Interoffice Letter

UNITED TECHNOLOGIES CARRIER
BUILDING SERVICES DIVISION

To: SERVICE MANAGERS
DISTRICT MANAGERS
SERVICE ENGINEERS
TECHNICAL REPRESENTATIVES

Date: OCTOBER 30, 1986

From: MIKE DECHIARO

Office: CBS CRANFORD

Subject: 32MP SENSOR CROSSREFERENCE
F.E.R. - 86-11

The attached guide is being distributed to aide in machine troubleshooting. It is intended to help diagnose problems on machines without the E.S.P. panels. It could also be used on machines with the E.S.P. panels but it is, for the most part, unnecessary due to direct temperature readout that the panel gives you.

You will note that the voltage column/curve can be used to read machine temperatures while the machine is running. Before this temperature readings could only be read with the machine off (temperature values are read in resistance instead of voltage) as the operating and maintenance book states.

We have included a chart of precise voltage and resistance values as well as a graphical representation. It's a matter of preference as to which one is to be used. The Syracuse letter on the sensors gives a brief elaboration on testing.

If you have any questions, please feel free to call this office.

Regards,

Mike

Mike DeChiaro
MD:bg

Attachments

Date: 3/6/86 Subject: 3200MP SENSOR TROUBLESHOOTING Dept: CML ENGINEERING

Number: SMB86-28 Author: C.B. HOLMES

PURPOSE:

To transmit voltage drop information that will permit determining the temperature of any sensor while the machine is operating.

EQUIPMENT REQUIRED:

Digital Volt-OHM Meter

PROCEDURE:

The attached chart shows the relationship between (1) temperature, (2) sensor resistance, and (3) sensor voltage drop (volts DC - measured across an energized sensor).

The resistance Vs. temperature comparison is most useful when the 3200MP Controller cannot be energized or when checking sensor accuracy prior to installation.

The voltage drop Vs. temperature comparison can only be used when the sensor is energized. Voltage drop across any desired sensor can be measured while the machine is operating or for a particular sensor while performing the applicable controls test. Exercise care while measuring voltage to prevent damage to the sensor leads, the connector plugs and the processor board.

CHECKING SENSOR ACCURACY:

Sensor accuracy is checked by placing the sensor in a medium of known temperature, then comparing that temperature against the temperature that relates to the measured resistance or voltage drop. The thermometer used to determine the temperature of the test medium should be of laboratory quality with 0.5 degree Fahrenheit graduations. Sensor accuracy should be within 2 degrees Fahrenheit.

Prepared By: Approved By:

C.B. Holmes

William S. DeLaurier

Mail Keys: 2.19, 2.30, 2.31, 2.32
CBH/ms
Attachment

5200MP SENSOR TEMPERATURE RESISTANCE VS. VOLTAGE DROP

DEG F	OHMS	VOLTS	DEG F	OHMS	VOLTS	DEG F	OHMS	VOLTS	DEG F	OHMS	VOLTS
-25.0	98009.6	4.684	38.0	13825.5	3.373	101.0	2834.9	1.500	164.0	765.3	0.527
-24.0	94707.1	4.673	39.0	13449.2	3.343	102.0	2773.2	1.476	165.0	749.5	0.518
-23.0	91521.5	4.662	40.0	13084.2	3.312	103.0	2713.1	1.453	166.0	734.2	0.509
-22.0	88448.9	4.651	41.0	12730.1	3.281	104.0	2654.7	1.430	167.0	719.2	0.501
-21.0	85485.5	4.640	42.0	12386.6	3.250	105.0	2597.8	1.407	168.0	704.6	0.493
-20.0	82627.2	4.628	43.0	12053.3	3.219	106.0	2542.3	1.385	169.0	690.4	0.484
-19.0	79870.6	4.614	44.0	11730.0	3.187	107.0	2488.3	1.362	170.0	676.6	0.476
-18.0	77212.0	4.604	45.0	11416.1	3.156	108.0	2435.8	1.341	171.0	663.3	0.468
-17.0	74647.9	4.591	46.0	11111.5	3.124	109.0	2384.5	1.319	172.0	650.3	0.461
-16.0	72175.1	4.578	47.0	10815.8	3.093	110.0	2334.6	1.298	173.0	637.7	0.453
-15.0	69790.3	4.565	48.0	10528.7	3.061	111.0	2285.9	1.277	174.0	625.5	0.446
-14.0	67490.4	4.551	49.0	10250.0	3.029	112.0	2238.5	1.256	175.0	613.8	0.438
-13.0	65272.4	4.537	50.0	9979.3	2.997	113.0	2192.2	1.236	176.0	602.3	0.431
-12.0	63133.3	4.523	51.0	9716.5	2.965	114.0	2147.0	1.216	177.0	591.3	0.424
-11.0	61070.3	4.509	52.0	9461.3	2.933	115.0	2103.0	1.196	178.0	580.7	0.417
-10.0	59080.6	4.494	53.0	9213.4	2.901	116.0	2060.0	1.176	179.0	570.3	0.410
-9.0	57161.7	4.479	54.0	8972.6	2.869	117.0	2018.0	1.157	180.0	560.5	0.403
-8.0	55310.9	4.463	55.0	8738.6	2.837	118.0	1977.0	1.138	181.0	550.9	0.397
-7.0	53525.8	4.448	56.0	8511.4	2.805	119.0	1936.9	1.120	182.0	541.7	0.390
-6.0	51804.0	4.431	57.0	8290.6	2.772	120.0	1897.8	1.101	183.0	532.9	0.384
-5.0	50143.2	4.415	58.0	8076.1	2.740	121.0	1859.5	1.083	184.0	524.4	0.378
-4.0	48541.1	4.398	59.0	7867.7	2.708	122.0	1822.1	1.065	185.0	516.2	0.371
-3.0	46995.6	4.381	60.0	7665.1	2.676	123.0	1785.5	1.048	186.0	508.4	0.365
-2.0	45504.7	4.363	61.0	7468.3	2.644	124.0	1749.7	1.030	187.0	500.8	0.360
-1.0	44066.3	4.345	62.0	7277.1	2.612	125.0	1714.7	1.013	188.0	493.6	0.354
0.0	42678.5	4.327	63.0	7091.2	2.581	126.0	1680.4	0.997	189.0	486.5	0.348
1.0	41339.3	4.308	64.0	6910.6	2.549	127.0	1646.8	0.980	190.0	479.9	0.342
2.0	40047.1	4.289	65.0	6735.1	2.517	128.0	1613.8	0.964	191.0	473.4	0.337
3.0	38800.0	4.270	66.0	6564.4	2.486	129.0	1581.6	0.948	192.0	467.2	0.332
4.0	37596.4	4.250	67.0	6398.6	2.454	130.0	1550.0	0.932	193.0	461.2	0.326
5.0	36434.7	4.230	68.0	6237.5	2.423	131.0	1519.0	0.917	194.0	455.6	0.321
6.0	35313.3	4.209	69.0	6080.9	2.391	132.0	1488.6	0.902	195.0	450.0	0.316
7.0	34230.7	4.188	70.0	5928.6	2.360	133.0	1458.8	0.887	196.0	444.5	0.311
8.0	33185.4	4.167	71.0	5780.6	2.329	134.0	1429.6	0.872	197.0	439.2	0.306
9.0	32176.2	4.145	72.0	5636.8	2.299	135.0	1400.9	0.857	198.0	434.4	0.301
10.0	31201.5	4.123	73.0	5497.0	2.268	136.0	1372.7	0.843	199.0	429.2	0.297
11.0	30260.1	4.101	74.0	5361.2	2.237	137.0	1345.1	0.829	200.0	424.1	0.292
12.0	29350.9	4.078	75.0	5229.1	2.207	138.0	1318.0	0.815	201.0	419.4	0.288
13.0	28472.5	4.055	76.0	5100.8	2.177	139.0	1291.3	0.802	202.0	414.6	0.283
14.0	27623.8	4.032	77.0	4976.0	2.147	140.0	1265.2	0.788	203.0	410.2	0.279
15.0	26803.7	4.008	78.0	4854.8	2.117	141.0	1239.5	0.775	204.0	405.3	0.274
16.0	26011.2	3.984	79.0	4736.9	2.088	142.0	1214.3	0.762	205.0	400.8	0.270
17.0	25245.1	3.959	80.0	4622.4	2.058	143.0	1189.5	0.750	206.0	396.2	0.266
18.0	24504.6	3.934	81.0	4511.1	2.029	144.0	1165.2	0.737	207.0	391.2	0.262
19.0	23788.7	3.909	82.0	4402.9	2.000	145.0	1141.3	0.725	208.0	386.4	0.258
20.0	23096.4	3.883	83.0	4297.7	1.972	146.0	1117.8	0.713	209.0	381.6	0.254
21.0	22426.9	3.858	84.0	4195.5	1.943	147.0	1094.8	0.701	210.0	376.7	0.250
22.0	21779.3	3.831	85.0	4096.1	1.915	148.0	1072.2	0.689	211.0	371.6	0.247
23.0	21152.8	3.805	86.0	3999.6	1.887	149.0	1049.9	0.678	212.0	366.1	0.243
24.0	20546.7	3.778	87.0	3905.7	1.859	150.0	1028.1	0.666	213.0	360.7	0.239
25.0	19960.2	3.751	88.0	3814.4	1.832	151.0	1006.8	0.655	214.0	355.6	0.236
26.0	19392.5	3.723	89.0	3725.8	1.805	152.0	985.8	0.644	215.0	349.8	0.232
27.0	18843.0	3.696	90.0	3639.5	1.778	153.0	965.2	0.634	216.0	343.7	0.229
28.0	18311.0	3.668	91.0	3555.7	1.751	154.0	945.0	0.623	217.0	337.6	0.225
29.0	17795.8	3.639	92.0	3474.2	1.725	155.0	925.3	0.613	218.0	331.7	0.222
30.0	17297.0	3.611	93.0	3395.0	1.699	156.0	905.9	0.602	219.0	325.0	0.219
31.0	16813.8	3.582	94.0	3318.0	1.673	157.0	887.0	0.592	220.0	318.4	0.215
32.0	16345.7	3.553	95.0	3243.1	1.647	158.0	868.3	0.582	221.0	311.4	0.212
33.0	15892.2	3.523	96.0	3170.3	1.622	159.0	850.2	0.573	222.0	304.4	0.209
34.0	15452.7	3.494	97.0	3099.4	1.597	160.0	832.4	0.563	223.0	296.9	0.206
35.0	15026.7	3.464	98.0	3030.5	1.572	161.0	815.1	0.554	224.0	289.4	0.203
36.0	14613.9	3.434	99.0	2963.5	1.548	162.0	798.1	0.545	225.0	282.1	0.200
37.0	14213.6	3.404	100.0	2898.4	1.523	163.0	781.5	0.536			
38.0	13825.5	3.373	101.0	2834.9	1.500	164.0	765.3	0.527			

TEMPERATURE PERFORMANCE

VOLTAGE VS. TEMPERATURE RESISTANCE VS. TEMPERATURE