHEN POWERED OFF.
11. RS232 DATA FORMAT IS AS LISTED IN THE TABLE ON SHEET 2.
12. TO MEET EMI PROTECTION REQUIREMENTS OF DO-160D, ALL INPUT AND OUTPUT LINES MUST BE SHIELDED, WITH THE SHIELD GROUNDED AT THE SIU CONNECTOR SIDE.
13. FOR ACCEPTANCE TEST REPORT. SEE FORM F-134.
14. FOR FINAL ASSEMBLY, SEE A1156.
15. THE CURRENT SHUNTS FOR ALT1, ALT2 AND BATTERY AMP PARAMETERS ARE LOCATED IN THE HIGH SIDE OF EACH LINE.
16. TOLERANCE IS BASED ON ±1% OF FULL SCALE VALUE OR ONE COUNT, WHICHEVER IS GREATER, FROM 0 TO 40 °C AND 2% OR TWO COUNTS, WHICHEVER IS GREATER, FROM -40 TO 0 °C AND +40 TO +70 °C.
17. AVIDYNE PART NUMBER IS 200-00038-000.
18. ALL CHT RETURNS SHOULD COME DIRECTLY FROM THE SENSOR AND CONNECT TO J2-2.

SPECIFICATION CONTROL DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS ± 1/32 DECIMALS .X .008 .XX .01 .XXX .005 ANGLES ± .5°	AVIDYNE CORPORATION PROPRIETARY INFORMATION		AVIDYNE CORPORATION 55 Old Bedford Road Lincoln, MA 01773	
	APPROVALS	DATE	ENGINE INSTRUMENTS, LANCAIR KIT	
	DRAWN BY L. WRIGHTSON	6/27/03		
	CHECKED M. COLALILLO	6/27/03	SIZE D	DWG. NO. 200-00038-000
DO NOT SCALE DRAWING		SCALE	SHEET 2 OF 2	REV. 00