

SENSORS

MANUAL - MOTOR ASPIRATED TEMPERATURE SHIELD P/N M100325 Rev D

1.0 INTRODUCTION

The TS-10 Motor Aspirated Shield series is designed to reduce errors caused by solar radiation when measuring temperature and relative humidity. The TS-10 provides an effective shield for the sensors from both short (solar) wave and long (terrestrial) wave radiation. The motorized fan provides a high air flow rate past the sensor(s), thus ensuring a proper mixture of ambient air for measurement. The TS-10 features quick release sensor and motor housing assemblies and a motor housing safety lanyard.

A number of probes for measurement of temperature and humidity are available for use with the TS-10. Consult the System Description section of your manual for the specific sensors supplied.

1.1 Specifications:

Accuracy:	0.2°F. @ 1100 W/m ² radiation
Aspiration Rate:	10 ft/sec at sensor location.
Oper. Temp:	-40° to +130°F (-40° to +55°C)
Power Requirement:	115/220VAC 50/60 Hz @ 0.2 A (+12 VDC Optional)

2.0 INSTALLATION

All the TS-10 series shields must be mounted horizontally with the exhaust vent of the motor housing facing downward so water does not enter the unit. Make sure the exhaust does not interfere with other meteorological equipment (i.e., wind systems). Position the open end of the cylinder facing northward to reduce radiation errors caused by the sun shining into the end of the shield.

The TS-10 shield is typically provided with a speed rail fitting for attachment to a 1-1/4" pipe (1.66" O. D.). Optional mounting is available for 1" and 3/4" pipe. Refer to the Options Configuration Guide in Appendix A for mounting options.

3.0 INPUT/OUTPUT CONNECTIONS

Refer to 100325 Assembly Drawing, Sheet 4 of 6 for wiring details.

4.0 USER DEFINED OPTIONS

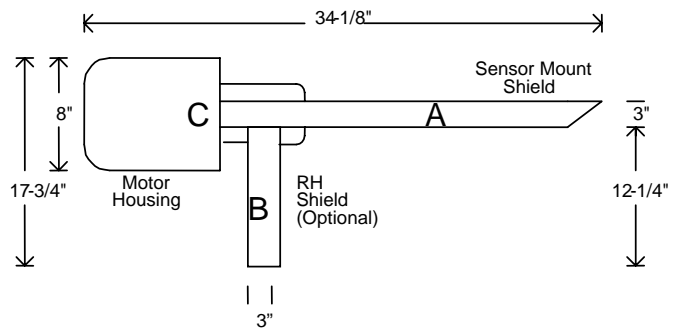


Figure 1

Temperature Sensors and RH/Temp Sensors 100093, 100093-2, 100093-3 and 100826 are mounted in the Sensor Mount Shield (Figure 1, Location A)

- **RH Probes** 101812 and 102273 are mounted in the optional shield. (Figure 1, Location B)
- **RH Sensors** 102425 & 100098 are mounted in the motor housing. (Figure 1, Location C)

4.1 Sensor Access

IMPORTANT: When installing and removing sensors, AC Power to the aspirator and signal conditioning modules or DATALOGGER must be turned OFF.

Temperature Sensors and RH/Temp Sensors:

1. Looking into the open end of the cylinder, you will notice an inner shield network connected to a ring. (Refer to Figure 2, Sensor Mount Shield internal, cut away, top view.)
2. Gently pull on the ring and slide out the inner shield network about 2-3 inches.

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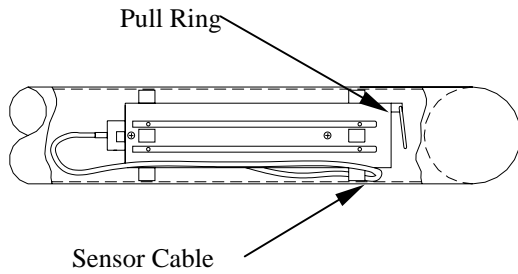


Figure 2

3. Unloop the sensor cable from the inner shield network. The sensor cable is looped around one of the shield guides that space the inner shield from the outer shield (See Figure 2). Remove the entire inner shield.

4. You will notice a thumbscrew at the rear of the inner shield network. Loosen the thumbscrew and remove the probe from the inner shield (See Figure 3).

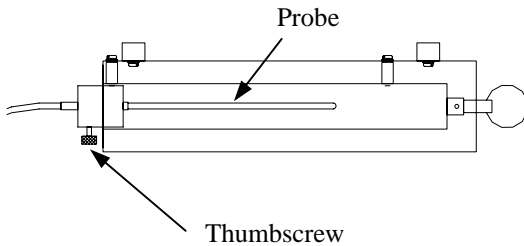


Figure 3

5. To completely remove the sensor, you must unlatch the motor housing and disconnect the sensor leads from the terminal strip. See 100325 (Sheet 4 of 6) for wiring details.

NOTE: The inner shield network must be properly oriented for installation into the temperature shield. Consult Figure 2 for proper orientation. Be sure to loop the sensor cable over the guide rod. This will prevent the sensor cable from possibly getting caught in the aspirator fan located at the rear of the shield.

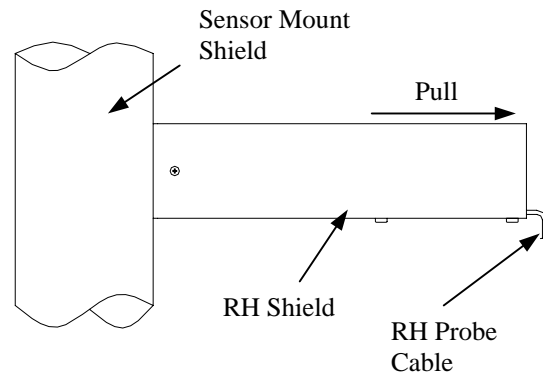


Figure 4

Relative Humidity Probes

1. A philips head screwdriver and a 5/64" hex key is required to remove the relative humidity probe located inside the optional RH Shield.

2. Remove the three screws that secure the RH Shield to the Sensor Mount Shield and gently pull the RH Shield off (See Figure 4).

3. Remove the three screws towards the middle of the RH Shield to expose three set screws. Do not remove the three screws at the end of the RH Shield, these hold the probe support. (See Figure 5).

4. Loosen the three set screws using a 5/64" hex key. Carefully slide Probe out of the RH Shield.

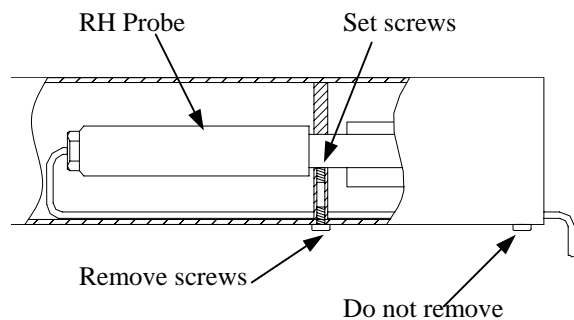


Figure 5

Relative Humidity Sensors

1. The relative humidity sensor is easily accessible by unclasping the two latches of the motor housing.
2. Removing the housing exposes the sensor mounted at the base of the inlet cylinder in front of the fan (See Figure 6).

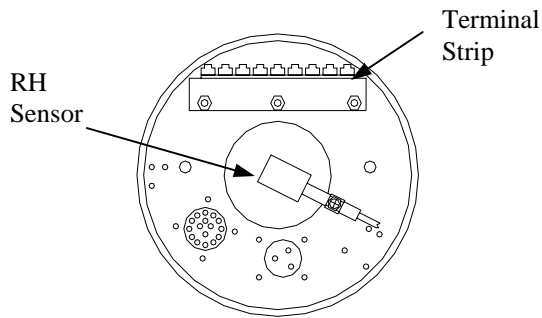


Figure 6

3. Release the sensor by removing it from the clips that secure it to the base of the shield

4. Unscrew the appropriate leads from the terminal strip. See 100325 (Sheet 4 of 6).

5. Reversing the steps reassembles the shield.

5.0 USER INTERFACE

Plugging in the AC cord activates the aspirator motor.

6.0 THEORY OF OPERATION

The motor provides a constant, adequate flow past the sensors which may otherwise be variable and inadequate if ambient conditions were relied upon.

7.0 CALIBRATION

The shield requires no calibration but has been tested for proper flow. Occasional cleaning of the terminal strip and fan area is required to keep sensor connections clean and to stop ground potentials from interfering with the sensor operation.

Climatronics Corporation
140 Wilbur Place Bohemia, NY 11716 (631) 567-7300
www.climatronics.com

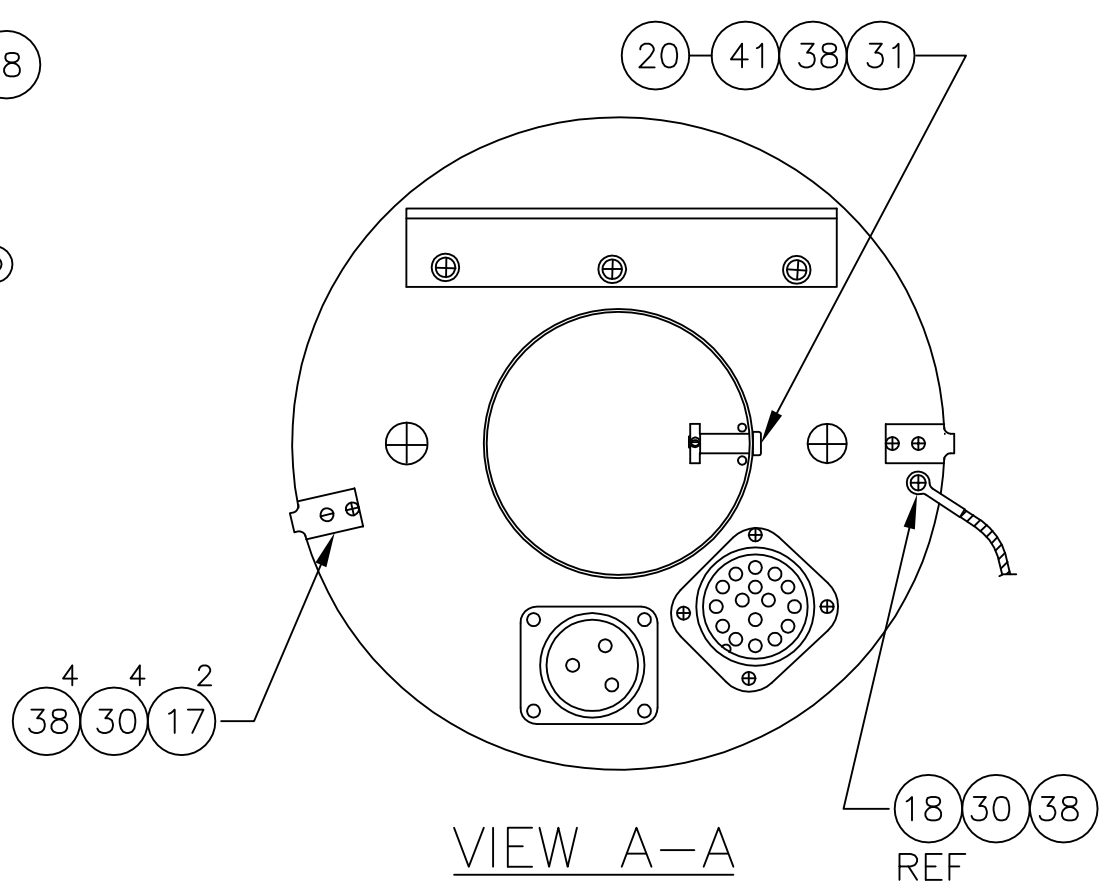
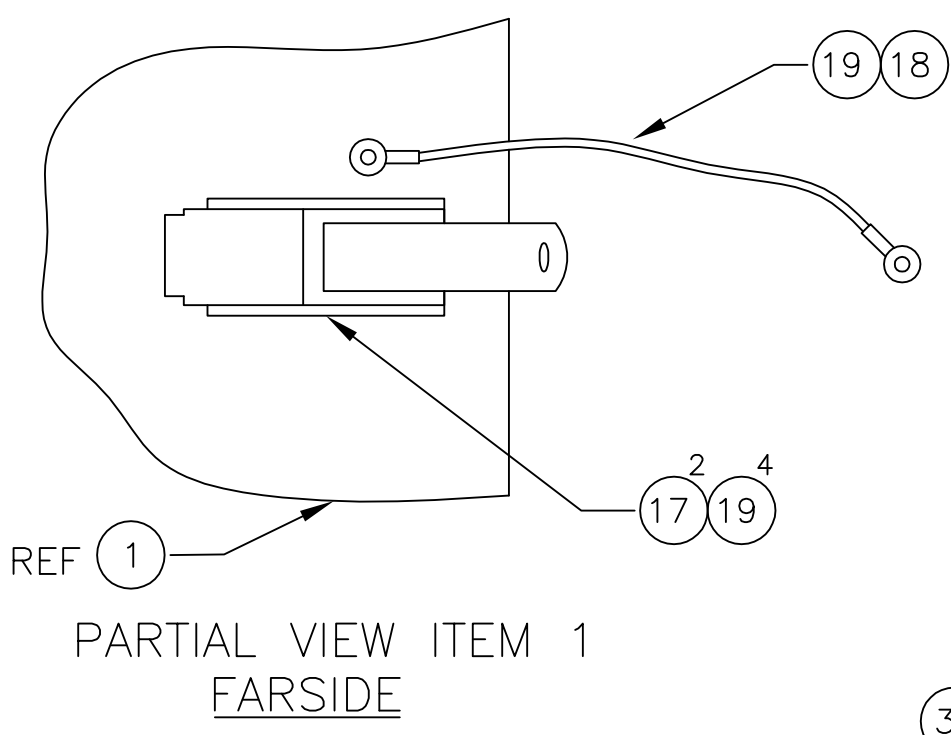
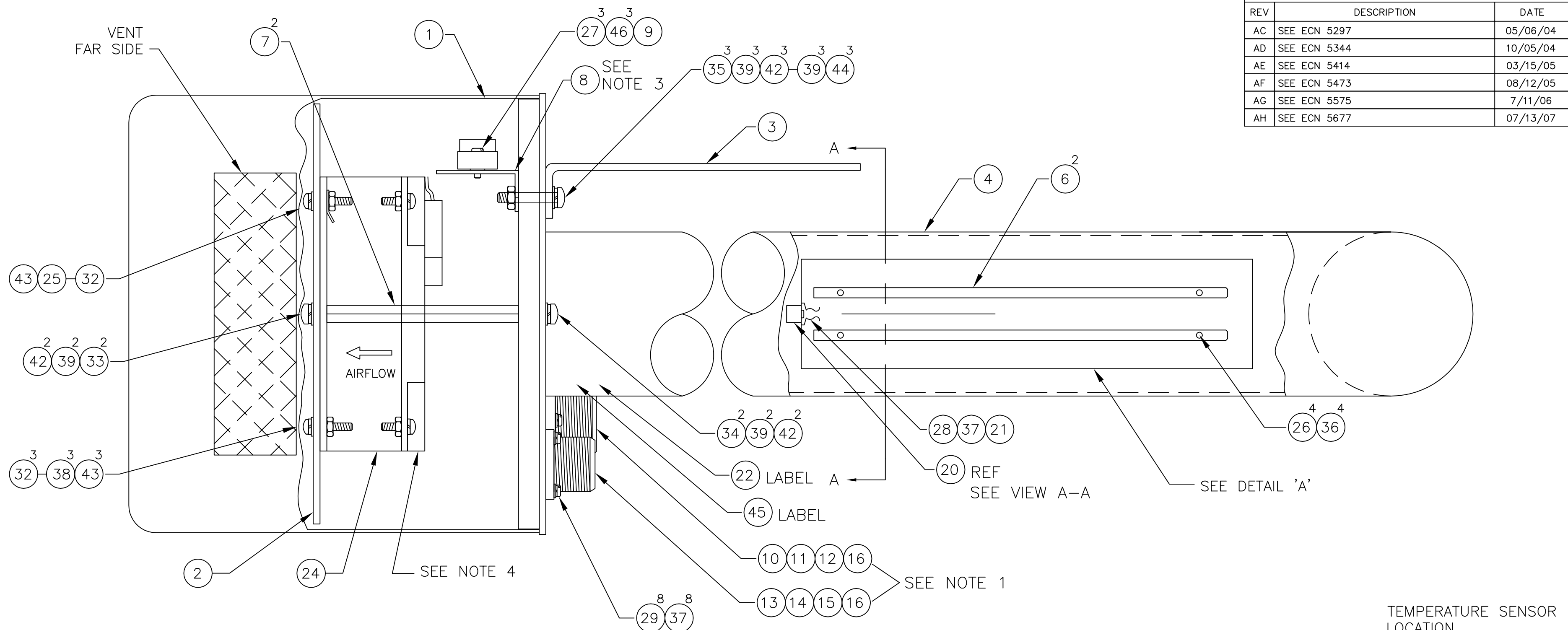
Revision	Description	Date	Approved
C	See ECN 4619	11/17/94	D.A.
D	See ECN 5403	3/7/05	D.A.

Appendix A

100325 TS-10 Motor Aspirated Shield Options Configuration Guide

Base Part Number	100325		
Sensor Mount Options	No Sensor Mount -G0		
	102273 Sensor Mount -G1		
	101812 Sensor Mount -G2		
Fan Power Options	100173-G0 115 VAC	-H0	
	100173-G1 220 VAC	-H1	
	100173-G2 12 VDC	-H2	
Mounting Options	1 -1/4 in Vertical Pipe		-J0
	1 in Vertical Pipe		-J1
	3/4 in Vertical Pipe		-J2
	3/4 - 2 in Vertical Pipe		-J3

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
AC	SEE ECN 5297	05/06/04	
AD	SEE ECN 5344	10/05/04	
AE	SEE ECN 5414	03/15/05	
AF	SEE ECN 5473	08/12/05	D.A.
AG	SEE ECN 5575	7/11/06	D.A.
AH	SEE ECN 5677	07/13/07	D.A.



- NOTES:
- 1) AFTER WIRING CONNECTORS (ITEMS 10 AND 13), INSTALL ITEM 12 TO ITEM 10 AND ITEM 15 TO ITEM 13 THEN FILL BACK OF CONNECTORS W/POTTING COMPOUND (ITEM 16).
 - 2) ALL SCREWS TO HAVE LOCKTITE 242.
 - 3) SPRAY ITEM 8 WITH CONFORMAL COATING PRIOR TO ASSEMBLY.
 - 4) GRILL TO BE INSTALLED WITH FLOW SWITCH OPTION ONLY.

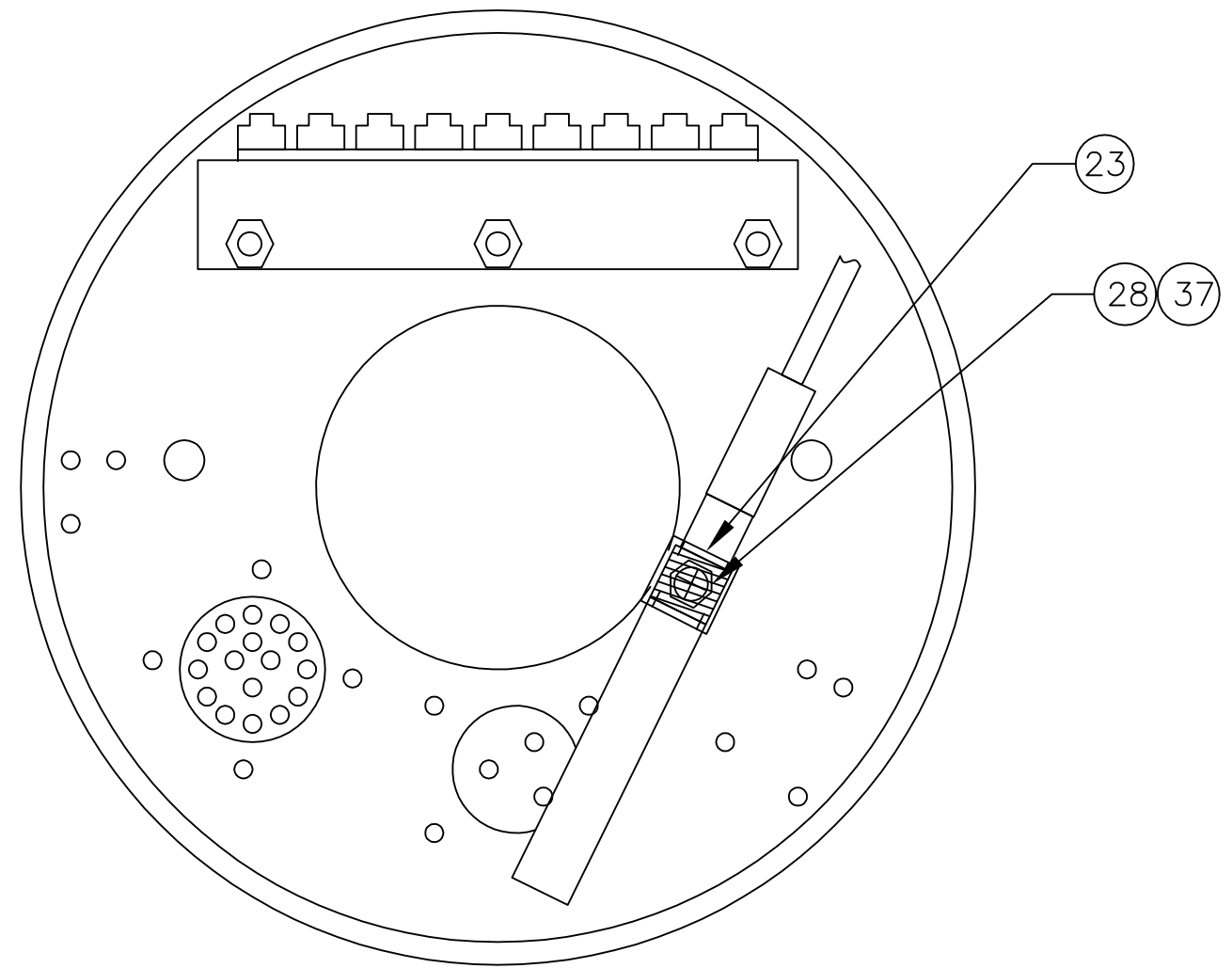
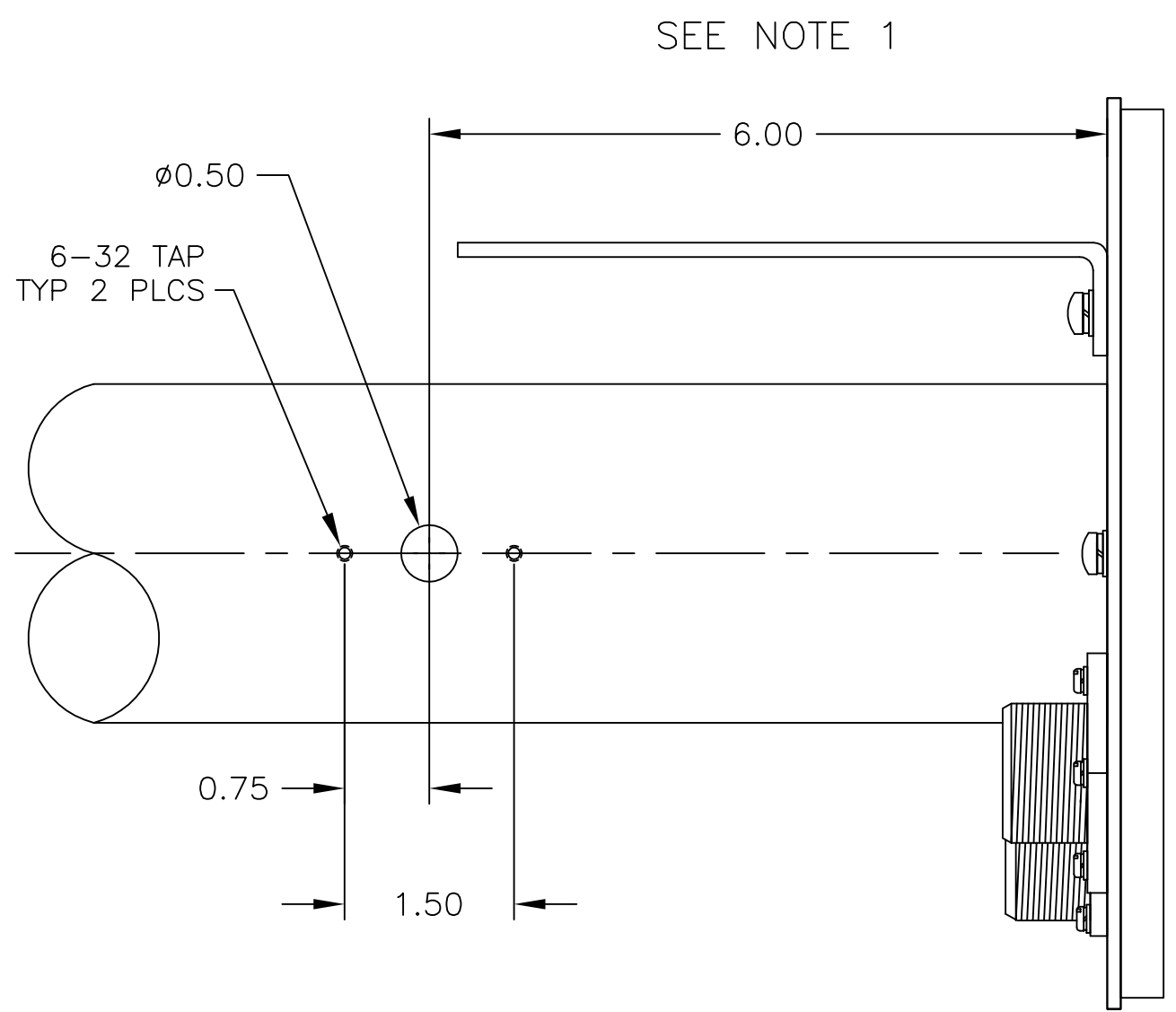
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± 1/64 .XX ± .010 ± 1'		CONTRACT NO.	
MATERIAL NOT APPLICABLE		APPROVALS	DATE
FINISH NOT APPLICABLE		DRAWN KC	03/03/81
APPLICATION		CHECKED NAG	07/07/81
DO NOT SCALE DRAWING		ISSUED TJS	08/15/81
SCALE: NONE		SIZE C	FSCM NO. 52332
P:\Drawings\Assembly\100325AHS1.dwg		DWG. NO.	100325
SHEET 1 OF 6		REV. AH	

CLIMATRONICS
 140 Wilbur Place
 Airport International Plaza
 Bohemia, NY 11716
 USA
 FAX (631)567-7585 Phone (631)567-7300

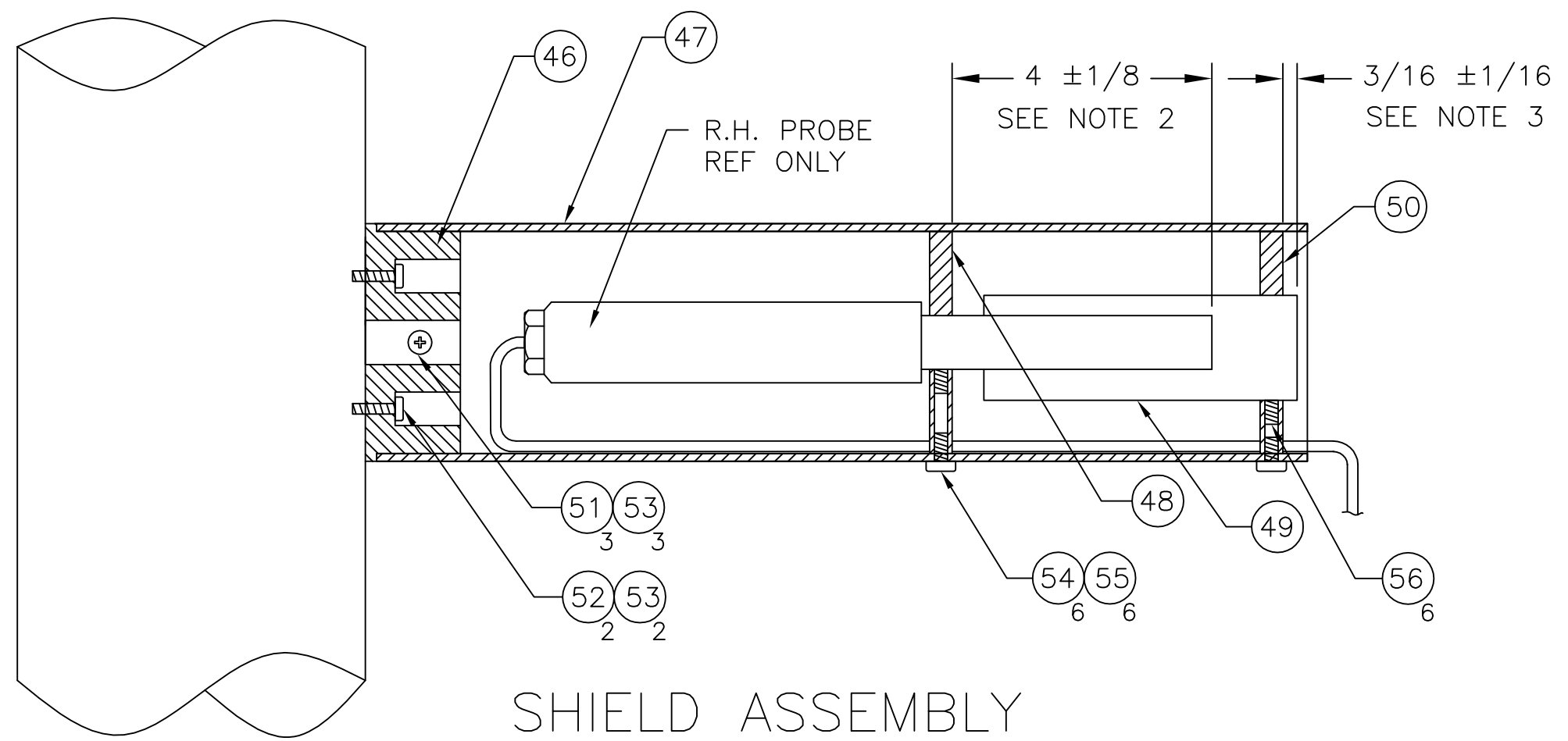
**MOTOR ASPIRATED
 TEMPERATURE SHIELD**

DRAWING NO. 100325
 SHEET 1
 REV. AH

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
AC	SEE ECN 5297	05/06/04	
AD	SEE ECN 5344	10/05/04	
AE	SEE ECN 5414	03/15/05	
AF	SEE ECN 5473	08/12/05	D.A.
AG	SEE ECN 5575	7/11/06	D.A.
AH	SEE ECN 5677	07/13/07	D.A.



RH INSTALLATION



SHIELD ASSEMBLY
R.H. PROBE
(100325G)

- NOTES:
- 1.) DIMENSIONS SHOWN TO BE IMPLEMENTED ONLY WHEN R.H. MOUNT (100325G1 OR 100325G2 OPTION) IS BEING USED.
 - 2.) DIMENSIONS SHOWN TO BE IMPLEMENTED ONLY WHEN R.H. PROBE AND ITEM 48 ARE ASSEMBLED.
 - 3.) DIMENSIONS SHOWN TO BE IMPLEMENTED ONLY WHEN R.H. PROBE AND ITEMS 49 AND 50 ARE ASSEMBLED.

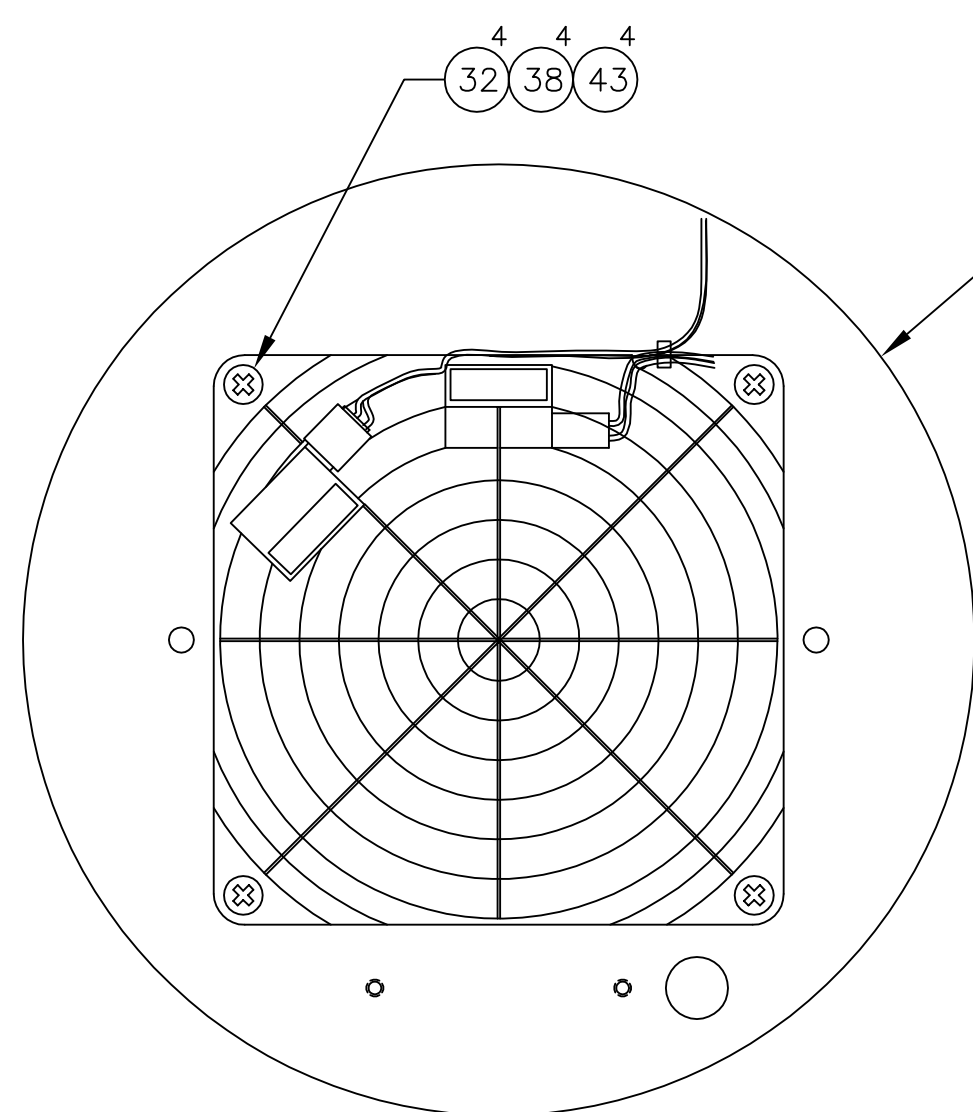
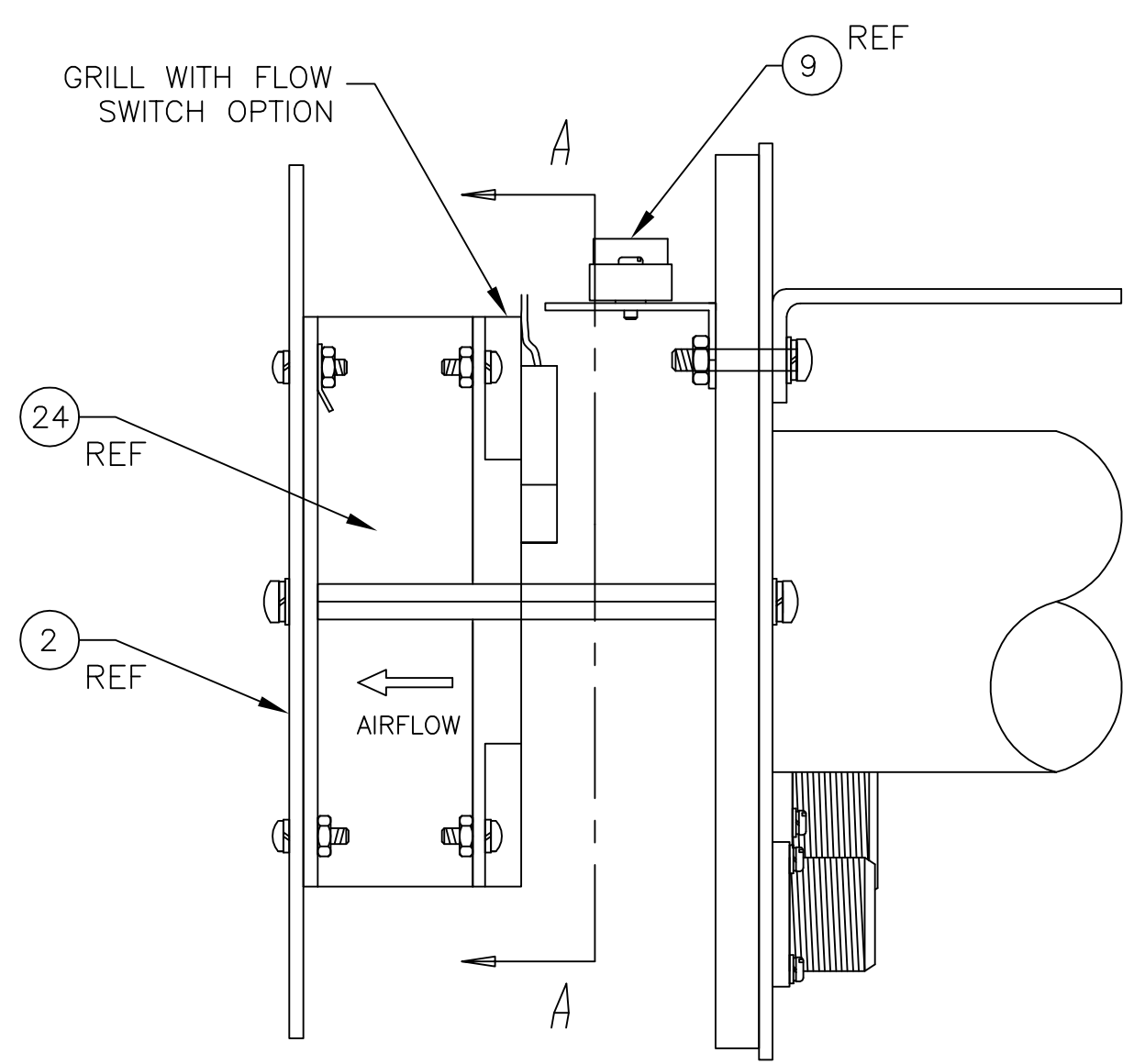
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± 1/64 .XX ± .010 ± 1° .XXX ± .005		CONTRACT NO.			
MATERIAL NOT APPLICABLE		APPROVALS			
FINISH NOT APPLICABLE		DRAWN KC		03/03/81	
NEXT ASSY		CHECKED NAG		07/07/81	
USED ON		ISSUED TJS		08/15/81	
APPLICATION		DO NOT SCALE DRAWING		SCALE: NONE	
		P:\Drawings\Assembly\100325AHS2.dwg		SHEET 2 OF 6	

MOTOR ASPIRATED
TEMPERATURE SHIELD

SIZE C FSCM NO. 52332 DWG. NO. 100325 REV. AH

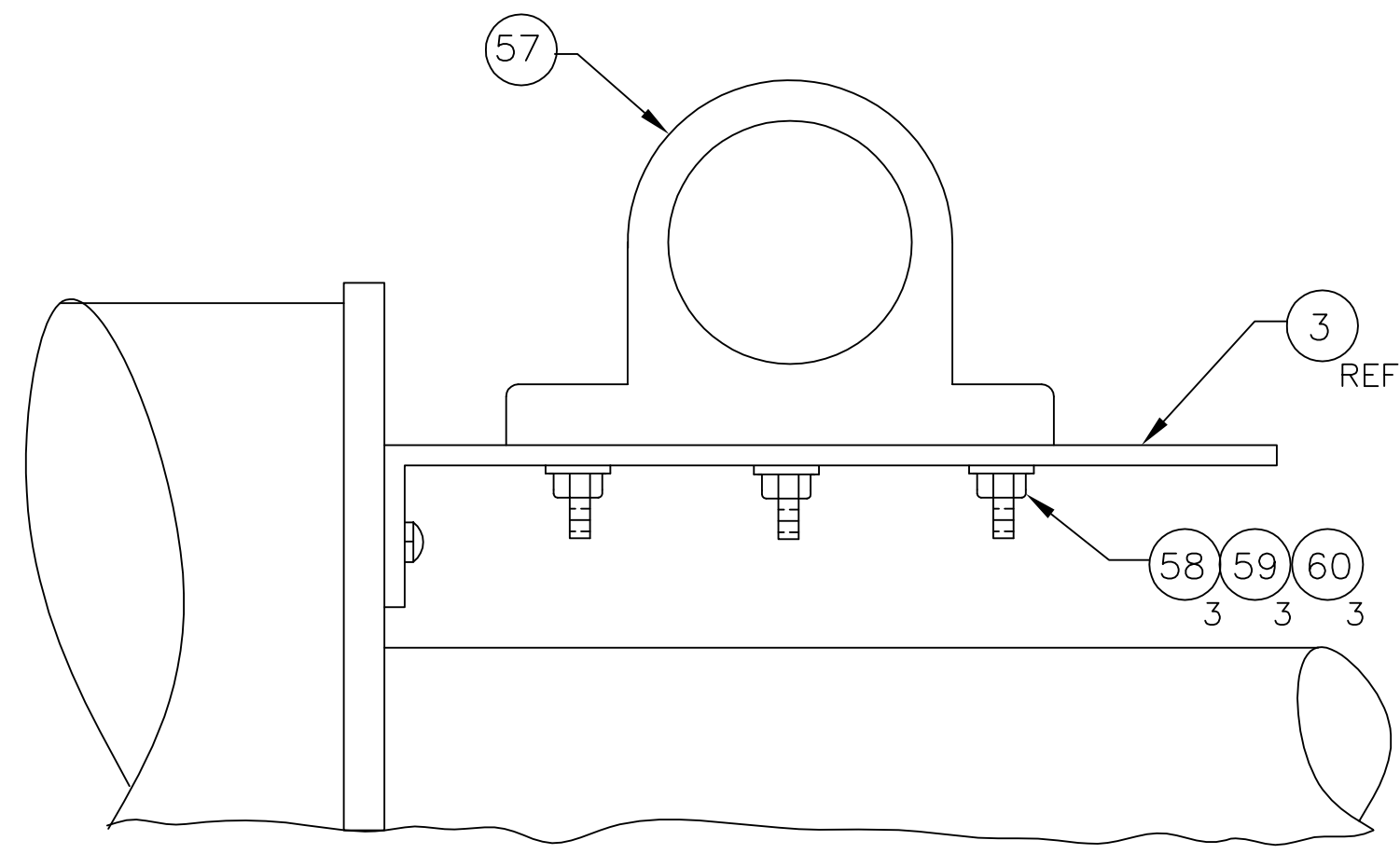
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AD	SEE ECN 5344	10/05/04	
AE	SEE ECN 5414	03/15/05	
AF	SEE ECN 5473	08/12/05	D.A.
AG	SEE ECN 5575	7/11/06	D.A.
AH	SEE ECN 5677	07/13/07	D.A.

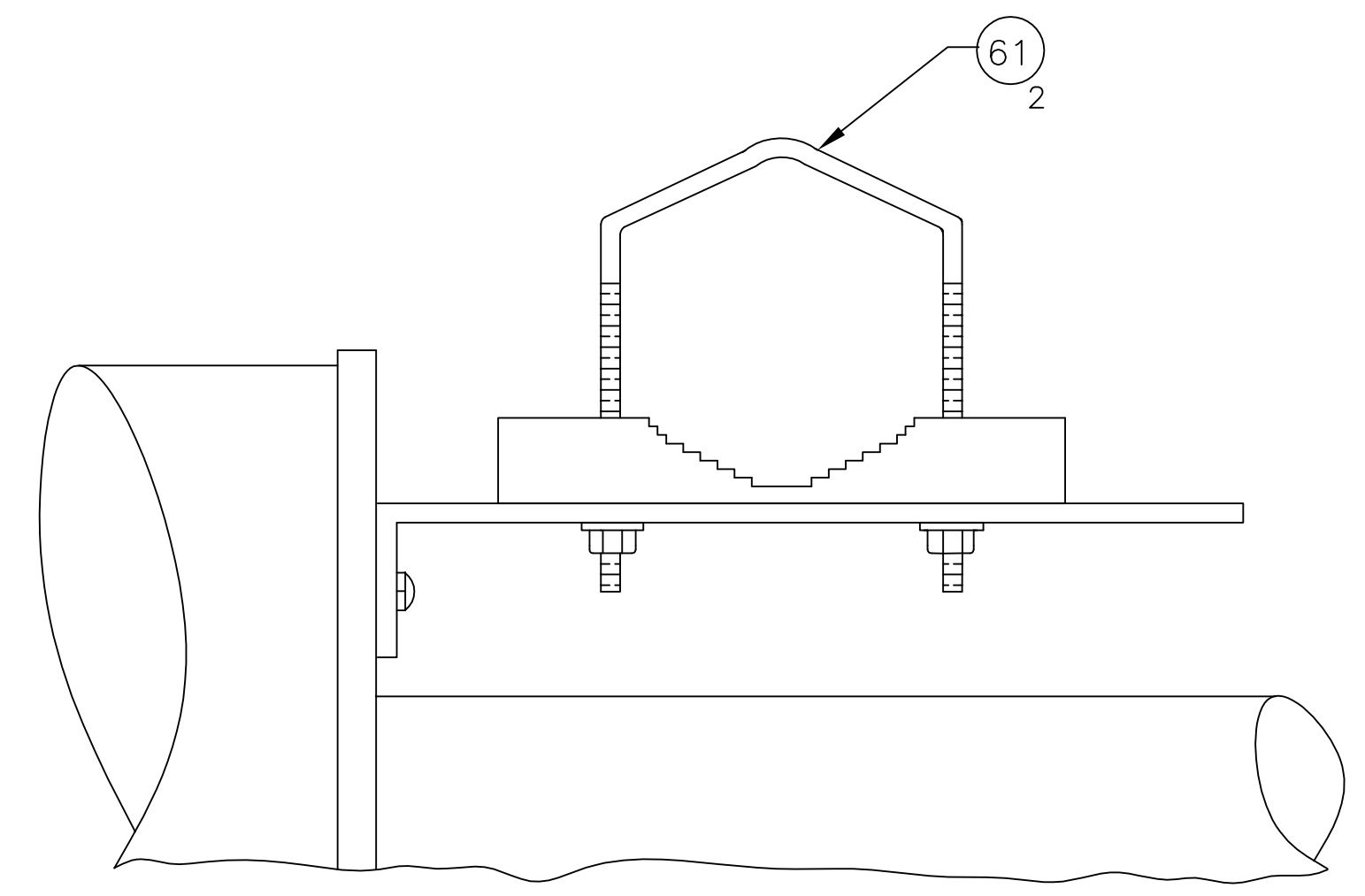


FLOW SWITCH INSTALLATION

VIEW A-A



MOUNTING OPTIONS



USED WITH 100325 J3
MOUNTS IN HOLES MARKED 'A'

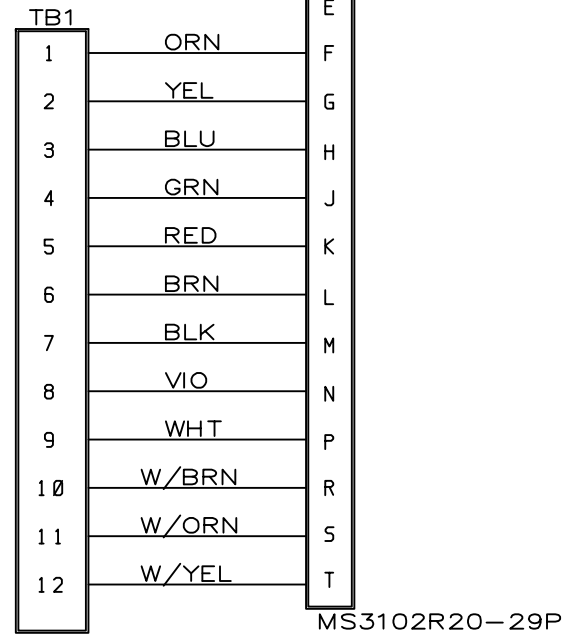
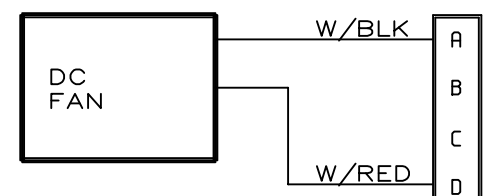
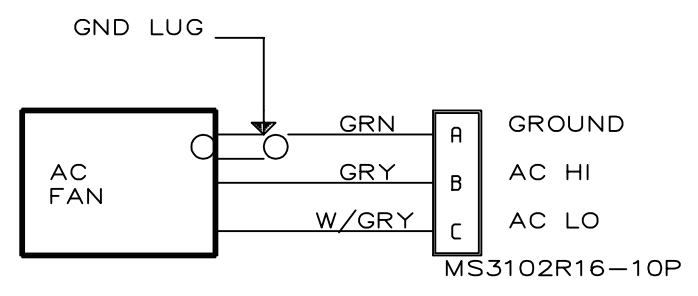
USED WITH 100325 J0,J1,J2
 J0 MOUNTS IN HOLES MARKED 'B'
 J1 MOUNTS IN HOLES MARKED 'D'
 J2 MOUNTS IN HOLES MARKED 'C'

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± 1/64 .XX ± .010 ± 1° .XXX ± .005		CONTRACT NO.			
MATERIAL NOT APPLICABLE		APPROVALS			
NEXT ASSY		FINISH NOT APPLICABLE		DRAWN KC	03/03/81
APPLICATION		DO NOT SCALE DRAWING		CHECKED NAG	07/07/81
				ISSUED TJS	08/15/81
				SIZE C	FSCM NO. 52332
				DWG. NO.	100325
				REV.	AH
				SHEET 3 OF 6	

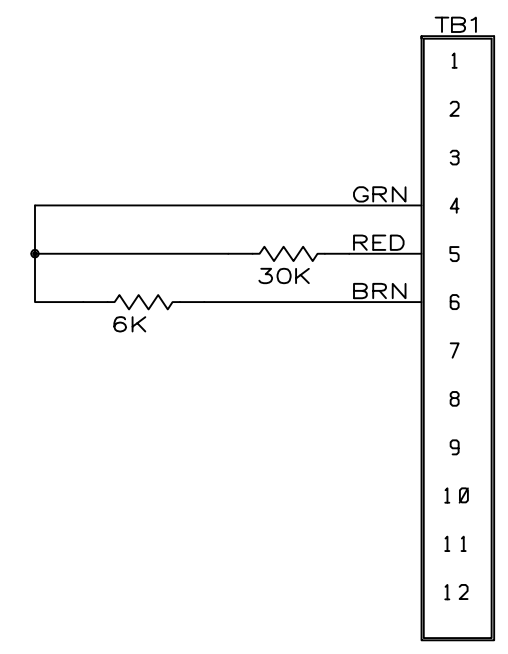
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AE	SEE ECN 5414	03/15/05	
AF	SEE ECN 5473	8/12/05	
AG	SEE ECN 5575	7/11/06	D.A.
AH	SEE ECN 5677	07/13/07	D.A.

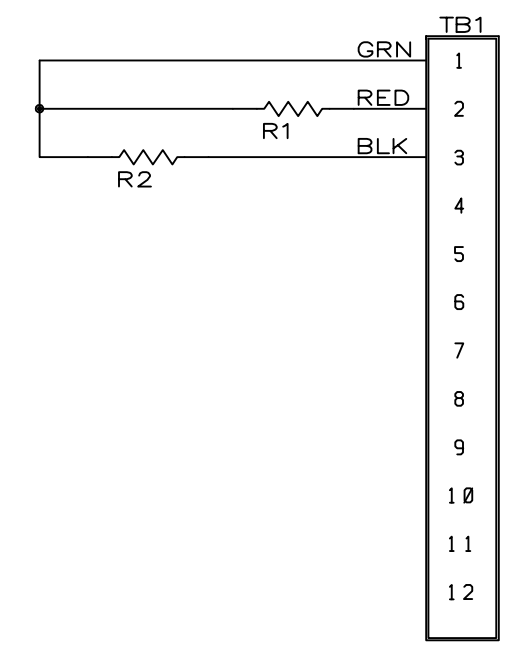
STANDARD TS-10 WIRING



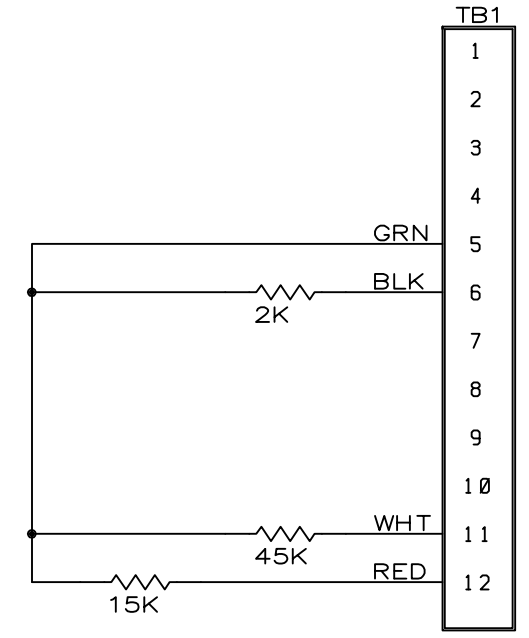
100093 TEMPERATURE SENSOR



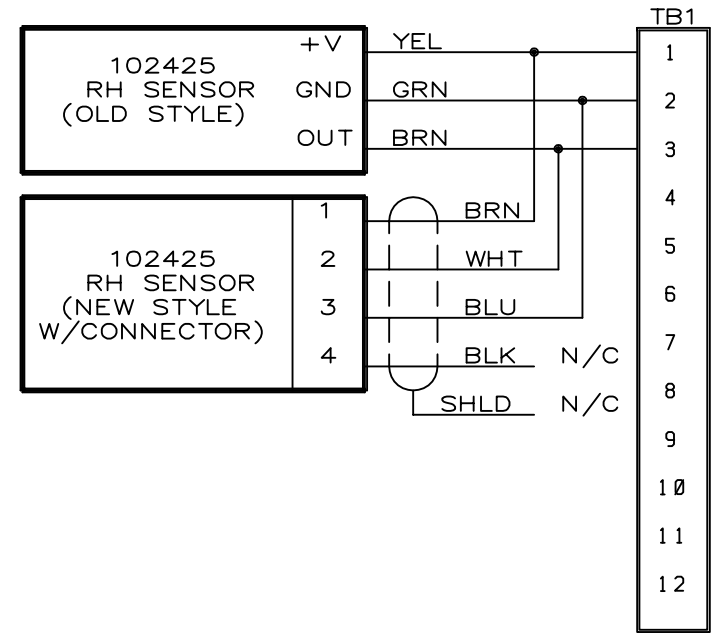
100098 HUMIDITY SENSOR



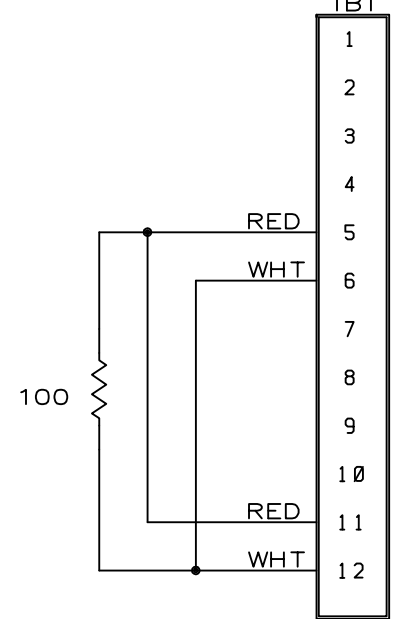
100093-2 TEMPERATURE SENSOR



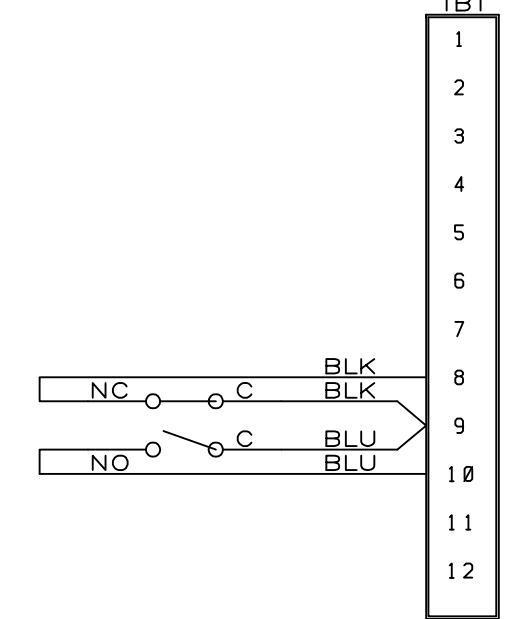
102425 HUMIDITY SENSOR



100826 TEMPERATURE SENSOR



100179 FLOW SENSOR



- NOTES:
- 1) GREEN WIRE FROM ITEM 13, AC FAN CONNECTOR, TO BE CONNECTED TO GROUND LUG ON FAN UNDER MOUNTING SCREW.
 - 2) WITH DC OPTION, CONNECTOR CAP AND CHAIN P/N MS25043-16D TO BE INSTALLED ON ITEM 10. SECURE CHAIN UNDER SCREW ON CONNECTOR.
 - 3) FOR 102425 HUMIDITY SENSOR OPTION, ONLY ONE SENSOR IS INSTALLED, WIRING SHOWN FOR TWO SENSOR STYLES.
 - 4) UNLESS SPECIFIED OTHERWISE, ALL WIRE TO BE 22 AWG.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± 1/64 .XX ± .010 ± 1° .XXX ± .005		CONTRACT NO.	
MATERIAL NOT APPLICABLE		APPROVALS	DATE
FINISH NOT APPLICABLE		DRAWN KC	6/23/81
NEXT ASSY	USED ON	CHECKED NAG	7/7/81
APPLICATION DO NOT SCALE DRAWING		ISSUED TJS	8/15/81

CLIMATRONICS
140 Wilbur Place
Airport International Plaza
Bohemia, NY 11716
USA
FAX (631)567-7585 Phone (631)567-7300

MOTOR ASPIRATED TEMPERATURE SHIELD

SIZE C FSCM NO. 52332 DWG. NO. 100325 REV. AH

P: \Drawings\Assembly\100325AHS4.dwg SHEET 4 OF 6

DRAWING NO. 100325 SHEET 4 REV. AH

MOTOR ASPIRATED TEMP SHIELD
P/N 100325 Rev AH
PARTS LIST
Sheet 5 of 6

ITEM	SYM. NO	QTY	PART NO.	DESCRIPTION
1		1.0	500244	REAR COVER
2		1.0	500243	MOUNT PLATE ASPIRATOR
3		1.0	500253	MOUNTING BRACKET ASPIRATOR
4		1.0	500242	FACE PLATE ASSEMBLY TS-10
5		1.0	102200	TS-10 INNER BAFFLE ASSY
6		2.0	500250	GUIDE ROD ASPIRATOR
7		2.0	8420-A-1032	STANDOFF, HEXAGON 5/16 in DIA
8		1.0	500791	TERMINAL BLOCK SUPP BRCKT
9		1.0	40.112	TERMINAL BLOCK
10		1.0	MS3102R20-29P	CONNECTOR, RECEPTACLE
11		1.0	10-40450-20	GASKET, CONNECTOR #20
12		1.0	304-0146-000	FERRULE, #20
13		1.0	MS3102R16-10P	CONNECTOR, RECEPTACLE
14		1.0	10-40450-16	GASKET, CONNECTOR #16
15		1.0	304-0143-000	FERRULE, #16
16		0.0	DP-270	EPOXY/POTTING COMPOUND
17		2.0	97-50-111-12	DRAW LATCH WITH KEEPER
18		1.0	LL2-8	LANYARD
19		5.0	5X515	RIVET, 5/32 DIA X 1/8 IN
20		1.0	500623	CLIP SUPPORT MOUNT
21		1.0	HC101	CLIP
22		1.0	500827	LABEL, SERIAL NO/PART NO
23		1.0	4511-50-50-2	CLIP, .5 DIA
24		1.0	100325H	SEE H LIST
25		1.0	1414-4	SOLDER LUG BRASS

MOTOR ASPIRATED TEMP SHIELD
P/N 100325 Rev AH
PARTS LIST
Sheet 6 of 6

ITEM	SYM. NO	QTY	PART NO.	DESCRIPTION
26		4.0	MS51957-3	SCREW 2-56 x 1/4
27		3.0	MS51957-8	SCREW 2-56 x 5/8
28		4.0	MS51957-13	SCREW 4-40 x 1/4 PH
29		8.0	MS51957-17	SCREW 4-40 x 1/2
30		5.0	MS51957-26	SCREW 6-32 x 1/4 PH
31		1.0	MS51957-28	SCREW 6-32 x 3/8
32		8.0	MS51957-32	SCREW 6-32 x 3/4
33		2.0	MS51958-61	SCREW 10-32 x 3/8
34		2.0	MS51958-65	SCREW 10-32 x 3/4 PH
35		3.0	MS51958-67	SCREW 10-32 x 1 PH
36		7.0	MS35338-134	WASHER LOCK SPLIT #2
37		12.0	MS35338-135	WASHER, LOCK SPLIT #4
38		13.0	MS35338-136	WASHER LOCK SPLIT #6
39		10.0	MS35338-138	WASHER LOCK SPLIT #10
40		2.0	MS15795-804	WASHER FLAT #4
41		1.0	MS15795-805	WASHER FLAT #6
42		7.0	MS15795-808	WASHER FLAT #10
43		8.0	MS35649-264	NUT HEX 6-32
44		3.0	MS35650-304	NUT HEX 10-32
45		1.0	501590	LABEL, WARNING, TS-10
46		3.0	5610-7-62	FLATWASHER, NYLON

SEE G LIST
P/N 100325G Rev -
PARTS LIST
Sheet 1 of 1

ITEM	SYM. NO	QTY	PART NO.	DESCRIPTION
		1.0	100325G0	ND 102273/101812 MOUNT
		1.0	100325G1	102273/101812 SENSOR MOUNT
		1.0	100325G2	102667 SENSOR MOUNT

SEE H LIST
P/N 100325H Rev -
PARTS LIST
Sheet 1 of 1

ITEM	SYM.NO	QTY	PART NO.	DESCRIPTION
		1.0	100325H0	WITH 115 VAC FAN
		1.0	100325H1	WITH 220 VAC FAN
		1.0	100325H2	WITH 12 VDC FAN

SEE J LIST
P/N 100325J Rev -
PARTS LIST
Sheet 1 of 1

ITEM	SYM.NO	QTY	PART NO.	DESCRIPTION
		1.0	100325J0	1-1/4 IN FLANGE MOUNT
		1.0	100325J1	1 IN FLANGE MOUNT
		1.0	100325J2	3/4 IN FLANGE MOUNT
		1.0	100325J3	3/4-2 IN PIPE U-BOLT MOUNT