

CONTROL LOGIC DESCRIPTION DOCUMENT

Configuration # : 41M02V3

Inputs/Outputs Table

Inputs	Qty	Outputs	Qty
Inside temperature	1	Variable Speed stages	2
Relative Humidity	1	ON / OFF fan stages	2
		Heating	2
		Cooling stage	1
		Alarm	1

Equipment required:

Item	Description	Qty
IC-410ND	Intelligent Control, 4 inputs / 10 outputs, No Display	1
2004-1k	Temperature Probe (-6.0 to 168.7 °F)	1
VPM-2 or VSM-2	Variable Speed Module (2 independant stages)	1 or 2
RHP-1	Relative Humidity Probe	1*

* Humidity Probe is Optional

Configuration Versions:

Version	Date	Modification
V0	98-05-21	New.
V1	98-06-22	Modifications on parameters and outputs.
V2	98-11-09	Modifications on ventilation stages 1, 2 and 3.
V3	99-06-28	Remove PM-1 for VSM-2.

1. GENERAL

For proper installation and full understanding of your IC-410ND, it is important to read both the **IC-410ND User's Manual** and this Control Logic Document. The User's Manual informs you on safety issues, warranty, sensors, adjustments of parameters and many other characteristics of the IC-410ND. However, this document explains all particularities of the configuration logic.

THIS CONFIGURATION CANNOT BE USED WITH IC-MANAGER OR EXPLORER.

Definition

Throughout this document, the following terminology is used.

-**DRT** → **Desired Room Temperature**. This is the Temperature goal for the room and it is also the reference temperature for all relative settings. Note that the *DRT* is affected by the growth curve function, see also Growth Curve Function paragraph in the IC-410ND manual.

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

-**DIFF** → **DIFFerential** is the number of degree changed before stopping the output. For example, with a differential = 1°F, the IC-410ND turns on a fan at 70°F when temperature increases, but it will shut it off only at 69°F when the room is cooling down. The differential is necessary to avoid oscillations.

-**MOD BAND** → **MODulation BAND** is the number of degrees a variable speed fan takes to reach its full speed.

Expressions in *ITALICS* are user parameters.

Ventilation System Overview

This control operates 2 variable speed stages, 2 ON / OFF ventilation stages, 2 heating stages, 1 cooling stage. All of these stages are controlled by the inside temperature probe.

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

2. LOGIC DESCRIPTION

2.1 Heating (2 Stages)

- Those outputs are activated when the temperature decreases to their *HEATER 1 (or 2) RSP*.
- The *DIFF* tells the control when to shut it off after the room has warmed up.
Ex: Say *DRT* = 70°F, *HEATER 1 RSP* = -2°F and the *DIFF* = 1°F, then the heater turns on at 68°F and shuts off at 69°F.

2.2 Fan 1 (Variable ventilation stage)

- Below the *DRT*, it runs on a timer, at *MIN SPEED*.
Ex: If the *FAN 1 TIMER PERIOD (min)* is adjusted to 5 minutes and the *% RUN TIME* is set to 40%, then the fan will cycle on 2 minute and off 3 minutes.
- Fan 1 accelerates from the *DRT* to the end of its *MOD BAND*.
- Fan 1 turns off when the inside temperature reaches *FAN 2 RSP* and the parameter *FAN 1 OFF WHEN 2 RSP* is set to **YES(1)**.
- Fan 1 will be reactivated at a relative set point called *FAN 1 REACTIVATE RSP*.
- If the humidity is higher than the *HUMIDITY SP* then the stage 1 increases its *MIN SPEED* of a percentage as indicated by the parameter *ADD MIN SPEED DEHUM FAN 1*. **In minimum ventilation**, the minimum ventilation timer is bypassed.
- There is a differential of 3% on the humidity logic.

2.3 Fan 2 (Variable ventilation stage)

- User has the option to activate fan 2 continuously at *MIN SPEED* below *FAN 2 RSP* by using *FAN 2 ON BELOW RSP*
- If the humidity is higher than the *HUMIDITY SP* then fan 2 increases its *MIN SPEED* of a percentage as indicated by the parameter *ADD SPEED DEHUM FAN 2*. **In minimum ventilation**, if the parameter *FAN 2 ON BELOW RSP* is set to **YES(1)**, then fan 2 increases its *MIN SPEED* of a percentage as indicated by the parameter *ADD SPD DEHUM FAN 2*. If the parameter *FAN 2 ON BELOW RSP* is set to **NO(0)** then the fan 2 will run continuously at the speed as the parameter *ADD SPEED DEHUM FAN 2*. There is a differential of 3% on the humidity logic.
- The fan 2 accelerates from the *FAN 2 RSP* to the end its *MOD BAND*.

2.4 Fans 3&4 (ON /OFF ventilation stages)

- Each of these ventilation stages will be activated at its relative set point called *FAN 3 (or 4) RSP*.
- The differential is adjustable with the parameter *DIFF*, and tells the control when to shut off the fan after the room has cooled down.

2.5 Cooling Stage (1 ON /OFF stage)

- This cooling stage will be activated on an adjustable timer at its relative set point called *COOLING RSP*.
Ex: If the temperature is above the *COOLING RSP* and the *TIMER PERIOD (min)* is adjusted to 20 minutes and the *% RUN TIME* is set to 5%, then the cooling stage will cycle ON 1 minute and OFF 19 minutes.
- The differential for this stage is fixed at 2°F.

2.6 Manual override

- Each output can be controlled manually with the *MANUAL OVERRIDE* parameter.
- See section 3 for more details on how to use the *MANUAL OVERRIDE* parameter.

2.7 Alarm

The alarm relay is normally activated, but it will deactivate 8 sec. after a power failure or after one of the following events:

- a. the IC-410ND fails
- b. the room temperature exceeds the limits *ALARM RSP HI* or *LO TEMP*.
- c. the room temperature probe vary more than 10°F in 1 minute.
- d. he room temperature probe is defective (short or open circuit).

3. HOW TO USE PARAMETERS 19 (USING THE MULTIPLE LISTING PROCEDURE)

The user must select first the main parameter (shown on the faceplate of IC-410ND) with the arrow buttons. After this selection, the control will indicate a number, meaning that it is in the "multiple list mode". The user must then choose the number of the parameter (shown on the parameter table) by way of the (+ and -) buttons. Once on the correct number, the user needs to press the F2 button. The Actual setting will then appear. Using the (+ and -) buttons, the setting can be adjusted.

Ex: If the user want to manually set to ON the heater 2 output, go to parameter *MANUAL OVERRIDE* using the arrows buttons, then press the (+ and -) buttons until 2 shows on the readout, then press F2 and adjust the setting with the (+ and -) buttons until ON appears, the heater 2 will now be activated.

ATTACHMENTS

- Parameter Table
- Labels
- Wiring Diagram

PARAMETER TABLE

DESCRIPTION		CONTROL VALUES				
		*	MIN	MAX	PRESET	
1. ROOM TEMPERATURE	deg. F		-6.0	168.7	*****	
F2: Probe Input		¢	*****	*****	P1	
F3: HI/LO			-6.0	168.7	*****	
2. DESIRED ROOM TEMP. (DRT)	deg. F	↗	32.0	120.0	70.0	
F2: Set Day (4 points)			1	126	1,10,15,20,	
F3: Set Temp. (4 points)			32.0	120.0	78,75,70, 65,	
3. GROWTH DAY			OFF	126	OFF	
F2: Adjust			OFF	126	OFF	
4. HEATER 1 RSP	deg. F		-10.0	5.0	-1.0	
F2: Diff	deg. F		0.5	5.0	1.0	
5. HEATER 2 RSP	deg. F		-10.0	5.0	-1.0	
F2: Diff	deg. F		0.5	5.0	1.0	
6. FAN 1 RSP	deg. F		-10.0	30.0	0.0	
F2: Min Speed	%		12	100	30	
F3: Mod Band	deg. F		0.5	10.0	5.0	
7. FAN 1 TIMER PERIOD	min		1	20	5	
F2: %Run Time	%		0	100	50	
8. FAN 2 RSP	deg. F		-10.0	30.0	4.0	
F2: Min Speed	%		12	100	30	
F3: Mod Band	deg. F		0.5	10.0	5.0	
9. FAN 3 RSP	deg. F		-10.0	30.0	6.0	
F2: Diff	deg. F		0.5	5.0	1.0	
10. FAN 4 RSP	deg. F		-10.0	30.0	8.0	
F2: Diff	deg. F		0.5	5.0	1.0	
11. COOLING RSP	deg. F		-10.0	30.0	14.0	
F2: Timer Period	min		1	20	5	
F3: %Run Time	%		0	100	30	
12. HUMIDITY READOUT	RH%		0	100	*****	
F2: Probe Input		¢	*****	*****	P2	
F3: HI/LO			0	100	*****	
13. HUMIDITY SP	RH%		0	100	60	
14. ADD MIN. SPEED DEHUM FAN 1	%		0	50	30	
F2: Add Min. Speed Dehum Fan 2	%		0	50	30	
15. ALARM HI TEMP. RSP	deg. F		0.0	40.0	10.0	
F2: LO Temp. RSP	deg. F		-20.0	-1.0	-5.0	
16. FAN 1 OFF, WHEN 2 ON	Yes/No		No(0)	Yes(1)	No(0)	
17. FAN 1 REACTIVATE RSP	deg. F		-10.0	30.0	10.0	
18. FAN 2 ON BELOW RSP	Yes/No		No(0)	Yes(1)	No(0)	
19. MANUAL OVERRIDE			1	7	1	

DESCRIPTION		CONTROL VALUES					
		*	MIN	MAX	PRESET		
F2(1): Heater 1			AUTO, 0	ON	AUTO		
F2(2): Heater 2			AUTO,0	ON	AUTO		
F2(3): Fan 1			AUTO, 0	100	AUTO		
F2(4): Fan 2			AUTO, 0	100	AUTO		
F2(5): Fan 3			AUTO, 0	ON	AUTO		
F2(6): Fan 4			AUTO, 0	ON	AUTO		
F2(7): Cooling			AUTO, 0	ON	AUTO		

*		Visible and/or adjustable by the user
	∅	Can not be changed
	↗	Affected by a growth curve function

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1. Room Temperature F3: Hi / Lo →
2. DRT F2: Set Day / F3: Set Temp →
3. Growth Day F2: Adjust →
4. Heater 1 RSP F2: Diff →
5. Heater 2 RSP F2: Diff →
6. Fan 1 RSP F2: Min Spd / F3: Mod Band →
7. Fan 1 Timer (min) F2: % Run Time →
8. Fan 2 RSP F2: Min Spd / F3: Mod Band →
9. Fan 3 RSP F2: Diff →
10. Fan 4 RSP F2: Diff →
11. Cool RSP F2: Timer (min) / F3: % Run →
12. Humidity Readout F3: Hi / Lo →
13. Humidity SP →
14. Add spd dehum Fan 1 F2: Fan 2 →
15. Alarm RSP Hi Temp. F2: Lo Temp →
16. Fan 1 off, when 2 RSP Yes(1)/No(0) →
17. Fan 1 reactivate RSP →
18. Fan 2 on below RSP Yes(1)/No(0) →
19. Manual Override (See output list) →
20. →

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1. Room Temperature F3: Hi / Lo →
2. DRT F2: Set Day / F3: Set Temp →
3. Growth Day F2: Adjust →
4. Heater 1 RSP F2: Diff →
5. Heater 2 RSP F2: Diff →
6. Fan 1 RSP F2: Min Spd / F3: Mod Band →
7. Fan 1 Timer (min) F2: % Run Time →
8. Fan 2 RSP F2: Min Spd / F3: Mod Band →
9. Fan 3 RSP F2: Diff →
10. Fan 4 RSP F2: Diff →
11. Cool RSP F2: Timer (min) / F3: % Run →
12. Humidity Readout F3: Hi / Lo →
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1. Heater 1 On
2. Heater 2 On
3. Fan 1 On
4. Fan 2 On
5. Fan 3 On
6. Fan 4 On
7. Cooling On

OUTPUT LIST

Manual Override
(Parameter 19)
Select # then,
press F2 to access

(1) = Heater 1
(2) = Heater 2
(3) = Fan 1
(4) = Fan 2
(5) = Fan 3
(6) = Fan 4
(7) = Cooling

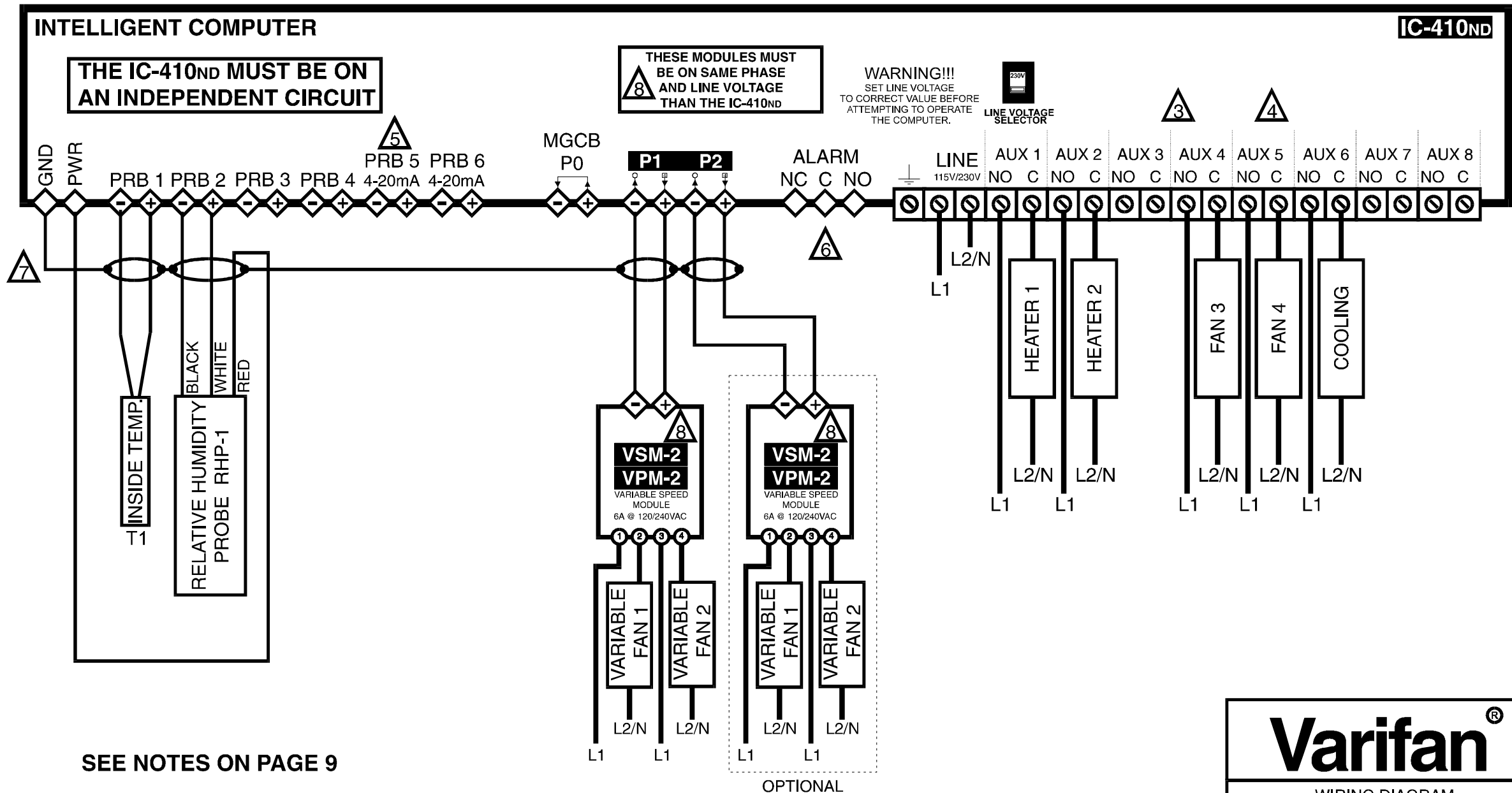
1. Heater 1 On
2. Heater 2 On
3. Fan 1 On
4. Fan 2 On
5. Fan 3 On
6. Fan 4 On
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OUTPUT LIST

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(Parameter 19)
Select # then,
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(1) = Heater 1
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(4) = Fan 2
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(7) = Cooling

WIRING DIAGRAM CONFIGURATION 41M02V3



Varifan®

WIRING DIAGRAM

28/06/99	<small>DRAW</small> Yanick Alain	<small>FILE</small> /DIAG/IC/41M02V3
	<small>CONFIGURATION</small> 41M02V3	<small>WIR</small> 0

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Electrician's notes

wiring tips and hints

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

 - THE CURRENT SHALL NOT EXCEED 10A AT EACH OUTPUTS (AUX 1-8)

 - MAXIMUM 2 WIRES OF SAME SIZE PER TERMINAL, NOT BIGGER
THAN #AWG 12, NOT SMALLER THAN #AWG 22

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

 - CHECK USER'S MANUAL FOR ALARM WIRING

 - USE SHIELD FOR SHIELDING PURPOSE ONLY. CONNECT THE SHIELD
TO THE CONTROL CIRCUIT COMMON END ONLY NEVER LEAVE THE
SHIELD UNCONNECTED AT BOTH ENDS. NEVER CONNECT BOTH
ENDS OF THE SHIELD TO COMMON.

 - THESE MODULES MUST BE ON SAME POWER PHASE AND LINE
VOLTAGE THAN THE IC-410ND.