

MSC-20

2 Natural zones with Poly-vent Curtain

Configuration#:20MF23V7

Input/Output Table:

Inputs	Qty	Outputs	Qty
Inside Temperature	2	Variable Speed Stage	2
		On/Off Stage	2
		Natural Poly-vent Curtain	4
		Cooling	1
		Heater	1

Equipment Required:

Item	Description	Qty
MSC-20*	Multistage 20 Computer	1
CM10-2	Control Module 10 Amp	2
CM3-2	Control Module 4 Amp	4
VSM-2	Variable Speed Module	3
2004-1k	Temperature Probe	2

* MSC software 228 and up only.

Configuration Versions:

Version	Date	Modification
v0	94-06-16	New configuration created to meet the request as detailed in Multifan Fax #118 dated 94-06-14.
v1	94-11-18	Rectifies the fan 1 stopping during minimum ventilation
v2	94-12-21	Fan 2 is tied to Fan #1 and turns at min. speed below DRT
v3	95-08-31	From v1, duplicates the Fans 1 and 2
v4	95-02-23	From v3, min speed of Fan 1 and 2 can be adjusted separately.
v4b	96-07-09	Prevent curtain #2 to inflate under some undesired conditions.
d4	00-01-24	Heater works on the average of the sensors 1 and 2.
v6	05-11-15	- 2 probe inputs instead of 4, one for North and one for South. - Logic changed for curtains, now North Upper/Lower and South Upper/Lower. - Heater differential added. - Separate RSP for North and South, Lower and Upper added. - Option to shutoff fans 3&4 added. - Fans 3&4 are now on/off stages.
v7	06-01-03	Correction on fan 1 to run at minimum speed below DRT.

CONTROL LOGIC DESCRIPTION

CONFIGURATION 20MF23V7

1. GENERAL

1.1 Definitions.

In the following MSC-20 control logic description, we used the following terminology:

DRT → **Desired Room Temperature.** This is the temperature goal for the room. It is also the reference temperature for all relative set points.

RSP → **Relative Set Point.** Number of degrees relative to the DRT where a function is activated

Differential: Range of temperature where two conditions are possible. The output depends on whether the temperature was increasing or decreasing when it enters that range. For example, for a differential of 2°F in ventilation, the controller will turn on the fan at the RSP when temperature increases, but it will turn off the fan only at RSP - 2°F when the room is cooling down.

Bandwidth: Temperature range where a fan speeds up as the temperature increases. It turns at minimum speed at the RSP and reaches the maximum speed at RSP + Bandwidth.

-Every expression in *italics* is a control value which can be changed on the control.

1.2 Ventilation System Overview

This configuration controls the ventilation of a building having 2 natural zones and where the curtains are Poly-vent type.

2. LOGIC DESCRIPTION

2.1.Heater

- Works on the average of the temperature sensors.
- The heater will turn on at its Relative Set Point (RSP) when the temperature decreases.
- Differential = 2°F; if heater turns on at 70°F, it will shut off at 72°F.

2.2. FAN #1, Minimum Ventilation

- 2 outputs with the same function.
- Below DRT, the fan#1 runs at minimum speed.
- At DRT, the fan speeds up to reach the maximum speed at the end of the Bandwidth.
- Above DRT + BW, the fan runs at maximum speed if the *FANS #1&2 NAT. SHUTOFF = 0* (Off); otherwise (*SHUTOFF=1*), this fan shuts off after **all** of the four polyvent curtains have reached their respective *NAT. STG#1 DEFLATE RSP* and it turns back on at the instant that **one** curtain is inflating its lower section.
- The controller uses the average of temperature sensors to determine the room temperature .

2.3 FAN #2, Second stage of minimum ventilation

- 2 outputs with the same function.
- Below DRT + RSP, the fan#2 is OFF.
- Between RSP and RSP + Band Width (BW), the fan speeds up to reach the maximum speed at the end of the BW.
- Above RSP + BW, the fan runs at maximum speed if the *FANS #1&2 NAT. SHUTOFF = 0* (Off); otherwise (*SHUTOFF=1*), this fan shuts off after **all** of the four polyvent curtains have reached their respective *NAT. STG#1 DEFLATE RSP* and it turns back on at the instant that **one** curtain is inflating its lower section.
- The controller uses the average of temperature sensors to determine the room temperature.

2.4 FANS #3, #4 , Circulation ventilation

- Below DRT + RSP, the fan#3(or 4) is OFF.
- Fan#3(or 4) turns ON when average temperature reaches DRT + respective RSP.
- Differential is 2°F.
- Above DRT + RSP, if the *FANS #3&4 NAT. SHUTOFF = 0* (Off); otherwise (*SHUTOFF=1*), these fans shut off after **all** of the four polyvent curtains have reached their respective *NAT. STG#1 DEFLATE RSP* and it turns back on at the instant that **one** curtain is inflating its lower section.
- The controller uses the average of temperature sensors to determine the room temperature.

2.5 Natural Polyvent Ventilation

- 2 stages (Lower and Upper).
- The **first stage** (Lower) of natural ventilation begins at the *NORTH/SOUTH DEFLATE RSP LOWER*. At this point, and as the temperature increases, the **lower section** of the polyvent curtain is deflating by turning off the blower motor.
- The **second stage** (Upper) of natural ventilation begins at the *NORTH/SOUTH DEFLATE RSP UPPER*. At this point, and as the temperature increases, the **upper section** of the polyvent curtain is deflating by turning off the blower motor. However, there is a delay for the upper section to deflate after the lower section has deflated.
- The delay is at least 1 minute but maximum 2.
- Differential = 2°F: as the zone is cooling down, the curtain starts to inflate at its DRT +RSP - 2°F.
- Each curtain operates independently with its own respective sensor.

2.6 Cooling

- Works on a 20 minute timer (adjustable Duty Cycle).
- Differential is 2°F.
- The controller uses the average temperature sensors to determine the room temperature.

3. INSTALLATION NOTES

The guidelines in the **Varifan MSC-20 Installation and User's guide** shall be followed for a safe installation. In addition, that manual provides you with more details on temperature sensor installation and on the power source connection. Also, it is strongly recommended to use a separate thermostat, such as an ECS-1, on the fan #3 for instance, in order to provide an alarm relay and to provide a backup to MSC.

Refer to the **Wiring diagram** and the **Building layout diagram** in attachment for a typical installation.

ATTACHMENTS

- Control setting Table
- Labels
- Building layout diagram
- Wiring Diagram

MSC-20 CONTROL SETTINGS

DESCRIPTION	CONTROL VALUES						
	MIN	MAX	PRESET				
1. NORTH TEMP (°F)	41.5	111.0	*****				
2. SOUTH TEMP (°F)	41.5	111.0	*****				
3. DESIRED ROOM TEMP. DRT (°F)	41.5	111.0	70.0				
4. HEAT STAGE ON RSP (°F)	-2.0	-15.0	-4.0				
5. HEAT DIFFERENTIAL (°F)	0.5	5.0	1.0				
6. FAN #2 STAGE ON RSP (°F)	-10.0	30.0	0.0				
7. FAN #1 MIN. SPEED %	12	100	30				
8. FAN #2 MIN. SPEED %	12	100	30				
9. FANS #1&2 BANDWIDTH (°F)	1.0	10.0	2.0				
10.FAN #3 STAGE ON RSP (°F)	-10.0	30.0	2.0				
11.FAN #4 STAGE ON RSP (°F)	-10.0	30.0	4.0				
12.NORTH DEFLATE RSP LOWER (°F)	0.0	30.0	3.0				
13.NORTH DEFLATE RSP UPPER (°F)	0.0	30.0	5.0				
14.SOUTH DEFLATE RSP LOWER (°F)	0.0	30.0	3.0				
15.SOUTH DEFLATE RSP UPPER (°F)	0.0	30.0	5.0				
16.COOLING STAGE ON RSP (°F)	0.0	30.0	15.0				
17.COOLING CYC. (20 MIN.) %	0	100	50				
18.FANS #1&2 NAT. SHUTOFF	0 (OFF)	1(ON)	1				
19.FANS #3&4 NAT. SHUTOFF	0 (OFF)	1(ON)	1				
20.							

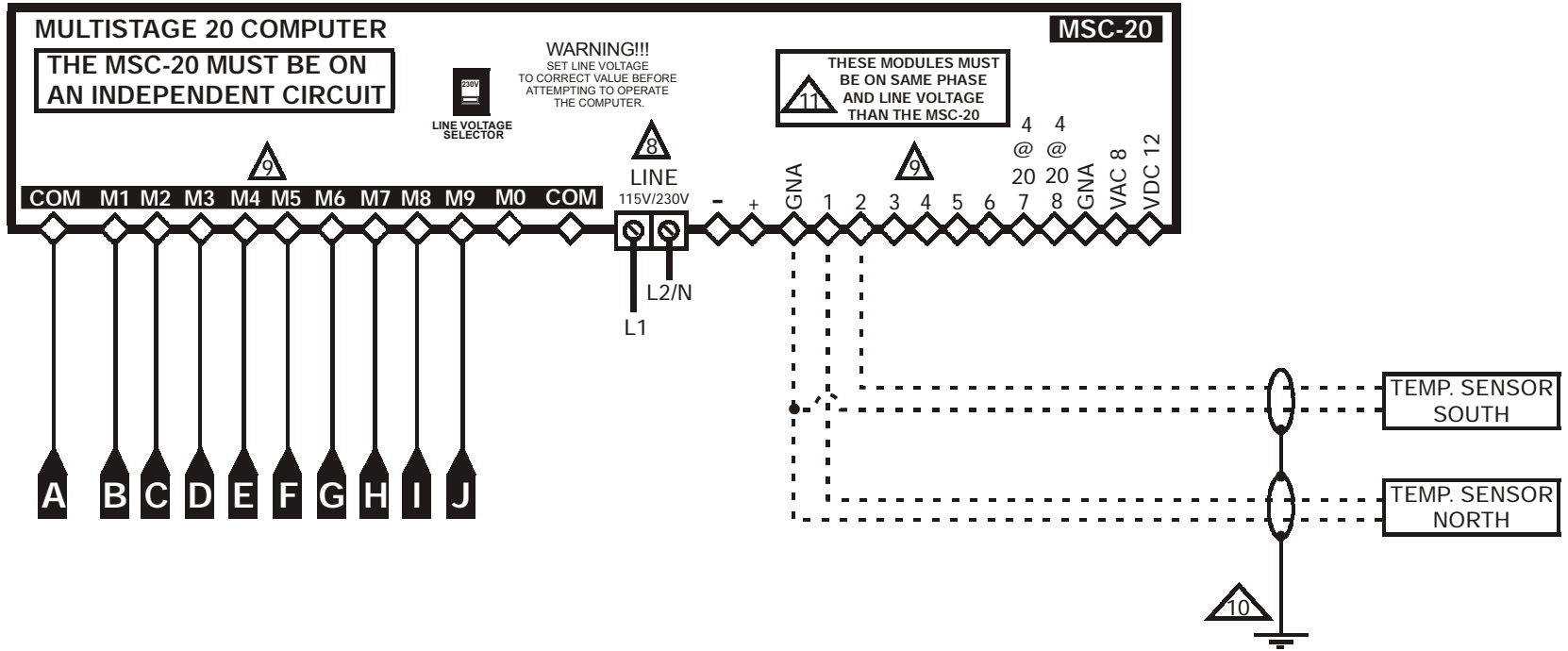
NOTES: -The PRESET values are factory set. This is the initial state of the computer.
 -Use the blank spaces for your personal values.

Cut along the dashed line

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|20MF23v7 Configuration |
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|
Input 1 |NORTH TEMP          °F|<23 character wide
2       |SOUTH TEMP          °F|
3       |DESIRED ROOM TEMP.  DRT|
4       |HEAT STAGE ON      RSP|
5       |HEAT DIFFERENTIAL  °F|
6       |FAN #2 STAGE ON    RSP|
7       |FAN #1 MIN.SPEED  %|
8       |FAN #2 MIN.SPEED  %|
9       |FANS #1&2 BAND WIDTH °F|
10      |FAN #3 STAGE ON    RSP|
11      |FAN #4 STAGE ON    RSP|
12      |NORTH DEF. LOWER  RSP|
13      |NORTH DEF. UPPER  RSP|
14      |SOUTH DEF. LOWER  RSP|
15      |SOUTH DEF. UPPER  RSP|
16      |COOLING STAGE ON  RSP|
17      |COOLING CYC.(20 MIN.) %|
18      |FANS #1&2 NAT. SHUTOFF |
19      |FANS #3&4 NAT. SHUTOFF |
20      |
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|
output 1 |HEAT STAGE    ON |
2       |COOLING STAGE ON |
3       |NORTH LOWER INFLATE |
4       |NORTH UPPER INFLATE |
5       |NORTH LOWER INFLATE |
6       |NORTH UPPER INFLATE |
7       |SOUTH LOWER INFLATE |
8       |SOUTH UPPER INFLATE |
9       |SOUTH LOWER INFLATE |
10      |SOUTH UPPER INFLATE |
11      |FAN #1 STAGE ON    |
12      |FAN #2 STAGE ON    |
13      |FAN #1 STAGE ON    |
14      |FAN #2 STAGE ON    |
15      |FAN #3 STAGE ON    |
16      |FAN #4 STAGE ON    |
17      |FAN #3 STAGE ON    |
18      |FAN #4 STAGE ON    |
19      |
20      |
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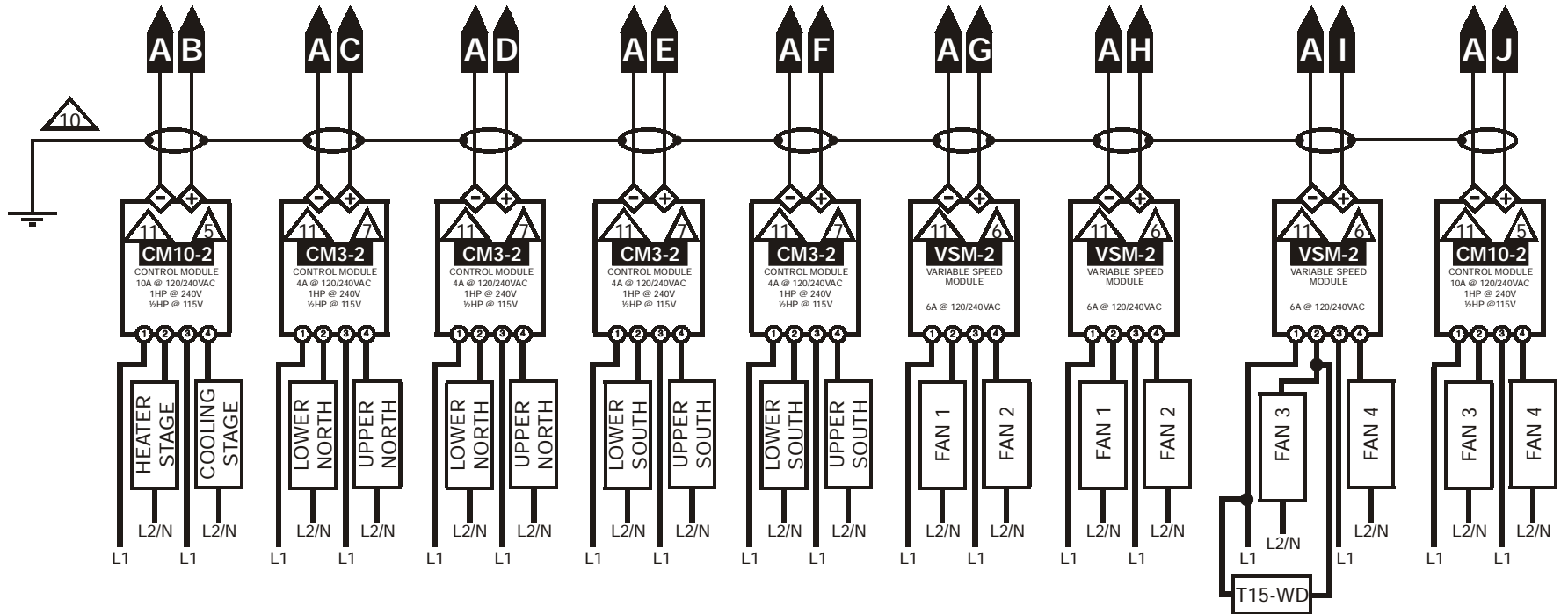
WIRING DIAGRAM CONFIGURATION 20MF23V7



SEE NOTES ON PAGE 10

Varifan ®			
WIRING DIAGRAM			
04/01/06	DRAWN	Yanick Alain	FILE /DIAG/IC/20MF23V7
	CONFIGURATION	20MF23V7	WIR 0

WIRING DIAGRAM FOR MODULES CONFIGURATION 20MF23V7



SEE NOTES ON PAGE 10

Varifan[®]			
WIRING DIAGRAM			
04/01/06	DRAWN Yanick Alain	FILE /04AGC/20MF23V7	
	CONFIGURATION 20MF23V7	WIR	REV 0

20MF23V7

Electrician's notes wiring tips and hints (see guide for details)

1 ----- (PROBE WIRING) SHIELDED WIRE AWG #18 WITH 16/30 STRANDING, 500FT/150M MAXIMUM LENGTH. (Ex.: DECA 73-310)
For other probe, refer to specific probe manual for appropriate maximum length and wire size or use AWG #18, 500FT/150M MAXIMUM LENGTH (whichever is shorter).

2 ————— (COMMUNICATION WIRING) SHIELDED LOW CAPACITANCE WIRE, (Capacitance between conductors @ 1Khz = 24PF/FT), TWISTED PAIR (8 twist/FT), AWG #18 TO 22, 750 FT/250 M MAX LENGTH. (Ex.: BELDEN 8761)

3 ————— HIGH VOLTAGE WIRE INSTALLED ACCORDING TO LOCAL WIRING CODE.

4 INSTALL LOW VOLTAGE WIRES (PROBES, COMPUTER LINK OR POTENTIOMETER WIRES) AT LEAST 12 INCHES (30cm) AWAY FROM HIGH VOLTAGE WIRES (120/230VAC, 24VDC). ALWAYS CROSS HIGH AND LOW VOLTAGE WIRES AT A 90-DEGREE ANGLE.



THE CURRENT SHALL NOT EXCEED 10A AT EACH OUTPUT (OUT 1-2).



THE CURRENT SHALL NOT EXCEED 6A AT EACH OUTPUT (OUT 1-2).



THE CURRENT SHALL NOT EXCEED 4A AT EACH OUTPUT (OUT 1-2).



MAXIMUM 2 WIRES OF SAME SIZE PER BLACK TERMINAL, NO BIGGER THAN AWG #12, NO SMALLER THAN AWG #22.



1 WIRE ONLY PER GREEN TERMINAL. USE WIRE CONNECTOR IF YOU WANT TO CONNECT MORE THAN 1 WIRE.



USE SHIELD FOR SHIELDING PURPOSE ONLY. NEVER LEAVE THE SHIELD UNCONNECTED AT BOTH ENDS. NEVER CONNECT BOTH ENDS OF THE SHIELD TO COMMON⊕. THE USE OF A SHIELD FOR ALL PROBES AND POTENTIOMETERS IS **MANDATORY**.



THESE MODULES MUST BE ON SAME POWER PHASE AND LINE VOLTAGE AS THE CONTROLLER.



WE RECOMMEND THAT YOU USE BACKUP THERMOSTAT FOR AT LEAST 1 FAN THAT WILL PROVIDE VENTILATION CASE OF EMERGENCY. THE SETTING OF THAT THERMOSTAT SHOULD BE AT LEAST 3 DEG F ABOVE THAT FAN OVERRIDE SET POINT.