MSC-10

Configuration#:10MF11v1

Inputs/Outputs Table

Inputs	Qty		Outputs	Qty
Inside temperature	2		Variable speed fan	2
			Single speed fan	1
			Sidewall Curtain	2
			Heater	1
			Cooling Stage	1
			Alarm relay	1

Equipment required:

Item	Description	Qty
MSC-10	Multistage 10 Computer	1
CM10-2	Control Module 10 Amp	
CM3-2	Control Module 3 Amp	
VSM-2	Variable Speed Module	
CIP-1	Curtain/Inlet Positionner	2
CIM-1	Curtain/Inlet Module	
ARM-1	Alarm Relay Module	
2004-1k	Temperature Probe	8
RHP-1	Relative Humidity Probe	

Configuration Versions:

Version	Date	Modification
v0	94-12-13	Created from 10MF06v1 but change the CIM-1 for CIP-1. Add interlock for Natural ventilation.
v1	95-12-01	Remove external temperature logic. Add a Natural Bandwidth, first move and a fan override setting.

Cut along the dashed lines

		10MF11v1 Configuration	
Input	1	CURTAIN #1 TEMP °F	<23 character wide
	2	CURTAIN #2 TEMP °F	
	3	DESIRED ROOM TEMP DRT	
	4	HEATER ON RSP	
	5	VAR FAN #1 ON RSP	
	6	VAR FAN #1 MIN SPEED %	
	7	VAR FAN #1,2 BANDWIDTH	
	8	VAR FAN #2 ON RSP	
	9	VAR FAN #2 MIN SPEED %	
	10	FAN #3 ON RSP	
	11	COOLING ON RSP	
	12	COOLING CYC (20 min) %	
	13	NATURAL OPEN RSP	
	14	NATURAL BANDWIDTH	
	15	NATURAL FIRST MOVE %	
	16	FAN #1 &3 NAT SHUTOFF	
	17	FAN #2 NAT SHUTOFF	
	18	FAN #1,2 OVERRIDE SP	
	19	LOW TEMP ALARM SP	
	20	HIGH TEMP ALARM SP	

output	1	ON=O.K., OFF=ALARM	
	2	HEATER ON	
	3	FAN #3 ON	
	4	COOLING ON	
	5	CURTAIN #1 COMMUNIC.	
	6		
	7	CURTAIN #2 COMMUNIC.	
	8		
	9	VAR FAN #1	
	10	VAR FAN #2	

CONTROL LOGIC DESCRIPTION

CONFIGURATION 10MF11v1

1. GENERAL

1.1 Definition

In the following MSC-10 control logic description, we used the following terminology:

-**DRT** -> Desired Room Temperature. This is the Temperature goal for the room.

-**RSP** -> Relative Set Point. Number of degrees relative to the DRT where a function begins.

-**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.

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

1.2 Ventilation System Overview

This control configuration allows the operation of two sidewall curtains, one heater, three fans and one cooling system.

2. LOGIC DESCRIPTION

2.1 Heating

- Runs below *HEATER ON RSP.*
- Differential = 2.0°F

2.2 Variable speed fan #1

- Runs at minimum speed below *DRT + VAR FAN #1 ON RSP*
- Accelerates from the RSP up to the end of *VAR FAN #1,2 BANDWIDTH*
- Stops 2 minutes after that both curtains have been commanded to open if *FAN #1 & #3 NAT SHUTOFF* is set to 1. It turns back ON the temperature decreases below the Natural Ventilation or it turn back on at full speed at *DRT + FAN 1,2 OVERRIDE.* (Diff = 2°F)

2.3 Variable speed fan #2

- OFF below *DRT + VAR FAN #2 ON RSP*
- Accelerate from RSP up to the end of *VAR FAN #1,2 BANDWIDTH*
- Stops 2 minutes after both curtains have been commanded to open if *FAN #2 NAT SHUTOFF* is set to 1. It turns back ON when temperature decreases below the Natural ventilation or it turn back on at full speed at *DRT + FAN 1,2 OVERRIDE.* (Diff = 2°F)

2.4 Single speed fan #3

- ON above *FAN #2 ON RSP*
- Differential = 2.0°F
- Stops after 2 cycles of Natural Ventilation, if *FAN #1 & #3 NAT SHUTOFF* setting is 1. It turns back ON when the temperature decreases below the RSP

2.5 Natural ventilation

- The sidewall curtain opens at *NATURAL FIRST MOVE* when temperature reaches *NATURAL OPEN RSP*
- The sidewall curtain opens gradually as the temperature increases above the *NATURAL OPEN RSP* to reach 100% at *NATURAL OPEN RSP* + *NATURAL BANDWIDTH.* Refer to the logic diagram hereafter for more information
- Each of the two curtains uses its respective temperature sensor while the heater, the fans and the cooling use the average of both temperature inputs

Note 1: The *CURTAIN #_ COMMUNIC.* indicator (on the MSC front plate) means that the MSC is sending a signal to the CIP-1, it does not necessary mean that the curtain is moving. When the CIP-1 loses that signal, it will operate in manual mode.

Warning: Since the controller does not know when the CIP-1 is set to manual, it is strongly recommended to **set the *FAN #1& #3 NAT SHUTOFF* to 0 when the CIP-1 is used in manual mode.** Otherwise, if the CIP-1 is left in manual mode in closed position, the MSC will command the CIP-1 to open, but the CIP-1 will not open the curtain and the MSC will stop the fan after 2 minutes, leaving the building without circulation of fresh air.

2.6 Cooling

- Runs on a 20 minutes timer, adjustable duty cycle
- ON above *DRT* + *COOLING ON RSP*
- Differential = 2.0°F

2.7 Alarm relay

- The relay is always closed in normal condition but it will open if one of the below condition occurs:
  a. The temperature at one inside sensor becomes lower than the *LOW TEMP ALARM SP,*
  b. The temperature at one inside sensor becomes higher than the *HIGH TEMP ALARM SP*, or
  c. The MSC-10 is defective or is not powered normally.

3. INSTALLATION NOTES

The guidelines in the Varifan MSC-10 Installation and User's guide shall be followed for a safe installation. In addition, that manual provude you with more details on temperature sensor installation and on the power source.

Refer to the wiring diagram in attachement for a typical installation.

3.4 Minimum/Maximum Load on different outputs

-Refer to the respective module manual to know the minimum and maximum load for the following modules:VSM-2, CM10-2, CM3-2, CIM-1,CIP-1 and ARM-1.

-Refer to the following table for the remaining outputs of the MSC-10, if the load is not respected the device may not work as expected:

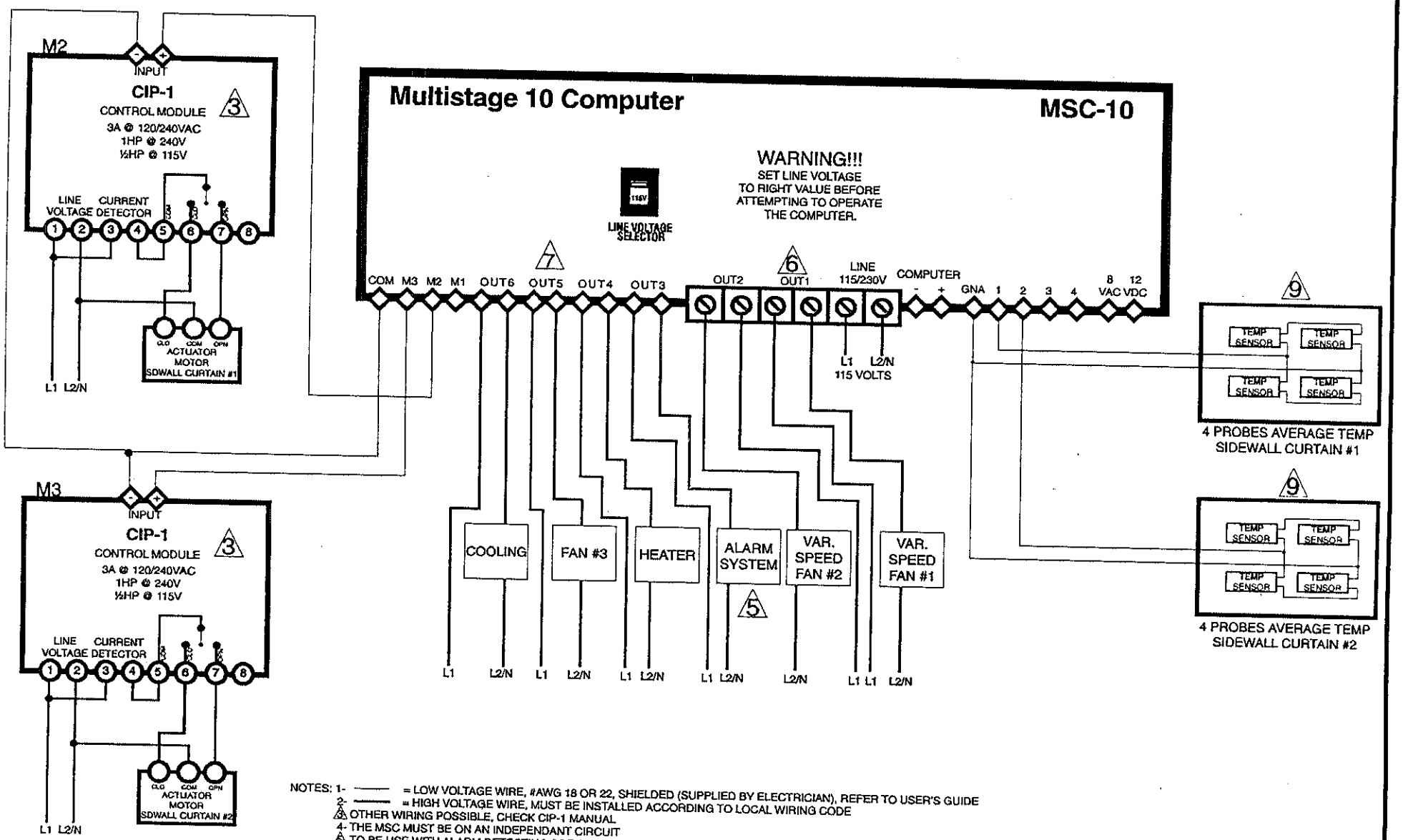
OUTPUTS	Type	Minimum Load	Maximum Load
OUT1 and OUT2	Variable, Triac	150 mA, AC only	10 A, AC only
OUT3- OUT6	Relay	50 mA, AC or DC	10 A, AC or DC

MSC-10 CONTROL SETTINGS

DESCRIPTION		CONTROL VALUES						
		MIN	MAX	PRESET				
1. CURTAIN #1 TEMP.	°F	41.5	111.0	*****	*****	*****	*****	*****
2. CURTAIN #2 TEMP.	°F	41.5	111.0	*****	*****	*****	*****	*****
3. DESIRED ROOM TEMP.	DRT	41.5	111.0	70.0				
4. HEATER ON	RSP	-2.0	-15.0	-2.0				
5. VAR FAN #1 ON	RSP	-10.0	30.0	0.0				
6. VAR FAN #1 MIN SPEED	%	12	100	30				
7. VAR FAN #1,2 BANDWIDTH		1.0	10.0	3.0				
8. VAR FAN #2 ON	RSP	-10.0	30.0	3.0				
9. VAR FAN #2 MIN SPEED	%	12	100	30				
10.FAN #3 ON	RSP	-10.0	30.0	5.0				
11.COOLING ON	RSP	0.0	30.0	15.0				
12.COOLING CYCLE (20min)	%	0	100	10				
13.NATURAL OPEN	RSP	0.0	30.0	5.0				
14.NATURAL BANDWIDTH		1.0	10.0	4.0				
15.NATURAL FIRST MOVE	%	5	50	10				
16.FAN #1 & #3 NAT SHUTOFF		0(OFF)	1(ON)	0				
17.FAN #2 NAT SHUTOFF		0(OFF)	1(ON)	0				
18.FAN #1, 2 OVERRIDE	RSP	0.0	30.0	10.0				
19.LOW TEMP WARNING	SP	41.5	90.0	55.0				
20.HIGH TEMP WARNING	SP	50.0	111.0	90.0				

NOTES: -The PRESET values are factory set are downloaded with the configuration.
-Use the blank spaces for your personal values

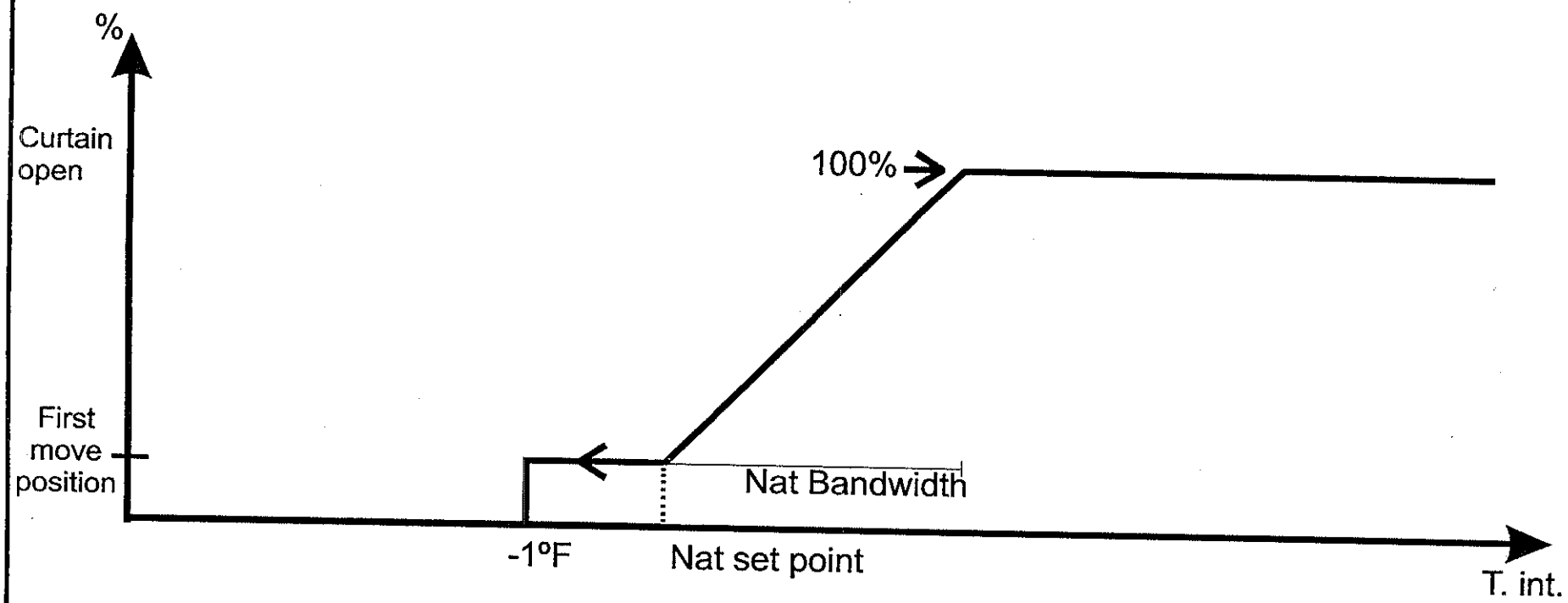
WIRING DIAGRAM CONFIGURATION 10MF11V1



NOTES: 1- ——— = LOW VOLTAGE WIRE, #AWG 18 OR 22, SHIELDED (SUPPLIED BY ELECTRICIAN), REFER TO USER'S GUIDE
2- ——— = HIGH VOLTAGE WIRE, MUST BE INSTALLED ACCORDING TO LOCAL WIRING CODE
3 OTHER WIRING POSSIBLE, CHECK CIP-1 MANUAL
4- THE MSC MUST BE ON AN INDEPENDANT CIRCUIT
5 TO BE USE WITH ALARM DETECTING OPEN CONTACT
6 MAXIMUM 2 WIRES OF SAME SIZE PER TERMINAL, NOT BIGGER THAN #AWG 12, NOT SMALLER THAN #AWG 22
7 1 WIRE ONLY PER TERMINAL. USE WIRE CONNECTOR IF YOU WANT TO CONNECT MORE THAN 1 WIRE
8- THE CURRENT SHALL NOT EXCEED 10 A AT EACH OUTPUTS (OUT1-6)
9 REFER TO FIGURE 2.2 IN THE INSTALLATION GUIDE FOR OTHER DETAILS

WIRING DIAGRAM			
01/12/95	DRAW: Stéphane Dussault	FILE: DIAGMSC10MF11V1	
	CONFIGURATION: 10MF11V1	WIR	REV: 0

NATURAL CURTAIN OPENING VS TEMPERATURE



LOGIC DIAGRAM			
01/12/95	DRAW: Stéphane Dussault	FILE: /DIAGNSC/10MF11V1	
	CONFIGURATION: 10MF11V1	LOG	REV: 0