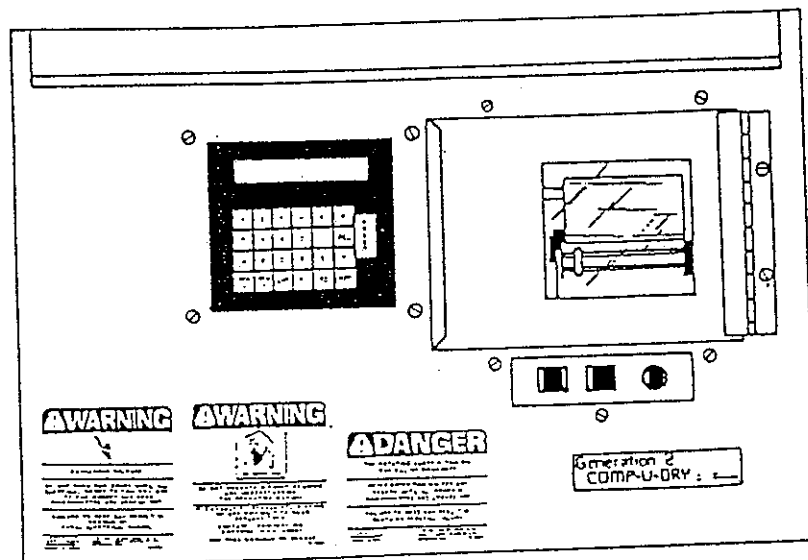


DELUXE COMP-U-DRY Generation 2

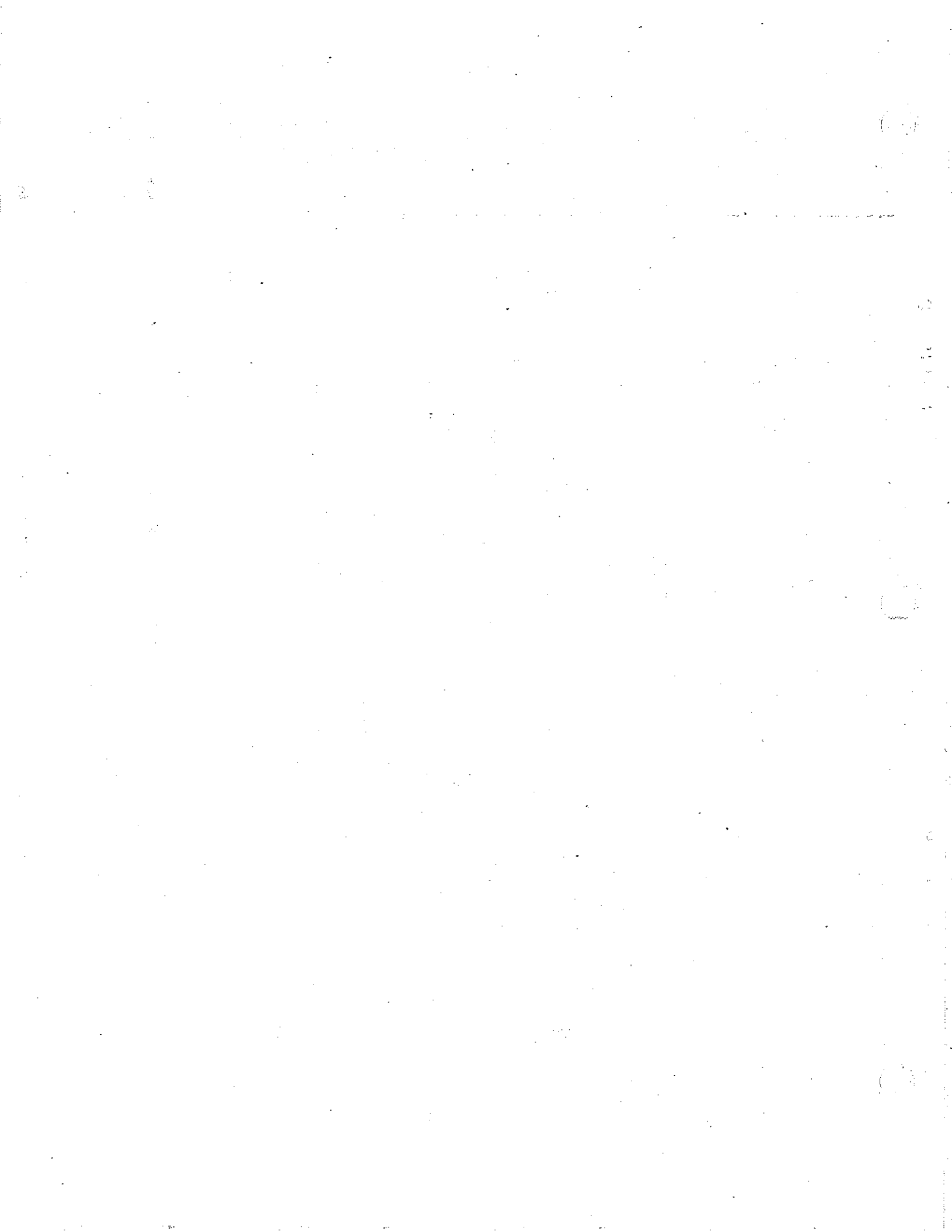
By Shivers



TECHNICAL MANUAL

Shivers Incorporated
614 West English
Corydon, Iowa 50060.
515/872-1005

P-10701
2/19/92



INTRODUCTION to TROUBLESHOOTING

THE GENERATION 2 COMP-U-DRY

THESE TROUBLESHOOTING CHARTS WILL GIVE THE MOST LIKELY CAUSE OF A PROBLEM. THEY ASSUME A GENERAL KNOWLEDGE OF THE DRYING SYSTEM AND ITS TERMINOLOGY. THEY ASSUME THAT EVERYTHING WAS WIRED CORRECTLY AND HAS BEEN WORKING. IN SOME CASES THEY MAY HELP TROUBLESHOOT INITIAL WIRING PROBLEMS. THEY WILL NOT WORK IN ALL SITUATIONS, AND IT IS ALWAYS POSSIBLE THERE IS MORE THAN ONE PROBLEM.

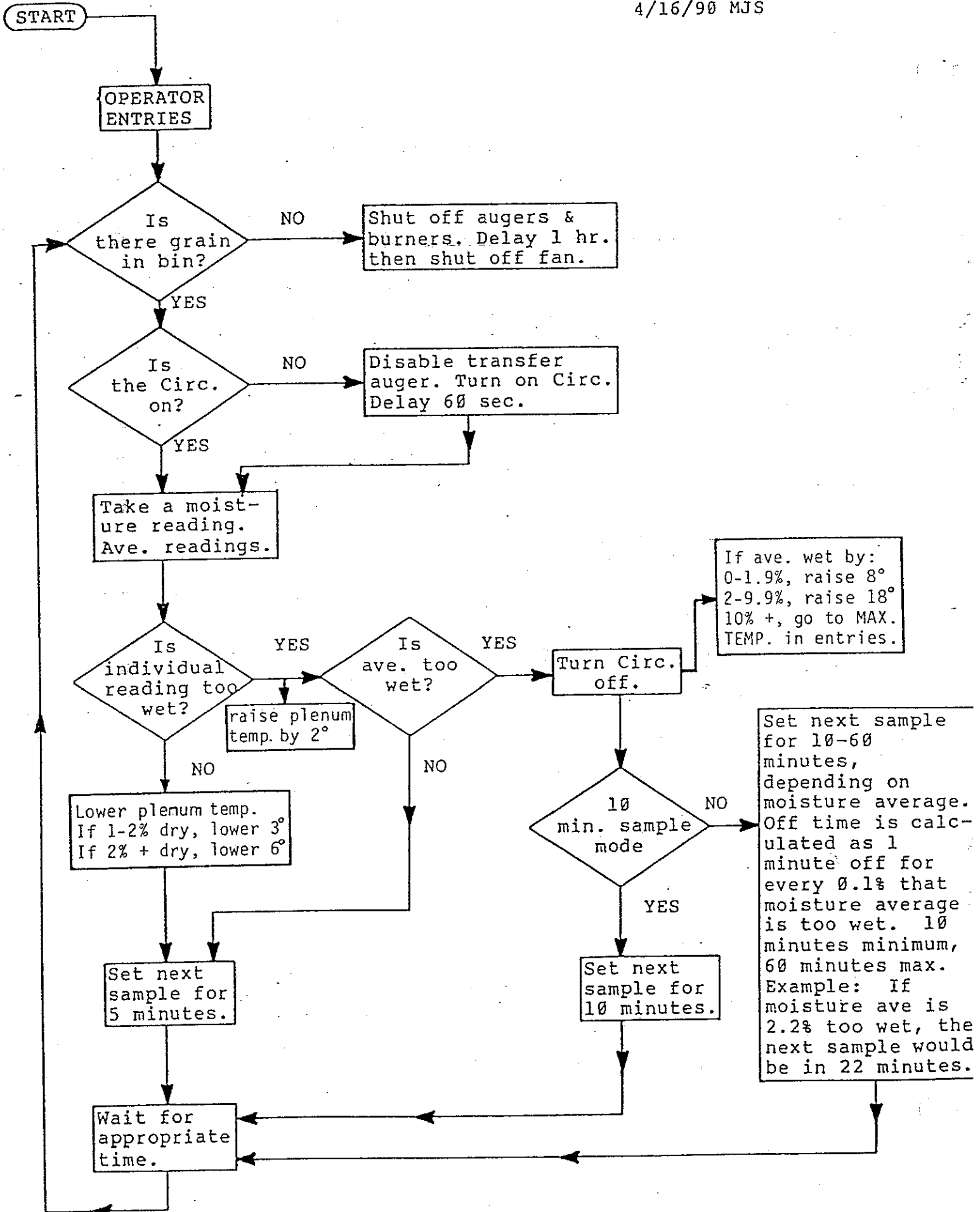
WHEN SHOWING COMPUTER DISPLAYS, AN "x" MEANS ANY VALUE IS PROBABLY OK. FOR EXAMPLE, "xxxF" COULD BE 120F OR 075F.

***** WARNING *****



IN SOME CASES, IT IS NECESSARY TO TAKE VOLTAGE MEASUREMENTS WHILE THE CIRCUIT IS "HOT". THESE CHECKS SHOULD BE PERFORMED ONLY BY EXPERIENCED AND COMPETENT SERVICE PERSONNEL. VOLTAGE LEVELS MAY BE AS HIGH AS 220 VOLTS. PERSONAL INJURY IS POSSIBLE. COMPUTER COMPONENTS AND CIRCUIT BOARD TRACES ARE VERY SENSITIVE. THEY MAY BE DESTROYED BY SHORT CIRCUITS. IF YOU ARE IN DOUBT ABOUT WHAT YOU ARE DOING, DON'T DO IT. SHUT ALL POWER OFF, AND REPLACE THE MAIN ASSEMBLIES UNTIL THE PROBLEM IS FIXED.

***** WARNING *****



OPERATING POINT

The operating point is the computer calculated temperature that is required in the plenum to obtain grain of the desired moisture. There is an entry in the start up procedure to set the "initial operating point" for a starting temperature. This is only a starting temperature. After the Comp-U-Dry obtains a grain sample, the operating point is computer controlled, as determined by the moisture average of the grain samples.

The operating point is programmed to allow a 1% (dry) variation in moisture without a change. If the selected moisture is 16.5%, the operating point will not be changed if the moisture average is between 16.5% and 15.5%. If the average moisture is above 16.5% the operating point will be raised. The amount the temperature is raised is determined by how much over the set point the moisture average is. In no case, will the operating point be raised above the maximum temperature.

If the moisture average is more than 1% less than the set point, (in this example, the moisture would be less than 15.5%) the computer will lower the operating point a small amount, to slow the drying rate. If the next moisture level is still too dry, the operating point will again be lowered a small amount.

As the grain drying process continues, the operating point will probably continue to be adjusted, trying to find equilibrium, where the grain is at the desired moisture without overdrying. In most installations, perfect equilibrium will be impossible to achieve because of variations of the heat under the floor (within the bin) and variations of grain depth and grain moisture. If the drying conditions are conducive to it, the operating point may go lower than the outside temperature, resulting in natural air drying while maintaining the capacity of the machine.

CONTROL CHECK

There is a program execution monitor in the G2 COMPUDRY which will shut off control power if the program stops running. This feature is checked by the computer at the next sample after 6:00 and 12:00. Program version numbers 2.6, or later, do this check only once a day, at 6:00 AM. The computer does the following:

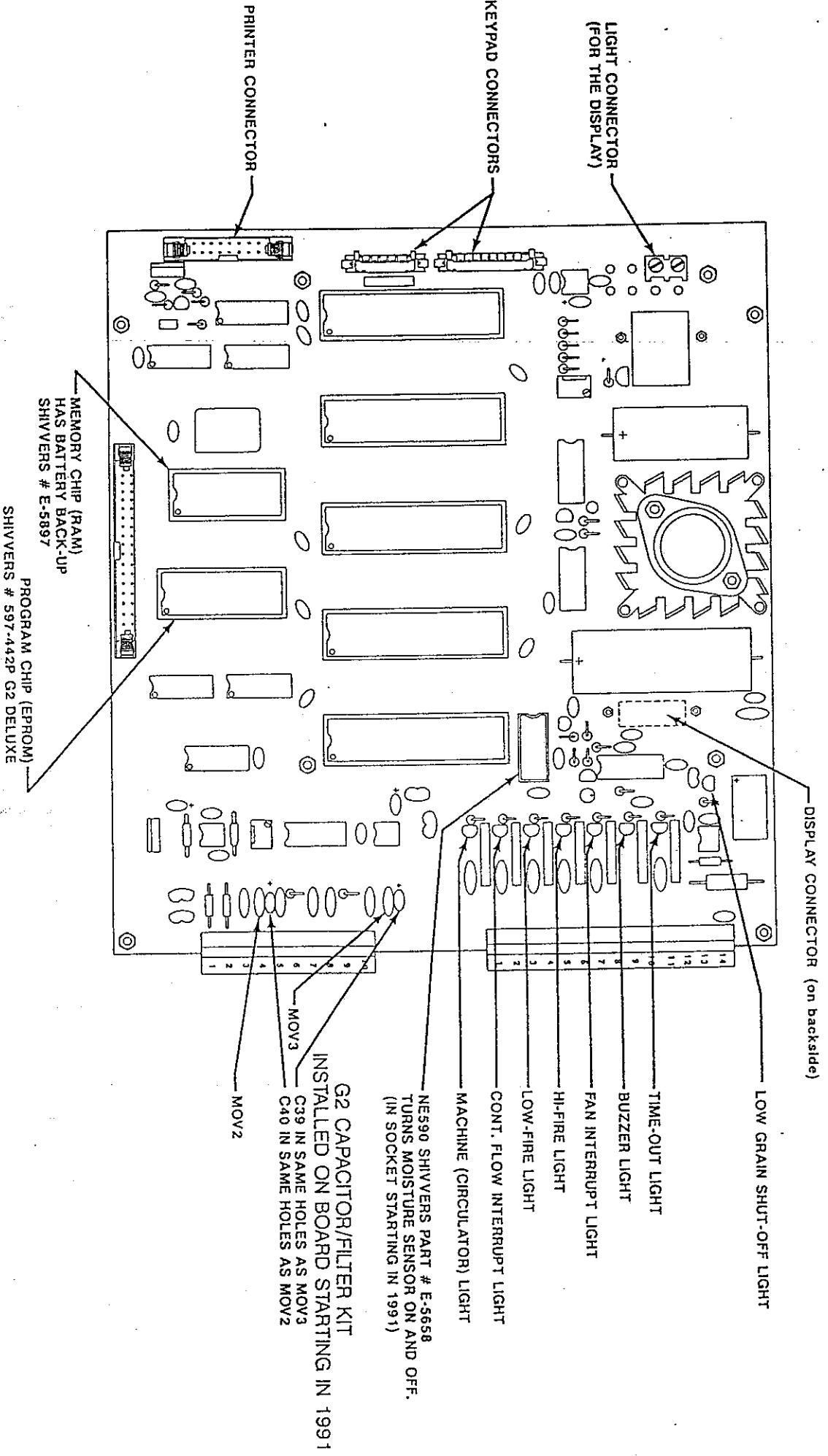
- 1) Displays "CONTROL CHECK".
- 2) Disables program execution monitor.
- 3) Shuts off machine (circulator), and burner fire.
- 4) Waits 80 seconds. Time-out light should come on during this time.
- 5) Tries to turn on machine (circulator). It shouldn't come on.
- 6) Reads moisture meter five times.
- 7) If readings are all the same, assumes that the machine is indeed disabled, and continues with step 8. If the readings are changing, assumes that the machine is running. Tries reading the moisture meter five more times. If the readings are still changing, prints out:

----- CAUTION -----
COMPUDRY CONTROL INTERRUPT INOPERATIVE.
SEE OWNERS MANUAL. SERVICE IMMEDIATELY.
----- CAUTION -----

Also sets the buzzer so it will beep on and off.
Continues with step 8.

- 8) Turns machine (circulator), off. (It never should have come on). Reenables the program execution monitor. The Time-out light should go off at this time.
- 9) Prints out 6 hour information, and continues drying.

G2 COMPUTER CONTROL BOARD



DISPLAY CONNECTOR (on backside)

LOW GRAIN SHUT-OFF LIGHT

TIME-OUT LIGHT

BUZZER LIGHT

FAN INTERRUPT LIGHT

HI-FIRE LIGHT

LOW-FIRE LIGHT

CONT. FLOW INTERRUPT LIGHT

MACHINE (CIRCULATOR) LIGHT

NES90 SHIVERS PART # E-5658
TURNS MOISTURE SENSOR ON AND OFF.
(IN SOCKET STARTING IN 1991)

G2 CAPACITOR/FILTER KIT
INSTALLED ON BOARD STARTING IN 1991

C39 IN SAME HOLES AS MOV3
C40 IN SAME HOLES AS MOV2

MOV3

MOV2

MEMORY CHIP (RAM)
HAS BATTERY BACK-UP
SHIVERS # E-5897

PROGRAM CHIP (EPROM)
SHIVERS # 597-442P G2 DELUXE

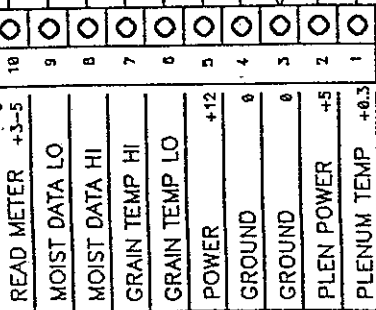
PRINTER CONNECTOR

KEYPAD CONNECTORS

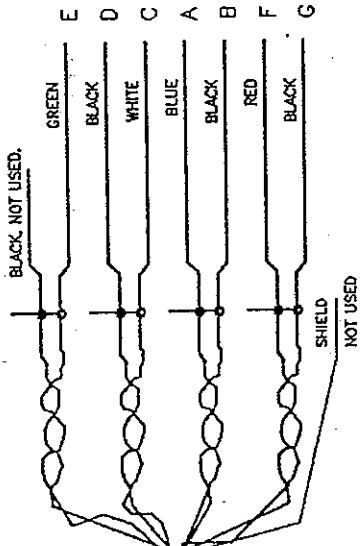
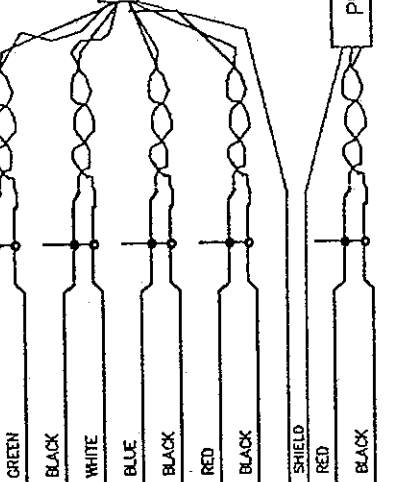
LIGHT CONNECTOR
(FOR THE DISPLAY)

VOLTAGES ARE APPROXIMATE
DC VOLTS WITH REFERENCE TO
GROUND (TERM. 3 OR 4).

ONLY WITH GOOD MOISTURE
SENSOR ATTACHED AND GOOD
COMPUTER BOX.



BLACK, NOT USED.



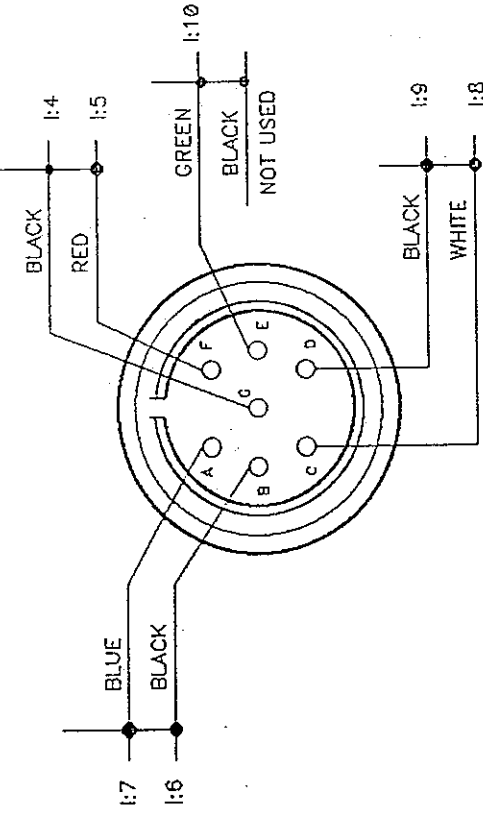
MOISTURE CABLE

MOISTURE CABLE

PLENUM TEMP
CABLE

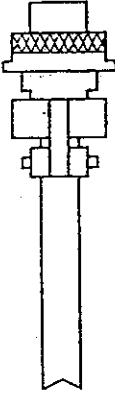
THIS SYMBOL MEANS
TWISTED PAIR WIRES

+0.273 VOLTS AT 032F
+0.373 VOLTS AT 212F



END VIEW

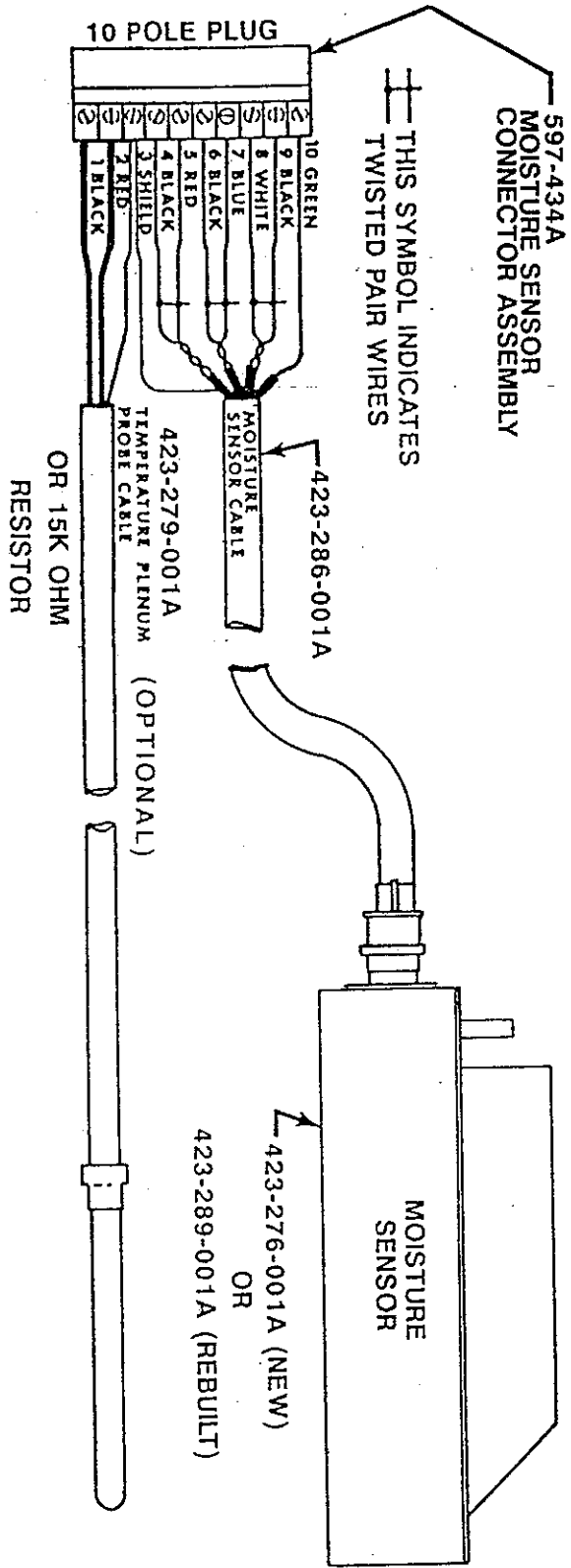
UNSCREW ONLY THIS PART
WHEN DISCONNECTING
MOISTURE SENSOR.



SIDE VIEW

Title G2 DELUXE LOW VOLTAGE WIRING DETAIL	
Size C	Rev
Date 3/13/91	Drawn by MJS
File name LOWVOLT.S01	Sheet 1 of 1

TEST TOOL

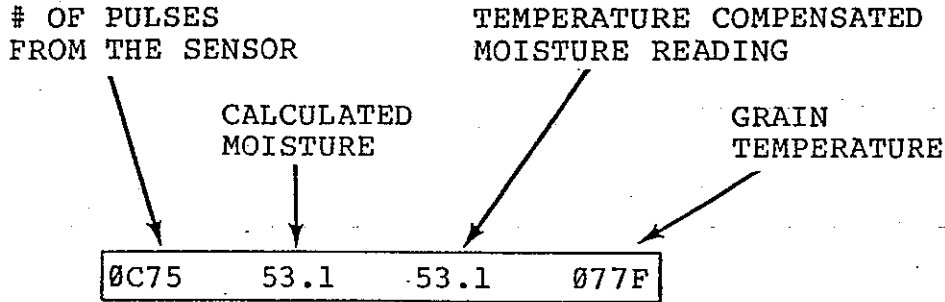


SHUT POWER OFF. UNPLUG THE 10 POLE "I" PLUG. PLUG IN THE TEST TOOL. TURN THE POWER ON. GET INTO THE MENU. SELECT "2 READ METER". MAKE SURE NOTHING IS TOUCHING THE "FLAG". IF COMPUTER BOX IS GOOD, THE DISPLAY SHOULD SHOW:

0CXX XX.X XX.X XXXF

X = ANY NUMBER OR LETTER AMBIENT TEMPERATURE

MENU READ METER



Empty chamber reading, (no grain around the sensor). Can range from 0C40 to 0C90. Number of pulses should not vary by more than 1 or 2 pulses each time RET key is pressed.

0D6E	16.1	15.0	100F
------	------	------	------

Grain is around the sensor. Can range from 0CCE to 0F00. Number of pulses will vary with moving grain.

0000	44.9	46.2	050F
------	------	------	------

Something is wrong. Either the sensor is wet or bad, or the computer board is not turning the sensor on and off at the proper times. Voltage is getting to the sensor because it is sending a grain temperature.

0000	44.9	43.8	000F
------	------	------	------

Power is either not getting to the sensor, or the sensor is bad, because there is not any grain temperature. Check connections on 10 pole "I" plug, especially the red wire in terminal #5.

DATE=10/26/91
 TIME=12:04P
 LOT #=0001
 DRY TO 16.0
 METER CAL=+0.0
 RDGD TO AVE=4
 MAX TEMP=160F
 OPR PNT=160F

TIME	MOIST RDG	GRAIN TEMP	MOIST AVE	MACH STAT	OPR PNT	PLENUM TEMP
12:06P	16.9	115F	16.9	OFF	160F	162F
12:17P	16.3	119F	16.6	OFF	160F	159F
12:28P	15.9	122F	16.3	ON	160F	161F
12:34P	15.5	125F	16.1	ON	160F	157F
12:40P	15.8	123F	15.8	ON	160F	163F
12:46P	15.2	128F	15.6	ON	160F	160F
12:52P	14.9	130F	15.3	ON	157F	155F
12:58P	15.3	127F	15.3	ON	157F	159F
01:04P	16.2	120F	15.4	ON	159F	161F
01:10P	16.8	116F	15.8	ON	160F	160F
01:16P	17.0	112F	16.3	OFF	160F	158F
ERROR READ=0000						
READ=49.3 READ=47.4						
REDO						
01:29P	16.5	115F	16.6	OFF	160F	162F
01:40P	16.0	121F	16.5	ON	160F	162F
01:45P	15.8	125F	16.3	ON	160F	160F
01:51P	15.9	124F	16.0	ON	160F	155F
01:57P	15.5	127F	15.8	ON	160F	159F
02:03P	15.7	125F	15.7	ON	160F	162F
02:09P	16.1	120F	15.8	ON	160F	159F
02:15P	16.8	115F	16.0	ON	160F	163F
02:21P	16.1	119F	16.1	OFF	160F	160F
02:32P	16.0	121F	16.2	ON	160F	159F
02:38P	15.8	125F	16.1	ON	160F	156F
02:44P	15.9	124F	15.9	ON	160F	158F
02:50P	16.1	122F	15.9	ON	160F	162F
ERROR READ=0000						
READ=51.2 READ=49.3						
REDO						
ERROR READ=0000						
READ=51.3 READ=49.4						
ERROR						
READING OUT OF RANGE						

Intermittent "ERROR READ=0000". Sometimes will "REDO" and go ahead and run. Sometimes gets two in a row and shuts down on "ERROR READING OUT OF RANGE". Circulator or Cont. Flow augers may also turn on and off at improper times.

Make sure that a Capacitor/Filter Kit is installed; either on the 10 pole "I" plug, or soldered onto the main computer board.

Check for a good connection with the green wire on terminal #10 of the 10 pole "I" plug.

SELECT ONE

F1 RESUME

1 MENU

4 DRY GRAIN

METER CAL=+2.0

ENTERED +2.0

-----RESUMED DATA -----

DATE=11/05/91

TIME=02:11P

LOT #=0000

DRY TO 14.5

METER CAL=+2.0

RDGD TO AVE=6

MAX TEMP=140F

OPR PNT=140F

TIME	MOIST RDG	GRAIN TEMP	MOIST AVE	MACH STAT	OPR PNT	PLENUM TEMP
ERROR	READ=0C75					
ERROR	READ=0C76					
ERROR	READ=0C75					
ERROR	READ=0C75					
ERROR	READ=0C75					
ERROR	READ=0C75					
ERROR	READ=0C76					
ERROR	READ=0C75					
ERROR	READ=0C75					
ERROR	READ=0C75					
READ=52.7	READ=54.9					
REDO						
ERROR	READ=0C75					
ERROR	READ=0C75					
ERROR	READ=0C76					
ERROR	READ=0C75					
ERROR	READ=0C75					
ERROR	READ=0C75					
ERROR	READ=0C75					
ERROR	READ=0C75					
ERROR	READ=0C75					
ERROR	READ=0C76					
READ=52.7	READ=54.9					
ERROR						
READING OUT OF RANGE						
READINGS NOT CHANGING						

Ten "ERROR READ=0Cxx" readings in a row, then a "REDO", with ten more "ERROR READ=0Cxx". Then "ERROR READING OUT OF RANGE", and "READINGS NOT CHANGING". On program versions G2.7 and above, it will also print a grain temperature. For example:
"ERROR READ=0C75 087F"

This usually means that there isn't any grain around the moisture sensor. The readings can be in a range from 0C40 to 0C9F.

Make sure there is grain in the bin.

Make sure the center vertical auger runs by putting the circulator switch in manual. Also make sure it will run by turning the grain T-stat to its lowest (wettest) setting. The grain will have to be at least 55 F. If it doesn't run, start checking fuses, and overloads.

If the circulator runs in manual, check the 1/2 Amp fuse on the Compudry Relay board.

Make sure there is a good connection on terminal #5 of the 16 pole "F" plug.

Make sure the 14 pole "C" plug is securely plugged into the top of the computer box.

Replace the Computer F

SELECT ONE
 F1 RESUME
 1 MENU
 4 DRY GRAIN

METER CAL=+0.0
 ENTERED +0.0

-----RESUMED DATA -----

DATE=11/07/91
 TIME=08:11A
 LOT #=0123
 DRY TO 15.5
 METER CAL=+0.0
 RDGD TO AVE=6
 MAX TEMP=140F
 OPR PNT=140F

TIME	RDG	MOIST	GRAIN	MOIST	MACH	OPR	PLENUM
		TEMP	AVE	STAT	PNT	TEMP	
							ERROR
							NO TEMP READING

SHIVVERS G2 COMPUDRY

SELECT ONE
 F1 RESUME
 1 MENU
 4 DRY GRAIN
 SELECTION 1

MENU
 1 READ TEMP
 2 READ METER
 3 MACHINE
 4 CONT FLOW ENABLE
 5 FAN ENABLE
 6 BUZZER
 7 HI FIRE
 8 LO FIRE
 A SET MACHINE OFF TIME
 E EXIT
 SELECTION 1

PLENUM=000F GRAIN=059F
 PLENUM=000F GRAIN=059F

"ERROR NO TEMP READING"

This occurs when the computer gets all zeros for a plenum temperature. It will shut the dryer down, and turn on the buzzer.

Check for a good connection on terminals #1 and #2 of the the 10 pole "I" plug.

Replace the plenum temp. probe.

Replace the Computer Box.

DATE=11/11/91
 TIME=12:04P
 LOT #=0005
 DRY TO 16.0
 METER CAL=+0.0
 RDGD TO AVE=4
 MAX TEMP=150F
 OPR PNT=150F

TIME	MOIST RDG	GRAIN TEMP	MOIST AVE	MACH STAT	OPR PNT	PLENUM TEMP
12:06P	16.9	115F	16.9	OFF	150F	152F
12:17P	16.3	119F	16.6	OFF	150F	149F
12:28P	15.9	122F	16.3	ON	150F	151F
12:34P	15.5	125F	16.1	ON	150F	147F
12:40P	15.8	123F	15.8	ON	150F	153F
12:46P	15.2	128F	15.6	ON	150F	150F
12:52P	14.9	000F	15.3	ON	147F	155F

ERROR

BAD GRAIN TEMP

12:58P	15.3	127F	15.3	ON	147F	149F
01:04P	16.2	120F	15.4	ON	149F	151F
01:10P	16.8	116F	15.8	ON	150F	150F
01:16P	17.0	112F	16.3	OFF	150F	148F
01:29P	16.5	115F	16.6	OFF	150F	152F
01:40P	16.0	121F	16.5	ON	150F	152F
01:45P	15.8	125F	16.3	ON	150F	150F
01:51P	15.9	124F	16.0	ON	150F	155F
01:57P	15.5	127F	15.8	ON	150F	149F
02:03P	15.7	125F	15.7	ON	150F	152F
02:09P	16.1	120F	15.8	ON	150F	149F
02:15P	16.8	115F	16.0	ON	150F	153F
02:21P	16.1	119F	16.1	OFF	150F	150F
02:32P	16.0	121F	16.2	ON	150F	149F
02:38P	15.8	125F	16.1	ON	150F	146F
02:44P	15.9	124F	15.9	ON	150F	148F
02:50P	16.1	122F	15.9	ON	150F	152F
02:56P	15.2	000F	15.7	ON	150F	147F

ERROR

BAD GRAIN TEMP

03:02P	15.3	000F	15.6	ON	150F	151F
--------	------	------	------	----	------	------

ERROR

BAD GRAIN TEMP

03:08P	16.5	120F	15.7	ON	150F	150F
03:14P	16.8	118F	15.9	ON	150F	147F
03:20P	16.7	117F	16.3	OFF	150F	151F

"ERROR BAD GRAIN TEMP"
 Grain temp. reads 000F,
 either all the time, or
 intermittently. Buzzer
 beeps, but does not shut
 dryer down.

Check for good connections
 on terminals #6 and #7 of
 the 10 pole "I" plug.
 These will be the blue
 and black wires.

Replace the Moisture
 Sensor.

DATE=11/11/91
 TIME=12:04P
 LOT #=0005
 DRY TO 16.0
 METER CAL=+0.0
 RDGD TO AVE=4
 MAX TEMP=150F
 OPR PNT=150F

TIME	MOIST RDG	GRAIN TEMP	MOIST AVE	MACH STAT	OPR PNT	PLENUM TEMP
12:06P	16.9	115F	16.9	OFF	150F	152F
12:17P	16.3	119F	16.6	OFF	150F	149F
12:28P	15.9	122F	16.3	ON	150F	151F
12:34P	15.5	125F	16.1	ON	150F	147F
12:40P	15.8	123F	15.8	ON	150F	153F
12:46P	15.2	128F	15.6	ON	150F	150F
12:52P	13.9	145F	15.1	ON	144F	145F
12:58P	15.3	127F	15.0	ON	144F	147F
01:04P	16.2	120F	15.1	ON	146F	141F
01:10P	16.8	116F	15.5	ON	148F	150F
01:16P	17.0	112F	16.3	OFF	150F	148F
01:29P	16.5	115F	16.6	OFF	150F	152F
01:40P	16.0	121F	16.5	ON	150F	152F
01:45P	15.8	125F	16.3	ON	150F	150F
01:51P	15.9	124F	16.0	ON	150F	155F
01:57P	13.5	157F	15.3	ON	144F	147F
02:03P	15.7	125F	15.2	ON	144F	142F
02:09P	16.1	120F	15.3	ON	146F	149F
02:15P	16.8	115F	15.5	ON	148F	150F
02:21P	16.1	119F	16.1	OFF	150F	152F
02:32P	16.0	121F	16.2	ON	150F	149F
02:38P	15.8	125F	16.1	ON	150F	146F
02:44P	15.9	124F	15.9	ON	150F	148F
02:50P	16.1	122F	15.9	ON	150F	152F
02:56P	13.2	161F	15.2	ON	144F	147F

ERROR

BAD GRAIN TEMP

03:02P	14.3	152F	14.8	ON	141F	145F
03:08P	15.5	130F	14.7	ON	141F	140F
03:14P	15.8	128F	14.7	ON	141F	143F
03:20P	15.7	127F	15.3	ON	141F	141F
03:26P	15.2	132F	15.5	ON	141F	144F
03:32P	15.0	133F	15.4	ON	141F	139F
03:38P	14.8	133F	15.1	ON	138F	140F
03:44P	14.0	145F	14.7	ON	135F	137F
03:50P	14.5	135F	14.5	ON	132F	134F

"ERROR BAD GRAIN TEMP"
 Grain temp. reads above
 160F intermittently.
 Buzzer beeps, but does
 not shut dryer down.

Look on the tape for a
 recurring spot where the
 grain temperature is
 high. Usually about
 every 5-8 "ON" samples.
 Also notice if when the
 grain is hot, that the
 moisture reading is low.
 If it is, there is
 probably a hot spot in
 the bin. This usually
 occurs with a single
 sweep unit. Find out
 where the sweep is when
 the hot reading occurs,
 to find the hot spot.
 Try to capture a sample
 of grain and verify that
 the grain is as hot as
 the computer says it is.

Also, if the grain temp.
 is hotter than the
 plenum temp., make sure
 the plenum temp probe is
 not in a cold spot, or
 not reading accurately.

Make sure the grain is
 level in the bin. Even
 the heat out under the
 floor.

If the grain is really
 not that hot and the
 moisture readings aren't
 much lower, then check
 for good connections on
 terminals #6 and #7 of
 the 10 pole "I" plug.
 These will be the blue
 and black wires.

If the connections look
 ok, then replace the
 Moisture Sensor.

DATE=09/06/91
 TIME=12:04P
 LOT #=0001
 DRY TO 15.0
 METER CAL=+0.0
 RDGD TO AVE=4
 MAX TEMP=140F
 OPR PNT= 55F

TIME	MOIST RDG	GRAIN TEMP	MOIST AVE	MACH STAT	OPR PNT	PLENUM TEMP
12:06P	15.0	085F	15.0	ON	055F	092F
12:12P	14.8	089F	14.9	ON	055F	093F
12:18P	14.9	082F	14.9	ON	055F	093F
12:24P	14.6	085F	14.8	ON	055F	093F
12:30P	14.8	083F	14.7	ON	055F	093F
12:36P	14.7	088F	14.7	ON	055F	092F
12:42P	14.9	085F	14.7	ON	055F	093F
12:48P	14.8	087F	14.8	ON	055F	092F
12:54P	15.0	085F	14.8	ON	055F	092F
01:00P	14.8	086F	14.8	ON	055F	093F
01:06P	15.0	084F	14.9	ON	055F	093F
READ=15.0		READ=14.8		REDO		
01:12P	14.5	085F	14.8	ON	055F	092F
01:18P	15.0	085F	14.8	ON	055F	092F
01:24P	14.8	086F	14.8	ON	055F	003F
01:31P	14.9	084F	14.8	ON	055F	093F
01:37P	14.5	085F	14.8	ON	055F	093F
01:43P	14.7	085F	14.7	ON	055F	092F
01:49P	14.6	086F	14.6	ON	055F	093F
01:55P	14.8	085F	14.6	ON	055F	093F
02:01P	14.6	085F	14.6	ON	055F	092F
02:07P	15.0	086F	14.7	ON	055F	092F
02:13P	14.8	084F	14.8	ON	055F	092F
02:19P	14.9	086F	14.8	ON	055F	092F
02:25P	15.1	085F	14.9	ON	055F	092F
READ=15.2		READ=15.0		REDO		
READ=15.1		READ=14.9		ERROR		
READINGS NOT CHANGING						

Intermittent "ERROR
 READINGS NOT CHANGING".

There is not enough variation in the ten moisture readings per sample, to get a valid reading. The computer errors only occasionally. Sometimes it will "REDO" and go ahead and run.

This will usually not occur when drying corn. It can occur when drying wheat and milo, especially when just taking out a few points of moisture, at a low drying temp. The moisture readings are so even, the computer thinks that the grain is not moving by the sensor.

About the only cure for this is to install a special program chip.

It can also occur when the moisture sensor is not properly installed, (usually in a DRI-SMART). Also check the moisture sensor for a build-up of dried crud.

```

SELECT ONE
F1 RESUME
  1 MENU
  4 DRY GRAIN

```

```

METER CAL=+2.0
ENTERED +2.0

```

```

-----RESUMED DATA -----

```

```

DATE=11/05/91
TIME=02:11P
LOT #=0000
DRY TO 14.5
METER CAL=+2.0
RDGD TO AVE=6
MAX TEMP=140F
OPR PNT=140F

```

TIME	RDG	MOIST	GRAIN	MOIST	MACH	OPR	PLENUM
		TEMP	AVE	STAT	PNT	TEMP	
READ=17.2	READ=15.3						
REDO							
READ=17.3	READ=15.4						
		ERROR					
		READINGS NOT CHANGING					

"ERROR
READINGS NOT CHANGING".

There is not enough variation in the ten moisture readings per sample, to get a valid reading. The computer errors and shuts down. It does not print "REDO", then go ahead and run.

This will usually occur when installed on a Dri-Flow (bottom unload), and on some 6" center verticals. Usually the auger is not running and there is a stationary slug of grain on the moisture sensor.

Make sure the discharge auger runs by putting the circulator switch in manual. Also make sure it will run by turning the grain T-stat to its lowest (wettest) setting. The grain will have to be at least 55 F. If it doesn't run, start checking fuses, and overloads.

If the auger runs in manual, check the 1/2 Amp fuse on the CompuDry Relay board.

Make sure there is a good connection on terminal #5 of the 16 pole "F" plug.

Make sure the 14 pole "C" plug is securely plugged into the top of the computer box.

Replace the Computer Box.

```

05:16A 15.9 122F 16.3 ON 160F 161F
05:22A 15.5 125F 16.1 ON 160F 157F
05:28A 15.8 123F 15.8 ON 160F 163F
05:34A 15.2 128F 15.6 ON 160F 160F
05:40A 14.9 130F 15.3 ON 157F 155F
05:46A 15.3 127F 15.3 ON 157F 159F
05:52A 16.2 120F 15.4 ON 159F 161F
05:58A 16.8 116F 15.8 ON 160F 160F

```

----- CAUTION -----

COMPUDRY CONTROL INTERRUPT INOPERATIVE.
SEE OWNERS MANUAL. SERVICE IMMEDIATELY.

----- CAUTION -----

```

DATE=10/26/91
TIME=06:04A
LOT #=0001
DRY TO 16.0
METER CAL=+0.0
RDGD TO AVE=4
MAX TEMP=160F
OPR PNT=160F

```

TIME	MOIST RDG	GRAIN TEMP	MOIST AVE	MACH STAT	OPR PNT	PLENUM TEMP
06:06A	16.9	115F	16.9	OFF	160F	162F
06:17A	16.3	119F	16.6	OFF	160F	159F
06:28A	15.9	122F	16.3	ON	160F	161F
06:34A	15.5	125F	16.1	ON	160F	157F
06:40A	15.8	123F	15.8	ON	160F	163F
06:46A	15.2	128F	15.6	ON	160F	160F
06:52A	14.9	130F	15.3	ON	157F	155F
06:58A	15.3	127F	15.3	ON	157F	159F
07:04A	16.2	120F	15.4	ON	159F	161F
07:10A	16.8	116F	15.8	ON	160F	160F

Computer failed "CONTROL CHECK" at 6:00 AM. Buzzer starts beeping, but dryer continues to run.

Program version G2.6 and later only does a control check at 6:00 AM. Earlier versions do the check every 6 hours, at 6:00 and 12:00.

Make sure that the grain T-stat in the dryer control box is turned to the highest (driest) setting.

If it only occurs once or twice a season, don't worry about it.

If it happens every time, replace the computer box. If that doesn't fix it, a ground strap from terminal #3 of the 10 pole "I" plug, to the box ground lug, may help.

DATE=10/26/91

TIME=12:04P

LOT #=0001

DRY TO 16.0

METER CAL=+0.0

RDGD TO AVE=4

MAX TEMP=160F

OPR PNT=160F

TIME	MOIST RDG	GRAIN TEMP	MOIST AVE	MACH STAT	OPR PNT	PLENUM TEMP
12:06P	16.9	115F	16.9	OFF	160F	162F
12:17P	16.8	119F	16.8	OFF	160F	159F
12:28P	16.9	118F	16.8	OFF	160F	161F
12:39P	16.5	120F	16.7	OFF	160F	157F
12:50P	16.4	121F	16.6	OFF	160F	163F
01:01P	16.2	128F	16.5	OFF	160F	160F
01:12P	16.1	130F	16.3	OFF	160F	165F
01:23P	16.0	127F	16.1	ON	160F	159F
01:29P	16.9	120F	16.3	OFF	160F	161F
01:40P	16.7	116F	16.4	OFF	160F	160F
01:51P	17.0	118F	16.6	OFF	160F	158F
02:02P	16.8	125F	16.8	OFF	160F	162F
02:13P	16.6	121F	16.7	OFF	160F	162F
02:24P	16.4	125F	16.7	OFF	160F	160F
02:35P	16.2	124F	16.5	OFF	160F	155F
02:46P	16.1	127F	16.3	OFF	160F	159F
02:57P	15.9	129F	16.1	ON	160F	162F
03:03P	16.1	125F	16.0	ON	160F	159F
03:09P	16.8	115F	16.2	OFF	160F	163F
03:20P	16.7	119F	16.3	OFF	160F	160F
03:31P	16.5	121F	16.5	OFF	160F	159F
03:42P	16.4	125F	16.6	OFF	160F	156F
03:53P	16.2	124F	16.4	OFF	160F	158F
04:04P	16.1	126F	16.3	OFF	160F	162F
04:14P	16.3	129F	16.2	OFF	160F	161F
04:25P	16.5	125F	16.2	OFF	160F	157F
04:36P	16.4	127F	16.3	OFF	160F	160F
04:47P	16.2	130F	16.3	OFF	160F	162F
05:58P	16.1	129F	16.3	OFF	160F	163F

DATE=10/26/91

TIME=06:10P

LOT #=0001

DRY TO 16.0

METER CAL=+0.0

RDGD TO AVE=4

MAX TEMP=160F

OPR PNT=160F

Grain does not dry.
Even with a fairly high
temperature.

Make sure that the sweep
is going around the bin.
It could be stuck, and
it keeps pulling wet
grain down, instead of
advancing into the dry
grain.

It could be a bin with
a bin liner that is too
low. All the hot air is
going up the outside and
not drying the grain.

There may not be any air
flow thru the grain.

Make sure that grain
T-stat is turned to the
highest (driest) setting.
Especially if the auger
is running all the time,
even when the computer
says "OFF".

When the computer is off
the augers should not
run. If they do, the
problem is not in the
computer.

DATE=11/26/91
 TIME=12:04P
 LOT #=0001
 DRY TO 16.0
 METER CAL=+2.0
 RDGD TO AVE=4
 MAX TEMP=160F
 OPR PNT=160F

TIME	MOIST RDG	GRAIN TEMP	MOIST AVE	MACH STAT	OPR PNT	PLENUM TEMP
12:06P	16.9	115F	16.9	OFF	160F	162F
12:17P	16.4	119F	16.6	OFF	160F	159F
12:28P	16.0	123F	16.4	ON	160F	161F
12:34P	15.5	125F	16.2	ON	160F	157F
12:40P	15.4	126F	15.8	ON	160F	163F
12:46P	15.2	128F	15.5	ON	160F	160F
12:52P	14.7	130F	15.2	ON	157F	159F
12:58P	15.0	127F	15.0	ON	157F	129F
01:04P	15.4	123F	15.0	ON	157F	092F
01:10P	15.7	119F	15.2	ON	157F	060F
01:16P	16.0	118F	15.5	ON	157F	054F
01:22P	16.8	105F	15.9	ON	159F	052F
01:28P	17.0	099F	16.3	OFF	160F	051F
01:39P	16.9	095F	16.6	OFF	160F	050F
01:50P	16.7	090F	16.8	OFF	160F	051F
02:01P	16.8	087F	16.8	OFF	160F	051F
02:12P	16.9	085F	16.8	OFF	160F	050F
02:23P	17.1	080F	16.8	OFF	160F	050F
02:34P	16.8	077F	16.9	OFF	160F	049F
02:45P	16.7	074F	16.8	OFF	160F	050F
02:56P	16.5	071F	16.7	OFF	160F	049F
03:07P	16.4	069F	16.6	OFF	160F	049F
03:18P	16.2	065F	16.4	OFF	160F	050F
03:29P	16.0	064F	16.2	ON	160F	049F
03:35P	16.3	062F	16.2	OFF	160F	049F
03:46P	16.5	059F	16.2	OFF	160F	050F
03:57P	16.4	057F	16.3	OFF	160F	050F
04:08P	16.7	055F	16.4	OFF	160F	051F
04:19P	16.6	054F	16.5	OFF	160F	050F

Burner stopped burning.

This is almost always a problem with the burner.

Turn up the plenum T-stat. If the burner does not light, the problem is not in the CompuDry. Check the plenum Hi-limit, Low grain shut-off relay burner contacts, burner safeties. Also make sure there is gas available.

If the burner fires with the plenum T-stat, then check the CompuDry Relay board. See if the lights for the Low and Hi Fire relays are coming on, and the relays are pulling in. If they are, replace the relays or the relay board.

If the Low and Hi Fire relays aren't pulling in, and the lights aren't lighting, replace the computer box.

DATE=11/06/91
 TIME=12:04P
 LOT #=1234
 DRY TO 16.0
 METER CAL=+1.5
 RDGD TO AVE=4
 MAX TEMP=160F
 OPR PNT=160F

TIME	MOIST RDG	GRAIN TEMP	MOIST AVE	MACH STAT	OPR PNT	PLENUM TEMP
12:06P	16.9	115F	16.9	OFF	160F	132F
12:17P	16.4	119F	16.6	OFF	160F	129F
12:28P	16.0	123F	16.4	ON	160F	131F
12:34P	15.5	124F	16.2	ON	160F	127F
12:40P	15.4	123F	15.8	ON	160F	133F
12:46P	15.2	122F	15.5	ON	160F	130F
12:52P	14.7	125F	15.2	ON	157F	129F
12:58P	15.0	124F	15.0	ON	157F	129F
01:04P	15.4	123F	15.0	ON	157F	130F
01:10P	15.7	119F	15.2	ON	157F	130F
01:16P	16.0	118F	15.5	ON	157F	131F
01:22P	16.8	115F	15.9	ON	159F	132F
01:28P	17.0	109F	16.3	OFF	160F	131F
01:39P	16.9	105F	16.6	OFF	160F	130F
01:50P	16.7	100F	16.8	OFF	160F	131F
02:01P	16.8	102F	16.8	OFF	160F	131F
02:12P	16.9	105F	16.8	OFF	160F	130F
02:23P	17.1	103F	16.8	OFF	160F	130F
02:34P	16.8	102F	16.9	OFF	160F	131F
02:45P	16.7	104F	16.8	OFF	160F	130F
02:56P	16.5	105F	16.7	OFF	160F	129F
03:07P	16.4	109F	16.6	OFF	160F	129F
03:18P	16.2	115F	16.4	OFF	160F	130F
03:29P	16.0	118F	16.2	ON	160F	129F
03:35P	15.9	120F	16.1	ON	160F	129F
03:41P	15.8	121F	15.9	ON	160F	130F
03:47P	16.4	117F	16.0	ON	160F	130F
03:53P	16.7	115F	16.2	OFF	160F	131F
04:04P	16.6	114F	16.3	OFF	160F	130F
04:15P	16.8	112F	16.6	OFF	160F	130F
04:26P	16.6	115F	16.6	OFF	160F	131F
04:37P	16.5	116F	16.6	OFF	160F	131F
04:48P	16.3	118F	16.5	OFF	160F	131F
04:49P	16.2	119F	16.4	OFF	160F	130F
05:00P	16.1	120F	16.2	OFF	160F	131F

Burner is not getting up
 to the temperature the
 Compudry is calling for.

In this case, the
 Compudry wants 160F, and
 is only getting 130F.

Drying capacity is
 slowed down.

Increase the gas
 pressure.

DATE=11/16/91
 TIME=12:04P
 LOT #=0034
 DRY TO 16.0
 METER CAL=+1.5
 RDGD TO AVE=4
 MAX TEMP=160F
 OPR PNT=160F

TIME	MOIST RDG	GRAIN TEMP	MOIST AVE	MACH STAT	OPR PNT	PLENUM TEMP
12:06P	16.9	115F	16.9	OFF	160F	162F
12:17P	16.4	119F	16.6	OFF	160F	159F
12:28P	16.0	123F	16.4	ON	160F	161F
12:34P	15.5	124F	16.2	ON	160F	157F
12:40P	15.4	123F	15.8	ON	160F	160F
12:46P	15.2	122F	15.5	ON	160F	160F
12:52P	14.7	125F	15.2	ON	157F	159F
12:58P	14.4	128F	14.9	ON	154F	159F
01:04P	14.1	133F	14.6	ON	151F	165F
01:10P	13.7	134F	14.2	ON	145F	155F
01:16P	13.8	133F	14.0	ON	139F	161F
						ERROR
						PLENUM TOO HOT
01:22P	13.8	135F	13.8	ON	133F	162F
						ERROR
						PLENUM TOO HOT
01:28P	13.9	132F	13.8	ON	127F	151F
						ERROR
						PLENUM TOO HOT
01:34P	13.6	135F	13.7	ON	121F	160F
						ERROR
						PLENUM TOO HOT
01:40P	14.0	130F	13.8	ON	128F	164F
						ERROR
						PLENUM TOO HOT
01:46P	13.8	132F	13.8	ON	122F	161F
						ERROR
						PLENUM TOO HOT
01:52P	13.9	133F	13.8	ON	116F	154F
						ERROR
						PLENUM TOO HOT

"ERROR PLENUM TOO HOT"

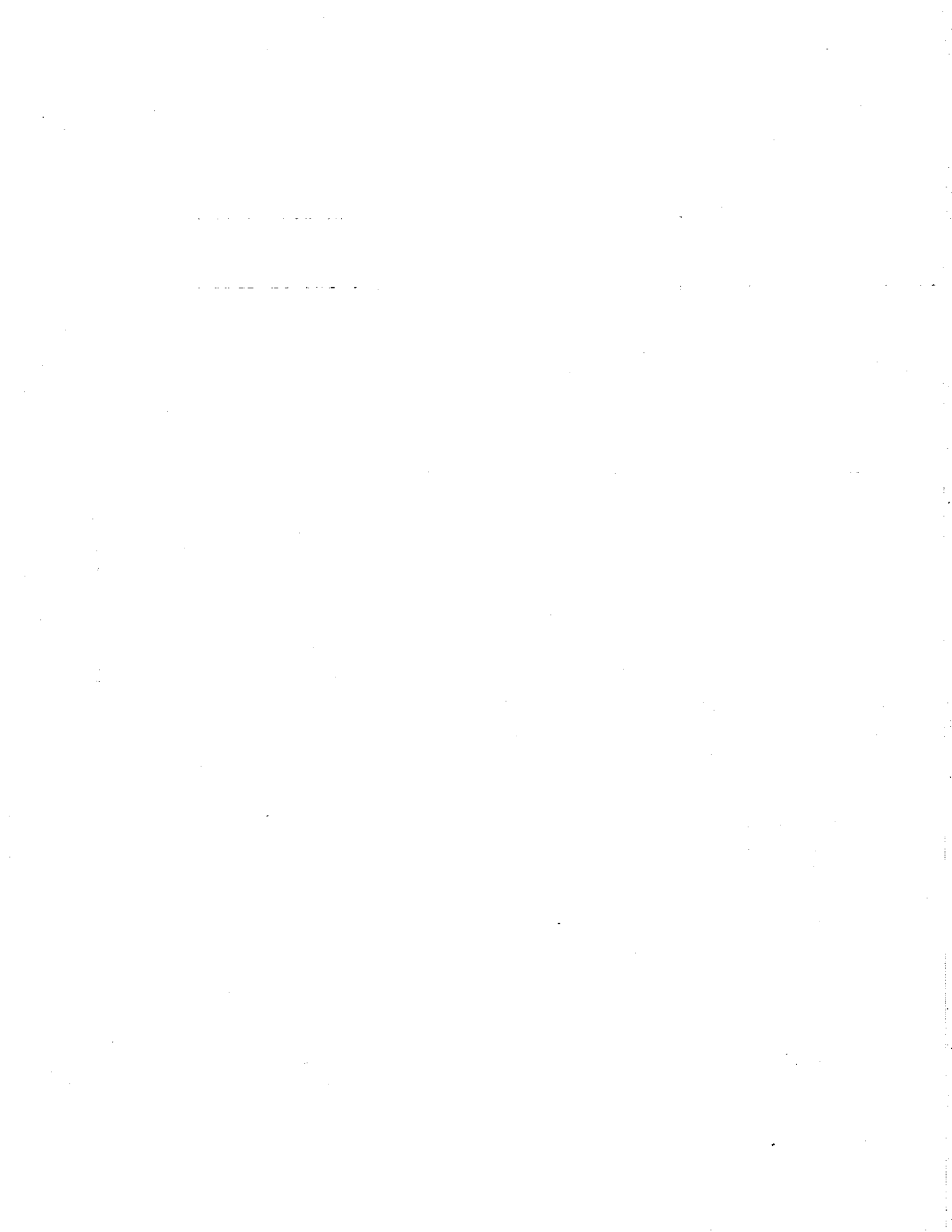
Buzzer beeps and error prints out, but computer keeps running.

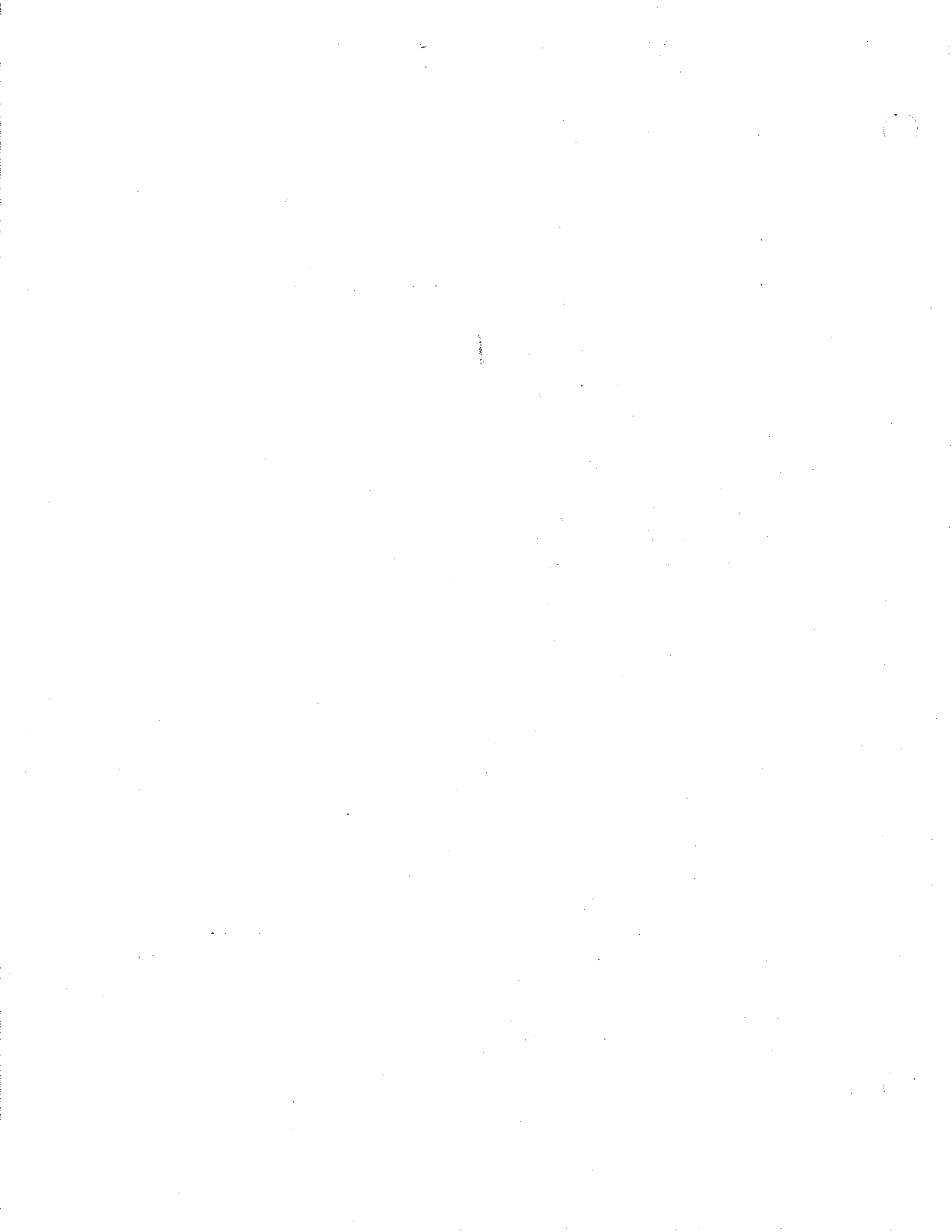
This error occurs when the plenum temp reading is more than 20F above the Operating Point.

It is usually caused by the plenum T-stat not being turned to its lowest setting.

It could be caused by a stuck gas valve, or shorted plenum T-stat.

If the burner shuts off when the Compudry is shut off, it could be a bad computer box.

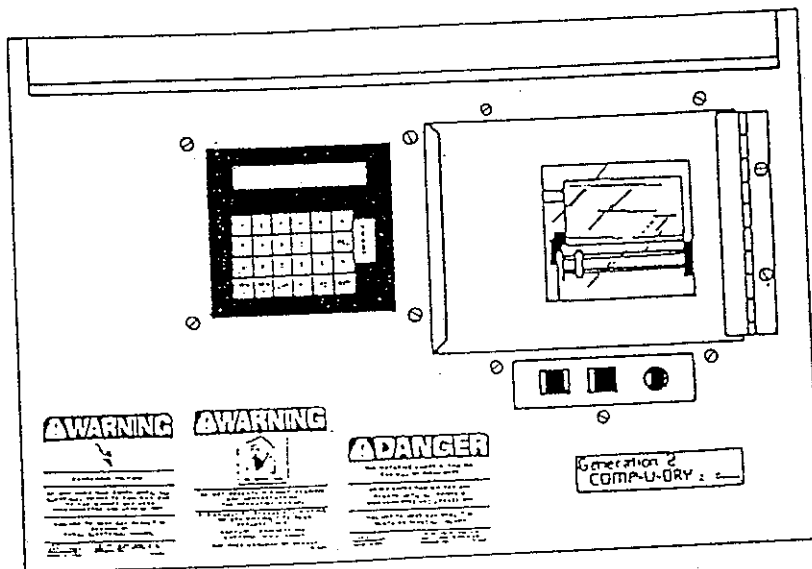




DELUXE COMP-U-DRY

Generation 2

By Shivers



TECHNICAL MANUAL

Shivers Incorporated
614 West English
Corydon, Iowa 50060
515/872-1005

P-10701
2/19/92

()

()

INTRODUCTION to TROUBLESHOOTING

THE GENERATION 2 COMP-U-DRY

THESE TROUBLESHOOTING CHARTS WILL GIVE THE MOST LIKELY CAUSE OF A PROBLEM. THEY ASSUME A GENERAL KNOWLEDGE OF THE DRYING SYSTEM AND ITS TERMINOLOGY. THEY ASSUME THAT EVERYTHING WAS WIRED CORRECTLY AND HAS BEEN WORKING. IN SOME CASES THEY MAY HELP TROUBLESHOOT INITIAL WIRING PROBLEMS. THEY WILL NOT WORK IN ALL SITUATIONS, AND IT IS ALWAYS POSSIBLE THERE IS MORE THAN ONE PROBLEM.

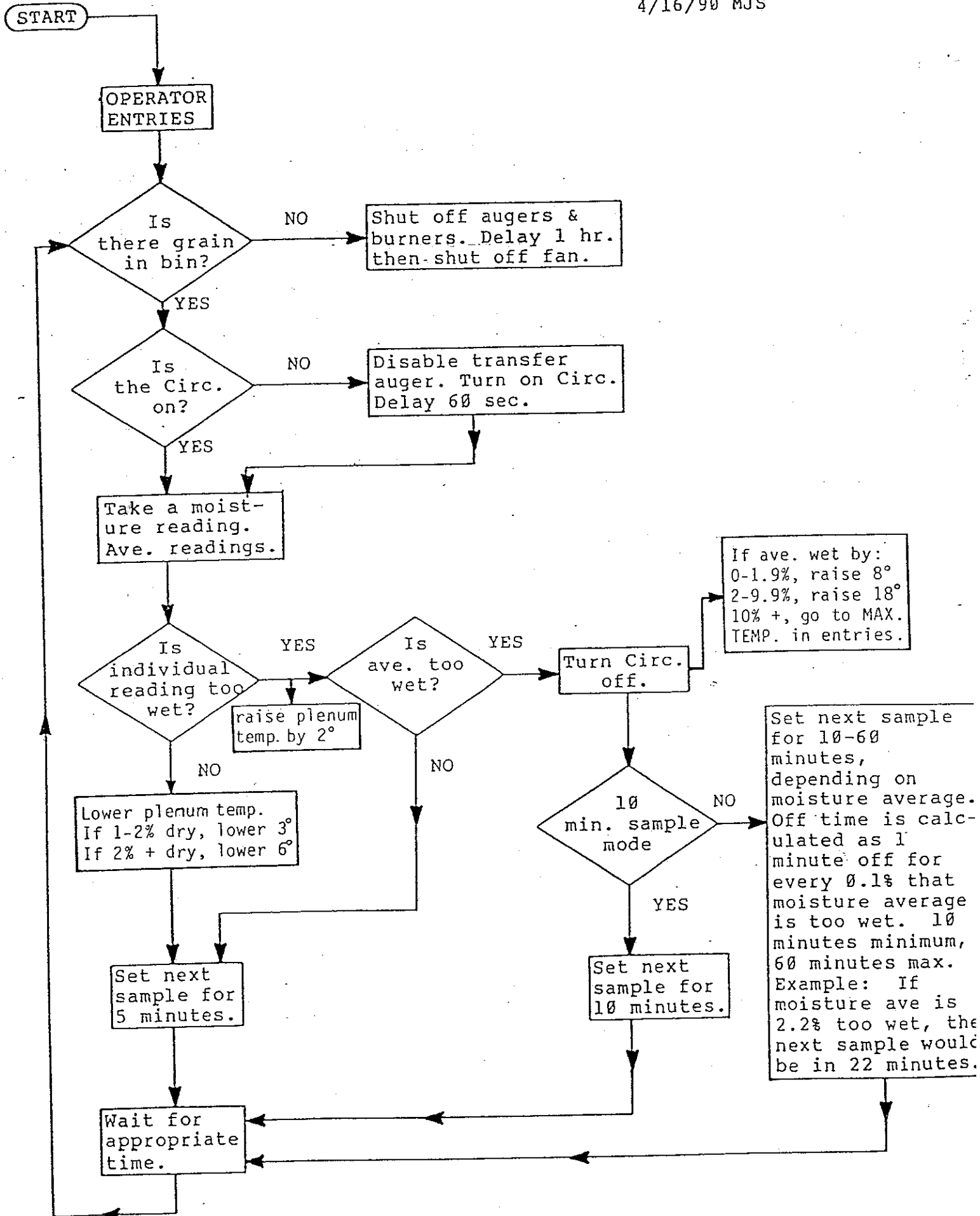
WHEN SHOWING COMPUTER DISPLAYS, AN "x" MEANS ANY VALUE IS PROBABLY OK. FOR EXAMPLE, "xxxF" COULD BE 120F OR 075F.

***** WARNING *****



IN SOME CASES, IT IS NECESSARY TO TAKE VOLTAGE MEASUREMENTS WHILE THE CIRCUIT IS "HOT". THESE CHECKS SHOULD BE PERFORMED ONLY BY EXPERIENCED AND COMPETENT SERVICE PERSONNEL. VOLTAGE LEVELS MAY BE AS HIGH AS 220 VOLTS. PERSONAL INJURY IS POSSIBLE. COMPUTER COMPONENTS AND CIRCUIT BOARD TRACES ARE VERY SENSITIVE. THEY MAY BE DESTROYED BY SHORT CIRCUITS. IF YOU ARE IN DOUBT ABOUT WHAT YOU ARE DOING, DON'T DO IT. SHUT ALL POWER OFF, AND REPLACE THE MAIN ASSEMBLIES UNTIL THE PROBLEM IS FIXED.

***** WARNING *****





OPERATING POINT

The operating point is the computer calculated temperature that is required in the plenum to obtain grain of the desired moisture. There is an entry in the start up procedure to set the "initial operating point" for a starting temperature. This is only a starting temperature. After the Comp-U-Dry obtains a grain sample, the operating point is computer controlled, as determined by the moisture average of the grain samples.

The operating point is programmed to allow a 1% (dry) variation in moisture without a change. If the selected moisture is 16.5%, the operating point will not be changed if the moisture average is between 16.5% and 15.5%. If the average moisture is above 16.5% the operating point will be raised. The amount the temperature is raised is determined by how much over the set point the moisture average is. In no case, will the operating point be raised above the maximum temperature.

If the moisture average is more than 1% less than the set point, (in this example, the moisture would be less than 15.5%) the computer will lower the operating point a small amount, to slow the drying rate. If the next moisture level is still too dry, the operating point will again be lowered a small amount.

As the grain drying process continues, the operating point will probably continue to be adjusted, trying to find equilibrium, where the grain is at the desired moisture without overdrying. In most installations, perfect equilibrium will be impossible to achieve because of variations of the heat under the floor (within the bin) and variations of grain depth and grain moisture. If the drying conditions are conducive to it, the operating point may go lower than the outside temperature, resulting in natural air drying while maintaining the capacity of the machine.

CONTROL CHECK

There is a program execution monitor in the G2 COMPUDRY which will shut off control power if the program stops running. This feature is checked by the computer at the next sample after 6:00 and 12:00. Program version numbers 2.6, or later, do this check only once a day, at 6:00 AM. The computer does the following:

- 1) Displays "CONTROL CHECK".
- 2) Disables program execution monitor.
- 3) Shuts off machine (circulator), and burner fire.
- 4) Waits 80 seconds. Time-out light should come on during this time.
- 5) Tries to turn on machine (circulator). It shouldn't come on.
- 6) Reads moisture meter five times.
- 7) If readings are all the same, assumes that the machine is indeed disabled, and continues with step 8. If the readings are changing, assumes that the machine is running. Tries reading the moisture meter five more times. If the readings are still changing, prints out:

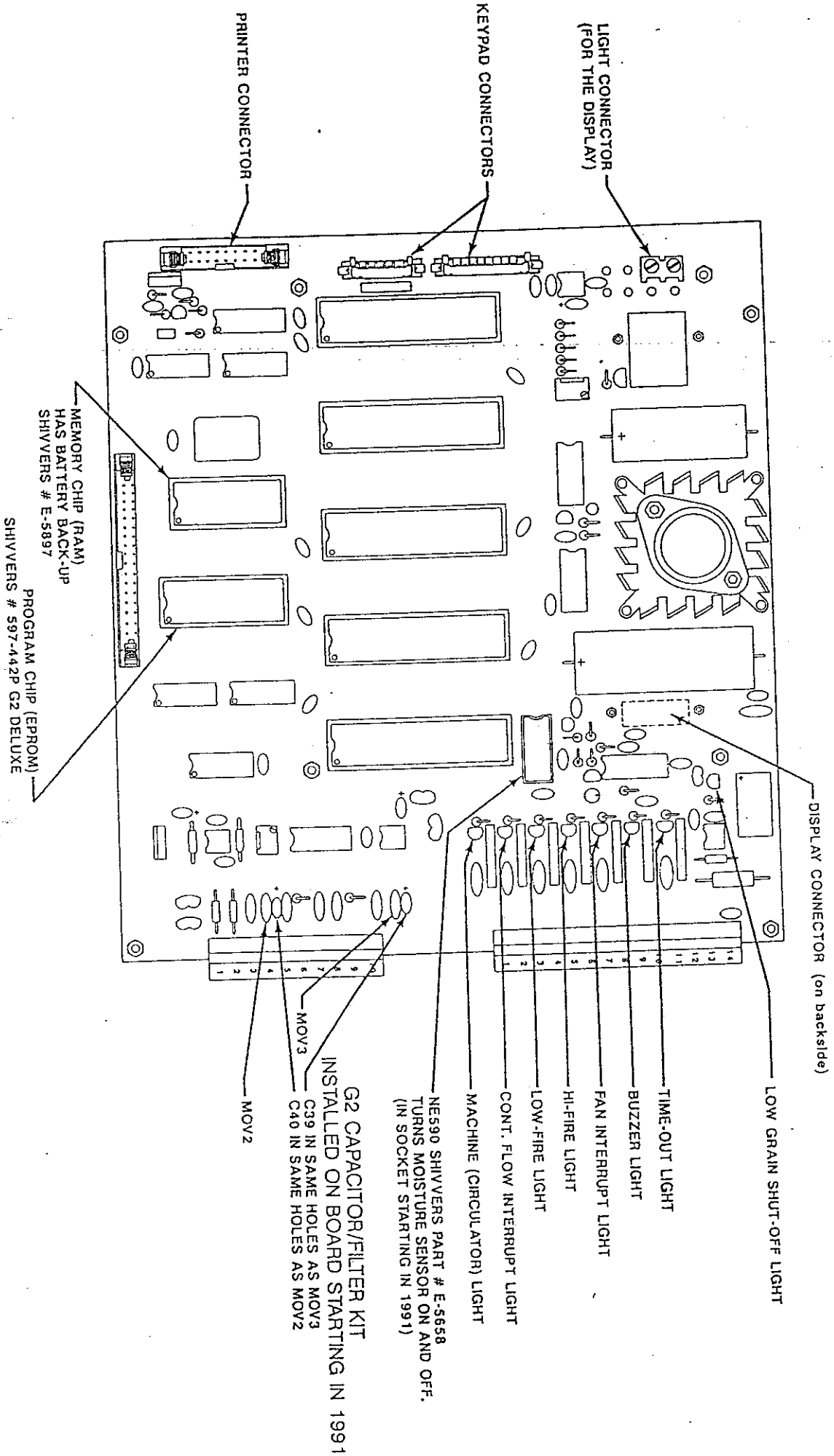
----- CAUTION -----
COMPUDRY CONTROL INTERRUPT INOPERATIVE.
SEE OWNERS MANUAL. SERVICE IMMEDIATELY.
----- CAUTION -----

Also sets the buzzer so it will beep on and off.
Continues with step 8.

- 8) Turns machine (circulator), off. (It never should have come on). Reenables the program execution monitor. The Time-out light should go off at this time.
- 9) Prints out 6 hour information, and continues drying.



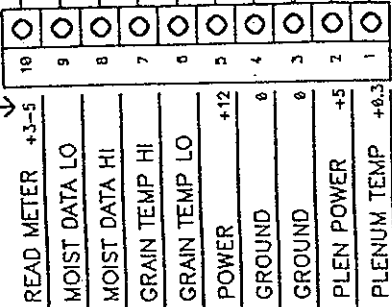
G2 COMPUTER CONTROL BOARD





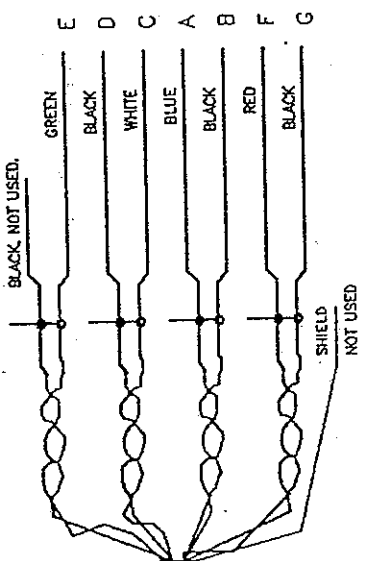
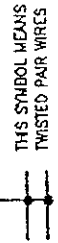
VOLTAGES ARE APPROXIMATE
DC VOLTS WITH REFERENCE TO
GROUND (TERM. 3 OR 4).

ONLY WITH GOOD MOISTURE
SENSOR ATTACHED AND GOOD
COMPUTER BOX.



10 POLE
** PLUG

+0.273 VOLTS AT 032F
+0.373 VOLTS AT 212F

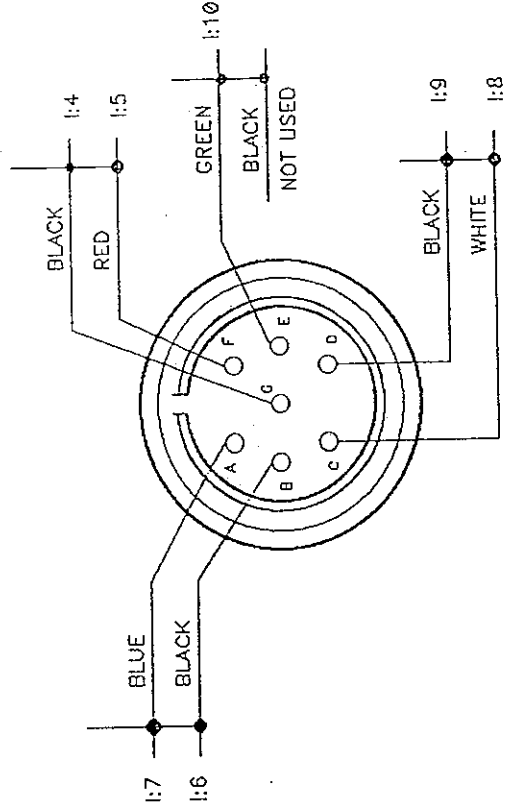


MOISTURE CABLE

MOISTURE CABLE

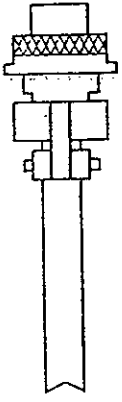
PLENUM TEMP
CABLE

BLACK NOT USED.



END VIEW

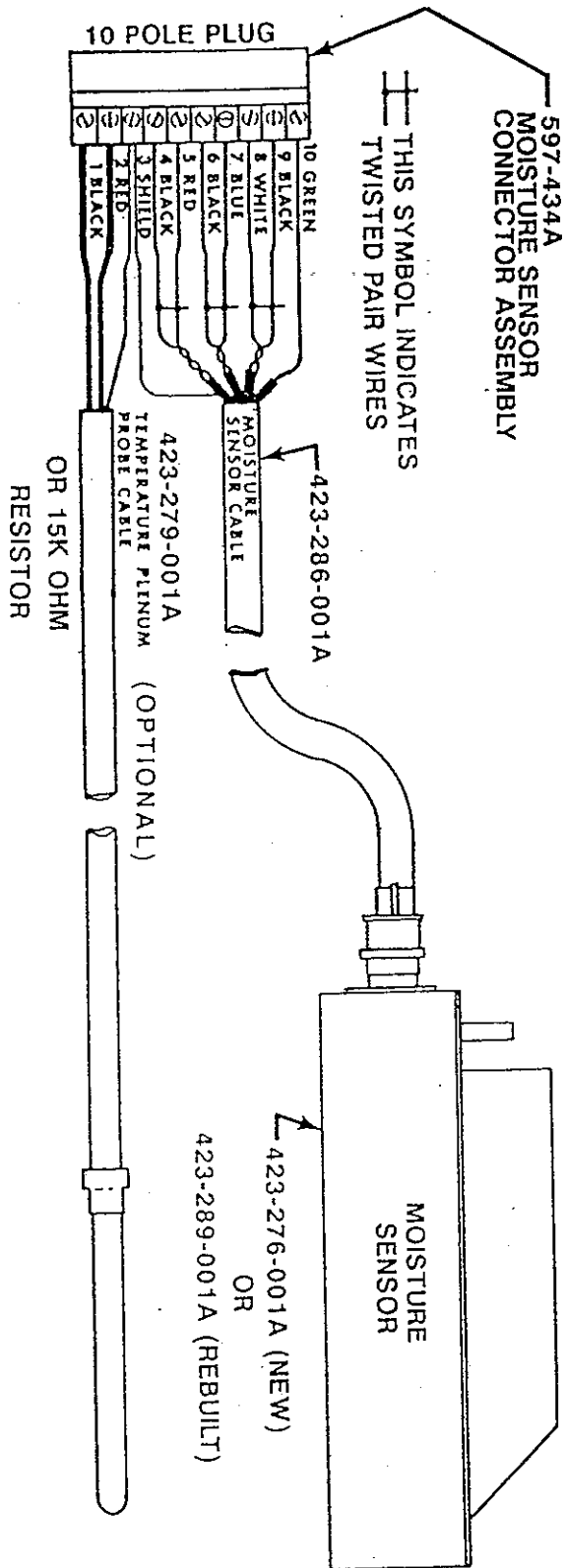
UNSCREW ONLY THIS PART
WHEN DISCONNECTING
MOISTURE SENSOR.



SIDE VIEW

Title G2 DELUXE LOW VOLTAGE WIRING DETAIL	
Size Number C	Rev
Date 3/13/91	Drawn by MS
Filename LOWV01S01	Sheet 1 of 1

TEST TOOL

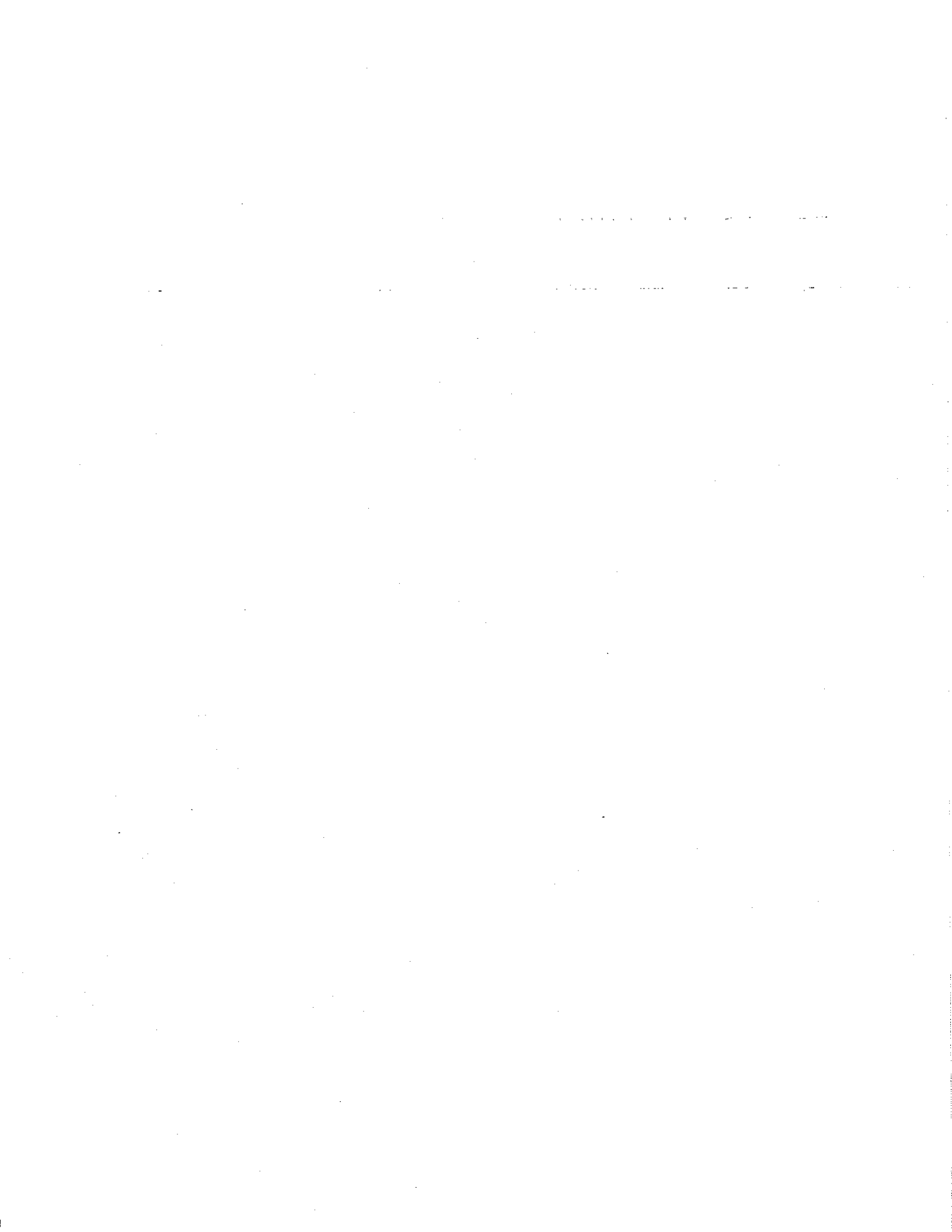


SHUT POWER OFF. UNPLUG THE 10 POLE "I" PLUG. PLUG IN THE TEST TOOL. TURN THE POWER ON. GET INTO THE MENU. SELECT "2 READ METER". MAKE SURE NOTHING IS TOUCHING THE "FLAG". IF COMPUTER BOX IS GOOD, THE DISPLAY SHOULD SHOW:

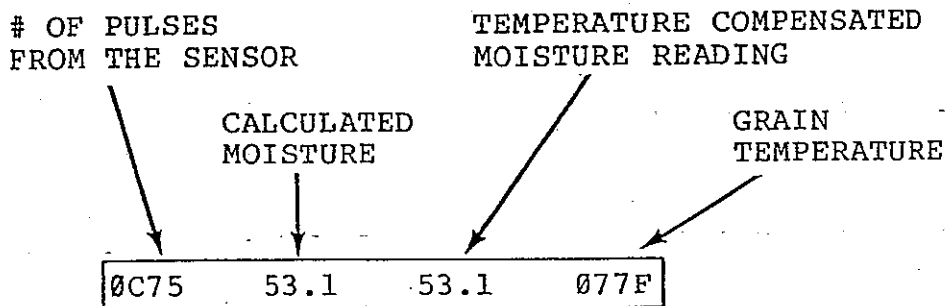
0Cxx xx.x xx.x xxxF

x = ANY NUMBER OR LETTER

AMBIENT TEMPERATURE



MENU READ METER



Empty chamber reading, (no grain around the sensor). Can range from 0C40 to 0C90. Number of pulses should not vary by more than 1 or 2 pulses each time RET key is pressed.

0D6E	16.1	15.0	100F
------	------	------	------

Grain is around the sensor. Can range from 0CCE to 0F00. Number of pulses will vary with moving grain.

0000	44.9	46.2	050F
------	------	------	------

Something is wrong. Either the sensor is wet or bad, or the computer board is not turning the sensor on and off at the proper times. Voltage is getting to the sensor because it is sending a grain temperature.

0000	44.9	43.8	000F
------	------	------	------

Power is either not getting to the sensor, or the sensor is bad, because there is not any grain temperature. Check connections on 10 pole "I" plug, especially the red wire in terminal #5.

DATE=10/26/91
 TIME=12:04P
 LOT #=0001
 DRY TO 16.0
 METER CAL=+0.0
 RDGD TO AVE=4
 MAX TEMP=160F
 OPR PNT=160F

TIME	MOIST RDG	GRAIN TEMP	MOIST AVE	MACH STAT	OPR PNT	PLENUM TEMP
12:06P	16.9	115F	16.9	OFF	160F	162F
12:17P	16.3	119F	16.6	OFF	160F	159F
12:28P	15.9	122F	16.3	ON	160F	161F
12:34P	15.5	125F	16.1	ON	160F	157F
12:40P	15.8	123F	15.8	ON	160F	163F
12:46P	15.2	128F	15.6	ON	160F	160F
12:52P	14.9	130F	15.3	ON	157F	155F
12:58P	15.3	127F	15.3	ON	157F	159F
01:04P	16.2	120F	15.4	ON	159F	161F
01:10P	16.8	116F	15.8	ON	160F	160F
01:16P	17.0	112F	16.3	OFF	160F	158F

ERROR READ=0000

READ=49.3 READ=47.4

REDO

01:29P	16.5	115F	16.6	OFF	160F	162F
01:40P	16.0	121F	16.5	ON	160F	162F
01:45P	15.8	125F	16.3	ON	160F	160F
01:51P	15.9	124F	16.0	ON	160F	155F
01:57P	15.5	127F	15.8	ON	160F	159F
02:03P	15.7	125F	15.7	ON	160F	162F
02:09P	16.1	120F	15.8	ON	160F	159F
02:15P	16.8	115F	16.0	ON	160F	163F
02:21P	16.1	119F	16.1	OFF	160F	160F
02:32P	16.0	121F	16.2	ON	160F	159F
02:38P	15.8	125F	16.1	ON	160F	156F
02:44P	15.9	124F	15.9	ON	160F	158F
02:50P	16.1	122F	15.9	ON	160F	162F

ERROR READ=0000

READ=51.2 READ=49.3

REDO

ERROR READ=0000

READ=51.3 READ=49.4

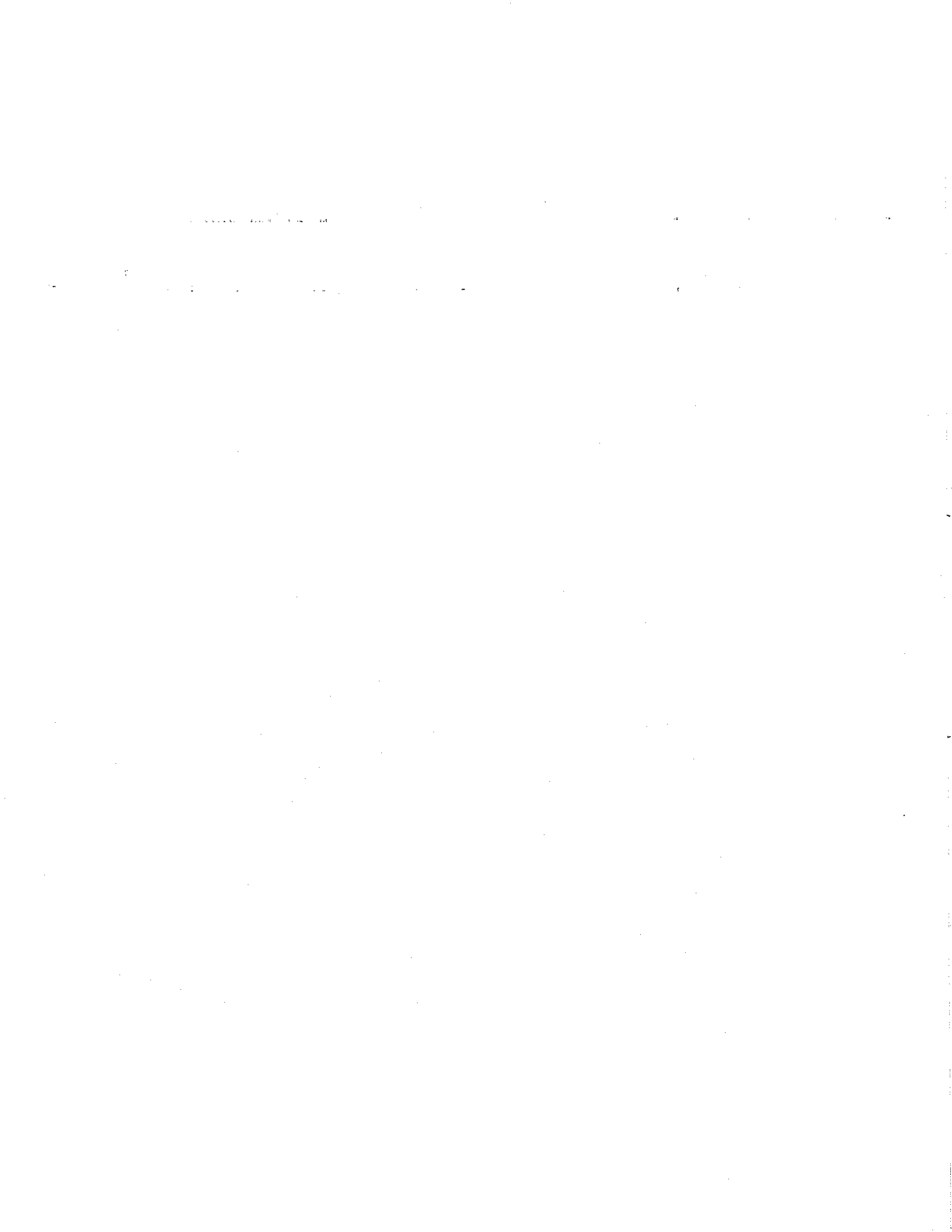
ERROR

READING OUT OF RANGE

Intermittent "ERROR READ=0000". Sometimes will "REDO" and go ahead and run. Sometimes gets two in a row and shuts down on "ERROR READING OUT OF RANGE". Circulator or Cont. Flow augers may also turn on and off at improper times.

Make sure that a Capacitor/Filter Kit is installed; either on the 10 pole "I" plug, or soldered onto the main computer board.

Check for a good connection with the green wire on terminal #10 of the 10 pole "I" plug.



SELECT ONE
 F1 RESUME
 1 MENU
 4 DRY GRAIN

METER CAL=+0.0
 ENTERED +1.0

-----RESUMED DATA -----

DATE=10/30/91
 TIME=07:04P
 LOT #=0000
 DRY TO 16.5
 METER CAL=+1.0
 RDGD TO AVE=6
 MAX TEMP=140F
 OPR PNT=133F

TIME	MOIST RDG	GRAIN TEMP	MOIST AVE	MACH STAT	OPR PNT	PLENUM TEMP
ERROR	READ=0000					
ERROR	READ=0000					
ERROR	READ=0000					
ERROR	READ=0000					
ERROR	READ=0000					
ERROR	READ=0000					
ERROR	READ=0000					
ERROR	READ=0000					
ERROR	READ=0000					
ERROR	READ=0000					
READ=44.9	READ=44.9					
REDO						
ERROR	READ=0000					
ERROR	READ=0000					
ERROR	READ=0000					
ERROR	READ=0000					
ERROR	READ=0000					
ERROR	READ=0000					
ERROR	READ=0000					
ERROR	READ=0000					
ERROR	READ=0000					
READ=44.9	READ=44.9					
ERROR						
READING OUT OF RANGE						
READINGS NOT CHANGING						

Ten "ERROR READ=0000" readings in a row, then a "REDO", with ten more "ERROR READ=0000". Then "ERROR READING OUT OF RANGE", and "READINGS NOT CHANGING". On program versions G2.7 and above, it will also print a grain temperature. For example:
 "ERROR READ=0000 115F"

This is probably one of the most common errors, and unfortunately, it is the hardest to diagnose because it can be so many different things.

Could be a wet or dirty moisture sensor.

Check for a good connection on the green wire to terminal #10 of the 10 pole "I" plug.

Replace the Moisture Sensor or substitute the sensor and cable. If it is not the Moisture Sensor, replace the NE590 if it is in a socket. If it is not in a socket, replace the Computer Box.

It could also be the Moisture Cable, but not very likely.

