

ISI

Incubation Systems Inc.

VORTECH MACHINE CONTROLLER UNIT AND SOFTWARE FUNCTION USER MANUAL



MAN003

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REV A.
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1. INTRODUCTION

THE VORTECH MACHINE CONTROLLER COMES EQUIPPED WITH SOFTWARE THAT ALLOWS FOR CONTROLLING MACHINE FUNCTION.

2. ABOUT THIS MANUAL

THIS MANUAL COVERS BOTH SOFTWARE EXAMPLES OF THE VORTECH MACHINE CONTROLLER (INCLUDING AN EXPLANATION OF MENU OPTIONS) AS WELL AS HARDWARE SETUP.

3. ACRONYMS

°F : DEGREES FARENHEIT

°C : DEGREES CELSIUS

Rh : RELATIVE HUMIDITY

Wb : WET BULB

H₂O : WATER

> : THEN

MIN : MINUTES

S : SECONDS

Sec : SECTION

d : DAY

h : HR

N : STEP NUMBER (e.g. 1-15)

4. GETTING STARTED

THIS MANUAL IS DIVIDED INTO DIFFERENT SECTIONS WHICH COVER THE VARIOUS MENUS OF THE VORTECH CONTROLLER PROGRAM. PLEASE REFER TO THE TABLE OF CONTENTS TO FIND THE CORRECT SECTION OR PAGE ON WHICH THE INFORMATION IS LOCATED.

5. ROTATING MAIN SCREEN MENU

[DISPLAYS EACH TEMPERATURE WITH SETPOINT, HUMIDITY WITH SETPOINT, FUNCTION STATUS AND DAMPER POSITION IN A ROTATING SCREEN.]

6. MAIN SCREEN MENU

[DISPLAYS FRONT TEMPERATURE, HUMIDITY, MACHINE FUNCTIONS, DAMPER POSITION AND PROGRAM MODE.]

7. TEMPERATURE GRAPH

[DISPLAYS FRONT TEMPERATURE IN A GRAPH FORM OVER THE PAST TEN HOURS.]

8. ALARM SCREEN

[DISPLAYS CURRENT ALARMS.]

9. TEMPERATURE SCREEN

[DISPLAYS FRONT AND REAR TEMPERATURE AS WELL AS HUMIDITY.]

10. DETAIL SCREEN

[DISPLAYS FRONT AND REAR TEMPERATURES AND HUMIDITY VALUES AS WELL AS SETPOINTS, TURNING COUNTER AND OPERATION MODE AND STEP NUMBER.]

10.1 RUN MODE

[TURNS MACHINE OFF AND ON. (**RUN**, **STOP**)]

10.2 LIGHTS

[TURNS LIGHTS OFF AND ON. (**OFF**, **ON**)]

10.3 LOW TEMP ALARM

[WHEN DISABLED THE LOW TEMP ALARM IS DISABLED FOR THE TIME SET IN THE LOW TEMP DISABLE TIME FUNCTION AFTER WHICH IT RE-ENABLES THE ALARM. (see sec 10.7.1.21.25) (**ENABLED**, **DISABLED**)]

10.4 HORN OUTPUT MODE

[TURNS HORN FUNCTION OFF AND ON. (**ENABLED**, **DISABLED**)]

10.5 TURNING MODE

[**AUTO**, THE MACHINE WILL TURN AUTOMATICALLY. **LEVEL**, THE MACHINE WILL GO TO **LEVEL**, THE **STOP**. **OFF**, THE MACHINE WILL NOT TURN. (**AUTO**, **LEVEL**, **OFF**)]

10.6 TURN COUNT

[DISPLAYS THE NUMBER OF TIMES THE MACHINE HAS TURNED SINCE LAST RESET. RESET BY CLICKING ON TURN COUNTER. (**RESET**)]

10.7 SETUP

[SETUP IS WHERE ALL THE SETTINGS FOR THE MACHINE ARE ENTERED.]

10.7.1 ENTER PASSWORD

[IF A PASSWORD IS SET, THE OPERATOR WILL NEED TO ENTER IT TO GO BELOW THIS POINT.]

10.7.1.1 TEMPERATURE SETPOINT

[SETPOINT FOR COOLING MODE. (**99.8**, 60.0 TO 104.0 °F)]

10.7.1.2 HEAT OFFSET

[THE POINT BELOW THE COOLING SETPOINT WHERE THE HEAT WILL COME ON. (**-0.3**, -0.0 TO -3.0)]

10.7.1.3 HIGH ALARM OFFSET

[THE POINT ABOVE THE COOLING SETPOINT WHERE THE HIGH TEMP ALARM WILL COME ON. (**1.2**, 0.1 TO 5.0)]

10.7.1.4 LOW ALARM OFFSET

[THE POINT BELOW THE COOLING SETPOINT WHERE THE LOW TEMP ALARM WILL COME ON. (**-2.8**, -99.0 TO -0.1)]

10.7.1.5 OVER TEMP SETPOINT

[IF THE MACHINE TEMPERATURE REACHES THIS SETPOINT THE ALARM WILL SOUND AND CANNOT BE TURNED OFF UNTIL THE TEMPERATURE FALLS BELOW THIS SETPOINT. (**101.0**, 99.0 TO 104.0)]

10.7.1.6 COOLING MODE

[WHERE THE OPERATOR CAN SELECT THE COOLING METHOD.]

COOLING METHOD	DESCRIPTION
H2O & AIR (DEFAULT)	TURN COOLING WATER AND AIR ON AT THE SAME TIME.
H2O > AIR	TURN COOLING WATER ON THEN COOLING AIR ON AFTER THE COOLING DELAY TIME EXPIRES.
AIR > H2O	TURN COOLING AIR ON THEN COOLING WATER ON AFTER THE COOLING DELAY TIME EXPIRES.
H2O	TURN COOLING WATER ON ONLY.
AIR	TURN COOLING AIR ON ONLY.

TABLE 1. COOLING MODE

10.7.1.7 HUMIDITY SETPOINT

[WHEN HUMIDITY IS BELOW THIS POINT THE HUMIDITY WILL COME ON. (IT CAN BE RELATIVE HUMIDITY (Rh) OR WET BULB (Wb) DEPENDING ON THE SENSOR USED.) ALSO THIS IS THE POINT WHERE THE DAMPER WILL BEGIN TO CLOSE, IF THE DAMPER IS SET TO BE CONTROLLED BY HUMIDITY. (**47% or 83.5Wb**, 20.0%Rh TO 80.0%Rh 60.0Wb to 90.0Wb).]

10.7.1.8 DAMPER DEHUM OFFSET

[IF YOUR DAMPER IS CONTROLLED BY HUMIDITY AT THIS VALUE ABOVE THE HUMIDITY SETPOINT THE DAMPER WILL START TO OPEN. (**2.5**, 0.5%Rh TO 20.0%Rh +0.5Wb to +20Wb)]

10.7.1.9 HIGH HUMIDITY OFFSET

[THE POINT ABOVE THE HUMIDITY SETPOINT WHERE THE HIGH HUMIDITY ALARM COMES ON. (**5**, 0.5%Rh TO 20%Rh .5Wb TO 20Wb)]

10.7.1.10 LOW HUMIDITY OFFSET

[THE POINT BELOW THE HUMIDITY SETPOINT WHERE THE LOW HUMIDITY ALARM COMES ON. (**-5**, -20.0%Rh TO -0.5%Rh -20.0Wb TO -0.5Wb)]

10.7.1.11 MINIMUM DAMPER

[WHEN CALLING FOR HEAT, THE DAMPER WILL MOVE TO THE CLOSED SIDE. THE DAMPER WILL NOT CLOSE BEYOND THIS POINT. (**30%**, 0% TO 100%)]

10.7.1.12 MAXIMUM DAMPER

[WHEN CALLING FOR COOLING, THE DAMPER WILL MOVE TO THE OPEN SIDE. THE DAMPER WILL NOT OPEN BEYOND THIS POINT. (**100%**, 0% TO 100%)]

10.7.1.13 DAMPER CONTROL MODE

[THIS IS WHERE THE OPERATOR SELECTS IF THE DAMPER WILL OPERATE ON TEMPERATURE OR HUMIDITY (**TEMP**, TEMP OR HUM)]

10.7.1.14 DEHUMIDIFICATION MODE

[THE OPERATOR CAN SELECT DEHUMIDIFICATION AND THE METHOD OF DEHUMIDIFICATION.]

DEHUMIDIFICATION METHOD	DESCRIPTION
NONE (DEFAULT)	THE CONTROL WILL NOT DEHUMIDIFY THE MACHINE.
FR-AIR	THE CONTROL WILL TURN ON THE FRONT COOLING AIR TO DEHUMIDIFY THE MACHINE.
RR-AIR	THE CONTROL WILL TURN ON THE REAR COOLING AIR TO DEHUMIDIFY THE MACHINE.
BOTH AIR	THE CONTROL WILL TURN ON BOTH THE FRONT AND REAR COOLING AIR TO DEHUMIDIFY THE MACHINE.
FR-H2O	THE CONTROL WILL TURN ON THE FRONT COOLING WATER TO DEHUMIDIFY THE MACHINE.
RR-H2O	THE CONTROL WILL TURN ON THE REAR COOLING WATER TO DEHUMIDIFY THE MACHINE.
BOTH-H2O	THE CONTROL WILL TURN ON THE FRONT AND REAR COOLING WATER TO DEHUMIDIFY THE MACHINE.

TABLE 2. DEHUMIDIFICATION MODE

10.7.1.15 TIMED DEHUMIDIF. MODE

[TIMED DEHUMIDIFICATION MODE]

TIMED DEHUMIDIFICATION MODE	DESCRIPTION
DISABLED (DEFAULT)	THE DEHUMIDIFICATION WILL NOT PULSE IN THIS MODE. IT WOULD BE EITHER ON OR OFF BASED ON THE DEHUMIDIFICATION MODE SETTING (see Sec. 10.7.1.14) AND DAMPER DEHUM OFFSET SETPOINT (see Sec. 10.7.1.8)
ENABLED	WILL ALLOW THE CONTROL TO PULSE THE DEHUMIDIFICATION TO PREVENT THE DEHUMIDIFICATION FUNCTION FROM COOLING THE MACHINE, BASED ON THE DEHUM

	ON TIME (See Sec. 10.7.1.16) AND THE DEHUM OFF TIME (See Sec. 10.7.1.17).
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TABLE 3. TIMED DEHUMIDIFICATION MODE

- 10.7.1.16 MINUTES TIMED DEHUM_ON**
[WHEN THE DEHUMIDIFICATION MODE IS NOT SET TO **NONE** AND THE TIMED DEHUMIDIF. MODE IS **ENABLED** – THIS SETTING IS THE TIME THE DEHUMIDIFICATION WILL PULSE ON. (**30MIN**, 0 TO 30 MIN)]
- 10.7.1.17 MINUTES TIMED DEHUM_OFF**
[WHEN THE DEHUMIDIFICATION MODE IS NOT SET TO **NONE** AND THE TIMED DEHUMIDIF. MODE IS **ENABLED** – THIS SETTING IS THE TIME THE DEHUMIDIFICATION WILL PULSE OFF. (**30MIN**, 0 TO 30 MIN)]
- 10.7.1.18 FRONT CAL OFFSET**
[FRONT TEMPERATURE CAN BE CALIBRATED HERE. (**0.0**, -4.0 TO +4.0)]
- 10.7.1.19 REAR CAL OFFSET**
[REAR TEMPERATURE CAN BE CALIBRATED HERE. (**0.0**, -4.0 TO +4.0)]
- 10.7.1.20 HUMIDITY CAL OFFSET**
[HUMIDITY READING CAN BE CALIBRATED HERE. (**0.0**, -20.00 TO +20.0)]
- 10.7.1.21 MACHINE SETUP**
[THIS IS WHERE THE ELECTRONICS CAN BE CONFIGURED FOR DIFFERENT MACHINES.]
 - 10.7.1.21.1 ALARM OUTPUT NO/NC**
[CLOSE OR OPEN TO TURN ON HORN. (NC, **NO**)]
 - 10.7.1.21.2 ALARM LIGHT NC/NO**
[CLOSE OR OPEN TO TURN ON ALARM LIGHT. (NC, NO)]
 - 10.7.1.21.3 TURNING NO/NC**
[CLOSE OR OPEN TO TURN ON TURNING. (NC, **NO**)]
 - 10.7.1.21.4 FRONT HEAT NO/NC**
[CLOSE OR OPEN TO TURN ON FRONT HEAT. (NC, NO)]
 - 10.7.1.21.5 REAR HEAT NO/NC**
[CLOSE OR OPEN TO TURN ON REAR HEAT OR SECOND STAGE HEAT. (NC, NO)]
 - 10.7.1.21.6 FRONT COOLING NO/NC**
[CLOSE OR OPEN TO TURN ON FRONT COOLING WATER. (NC, **NO**)]
 - 10.7.1.21.7 REAR COOLING NO/NC**
[CLOSE OR OPEN TO TURN ON REAR COOLING WATER. (NC, **NO**)]
 - 10.7.1.21.8 FRONT AIR NO/NC**
[CLOSE OR OPEN TO TURN ON FRONT COOLING AIR. (NC/**NO**)]
 - 10.7.1.21.9 REAR AIR NO/NC**
[CLOSE OR OPEN TO TURN ON REAR COOLING AIR. (NC/**NO**)]
 - 10.7.1.21.10 HUMIDITY NO/NC**

- [CLOSE OR OPEN TO TURN ON HUMIDITY WATER. (**NC**, **NO**)]
- 10.7.1.21.11 HUMIDITY AIR NO/NC**
[CLOSE OR OPEN TO TURN ON HUMIDITY AIR. (**NC**, **NO**)]
- 10.7.1.21.12 HEAT WITH HUMIDITY ON/OFF**
[CLOSE OR OPEN TO TURN ON HEAT WITH HUMIDITY. (**OFF**, **ON**)]
- 10.7.1.21.13 OPEN DAMPER NO/NC**
[CLOSE OR OPEN TO OPEN DAMPER. (**NC**, **NO**)]
- 10.7.1.21.14 CLOSE DAMPER NO/NC**
[CLOSE OR OPEN TO CLOSE DAMPER. (**NC**, **NO**)]
- 10.7.1.21.15 E STOP INPUT AH/AL**
[E-STOP ALARM ACTIVE HIGH OR ACTIVE LOW. THE E-STOP ALARM CANNOT BE TURNED OFF. (**AH**, **AL**)]
- 10.7.1.21.16 BREAKER INPUT AH/AL**
[BREAKER FAIL ALARM ACTIVE HIGH OR ACTIVE LOW (**AH**, **AL**)]
- 10.7.1.21.17 MOTOR INPUT AH/AL**
[MOTOR FAIL ALARM ACTIVE HIGH OR ACTIVE LOW (**AH**, **AL**)]
- 10.7.1.21.18 BATTERY INPUT AH/AL**
[BATTERY FAIL ALARM ACTIVE HIGH OR ACTIVE LOW (**AH**, **AL**)]
- 10.7.1.21.19 T SWITCH INPUT AH/AL**
[TURNING SWITCH ACTIVE HIGH OR ACTIVE LOW (**AH**, **AL**)]
NOTE: IF THE VORTECH CONTROLLER SENSES THAT THE MACHINE HAS NOT TURNED AT THE SET TURN TIME A TURNING ALARM WILL SOUND 15 MIN AFTER A TURN FAILURE.
- 10.7.1.21.20 TURNING ENABLE**
[ENABLE OR DISABLE TURNING FUNCTION (**ENABLED/DISABLED**)]
- 10.7.1.21.21 TURN TIME**
[SET THE TIME BETWEEN TURNS (**60**, 1 TO 240 MIN)]
- 10.7.1.21.22 TURN CONTINUATION TIME**
[THE MACHINE WILL CONTINUE TURNING THIS NUMBER OF SECONDS AFTER THE LEVEL SWITCH HAS BEEN ACTIVATED (**2**, 0 TO 10S)]
- 10.7.1.21.23 MUTE TIME**
[SET THE TIME THE HORN WILL STAY OFF AFTER THE BUTTON IS PRESSED. (**10**, 0 TO 240 MINUTES)]
- 10.7.1.21.24 STEP ALARM DISABLE**
[TEMPERATURE AND HUMIDITY ALARMS WILL BE DISABLED FOR 0 TO 30 MINUTES IF CAUSED BY A STEP CHANGE (**0**, 0 TO 30 MIN)]
- 10.7.1.21.25 LOW TEMP DISABLE TIME**
[WHEN THE LOW TEMPERATURE IS DISABLED IT WILL RE-ENABLE THE LOW TEMP ALARM AFTER THIS TIME (**10**, 0 TO 990 MIN)]
- 10.7.1.21.26 COOLING DELAY TIME**

[THE TIME BETWEEN COOLING AIR AND COOLING WATER, OR THE TIME BETWEEN COOLING WATER AND COOLING AIR (**30**, 30 TO 300S)]

10.7.1.21.27 STARTUP DELAY TIME

[THE AMOUNT OF TIME THE CONTROL WILL WAIT BEFORE TURNING ON THE MACHINE WHEN POWER RETURNS AFTER A POWER FAILURE. (**5**, 5 TO 60S)]

10.7.1.21.28 HEAT TOTAL TIME

[PROPORTIONAL PULSATING OF HEATERS AS TEMPERATURE GETS CLOSE TO THE SETPOINT. THE LOWER THE NUMBER THE LESS PULSATING (**0**, 0 TO 180)]

10.7.1.21.29 CALIBRATE DAMPER 0%

[WITH DAMPER PHYSICALLY PLACED IN 0% POSITION (i.e. **0% OPEN** or **FULLY CLOSED**) - PRESS THE (CALIBRATE DAMPER 0%) (**0%**)]

10.7.1.21.30 CALIBRATE DAMPER 100%

[WITH THE DAMPER PHYSICALLY PLACED IN 100% POSITION (i.e. **100% OPEN** or **FULLY OPEN**) – PRESS THE (CALIBRATE DAMPER 100%) (**100%**)]

10.7.1.21.31 DAMPER ON TIME

[IN CONJUNCTION WITH THE DAMPER OFF TIME THIS SETTING CONTROLS THE SPEED OF THE DAMPER. (**60S**, 1S TO 60 S)]

10.7.1.21.32 DAMPER OFF TIME

[IN CONJUNCTION WITH THE DAMPER ON TIME THIS SETTING CONTROLS THE SPEED OF THE DAMPER. (**0S**, 0S TO 60 S)]

10.7.1.21.33 HUMIDITY ALARMS

[TURN HUMIDITY ALARM ON OR OFF (**ENABLED**, DISABLED)]

10.7.1.21.34 ALARM LIGHT

[ALLOWS THE OPERATOR TO TURN OFF THE ALARM LIGHT WHEN THE MACHINE IS TURNED OFF FOR AN EXTENDED PERIOD OF TIME. THE LIGHT WILL AUTOMATICALLY BE REACTIVATED TO NORMAL OPERATION WHEN THE MACHINE IS TURNED ON. (**ENABLED**, DISABLED)]

10.7.1.21.35 FAN 1 ALARM

[TURN FAN CURRENT SENSOR ALARM 1 ON OR OFF. (**ENABLED**, DISABLED)]

10.7.1.21.36 FAN 2 ALARM

[TURN FAN CURRENT SENSOR ALARM 1 ON OR OFF. (**ENABLED**, DISABLED)]

10.7.1.21.37 POWER CTR: SWCH/KNOB/ON

[OPTION FOR TURNING THE MACHINE ON OR OFF BY THE KNOB OR AN EXTERNAL SWITCH. (**KNOB**, SWITCH, OVERRIDE (i.e. Always on))]

10.7.1.21.38 LIGHTS CONTROL: SWCH/KNOB

[OPTION FOR TURNING THE LIGHTS ON OR OFF BY THE KNOB OR AN EXTERNAL SWITCH. (**KNOB**, SWITCH)]

10.7.1.21.39 HORN CTRL: SWCH/KNOB/ON

[OPTION FOR TURNING THE HORN ON OR OFF BY THE KNOB OR AN EXTERNAL SWITCH. (**KNOB**, SWITCH, OVERRIDE (i.e. Always on))]

10.7.1.21.40 LOWTEMPDISABLE: SWCH/KNOB

[OPTION FOR ACTIVATING THE LOW TEMP DISABLE FUNCTION WITH THE KNOB OR AN EXTERNAL SWITCH. (**KNOB**, SWITCH)]

10.7.1.21.41 TURN CTRL: SWCH/KNOB/ON

[OPTION FOR CONTROLLING THE TURNING FUNCTION WITH THE KNOB OR AN EXTERNAL SWITCH. (**KNOB**, SWITCH, OVERRIDE)]

10.7.1.21.42 ACTIVE HUMIDITY DISPLAY

[THE OPERATOR CAN CHOOSE TO TURN OFF THE HUMIDITY DISPLAY WHEN HUMIDITY IS NOT BEING CONTROLLED BY THE MACHINE. (**ENABLED**, DISABLED)]

10.7.1.21.43 COMM ID

[SET THE NAME OF THE EQUIPMENT FOR VORTECH COMMANDER. (**0**, 0 TO 999)]

10.7.1.21.44 SET LANGUAGE

[CHANGES LANGUAGE (**ENGLISH**, SPANISH)]

10.7.1.21.45 SET FACTORY DEFAULTS

[RETURNS ALL THE SETTINGS BACK TO FACTORY DEFAULTS.]

MACHINE	FACTORY DEFAULTS
ISIS SETTER	SET DEFAULTS FOR ISIS SETTER
ISIS HATCHER	SET DEFAULTS FOR ISIS HATCHER
S2S3 SETTER	SET DEFAULTS FOR S2 AND S3 HATCHER
576/384 SETTER	SET DEFAULTS FOR 576/384 SETTER
192 HATCHER	SET DEFAULTS FOR 192 HATCHER
1152/768 SETTER	SET DEFAULTS FOR 1152/768 SETTER
TES HATCHER	SET DEFAULTS FOR TES HATCHER
ULTRA SETTER	SET DEFAULTS FOR ULTRA SETTER
ULTRA HATCHER	SET DEFAULTS FOR ULTRA HATCHER
MCS SETTER	SET DEFAULTS FOR MCS SETTER
MCS HATCHER	SET DEFAULTS FOR MCS HATCHER

TABLE 4. SET FACTORY DEFAULTS

10.7.1.21.46 TEMPERATURE HYSTERESIS

[ADJUSTS INITIAL COOLING AND HEATING OFFSET VALUES (**0.1**, 0.0 TO 0.2)]

10.7.1.21.47 EXIT

[JUMP BACK TO MAIN SCREEN]

10.7.1.21.48 BACK

[BACK TO MACHINE SETUP]

10.7.1.22 STEP PROGRAM SETUP

[SETTINGS FOR STEP PROGRAM (N CAN REPRESENT ANY STEP FROM STEPS 1-15)]

10.7.1.22.1 STEP (N): 00d 00h 099.8 050.0 H2O&Air HA Dmp 030%-100% -0.3NDH

[DISPLAYS CURRENT STEP (N) SETTINGS]

STEP FUNCTION	SETTINGS	DESCRIPTION
STEP (N) START TIME	(00d 00h, -30d 00h to 30d 00h)	START THIS STEP X HOURS AND X MINUTES FROM PROGRAM START. (STEPS CAN HAVE A NEGATIVE TIME FOR PRE-WARMING).
STEP (N) TEMPERATURE	(99.8, 60.0 to 104.0)	COOLING SETPOINT FOR THIS STEP (N)
STEP (N) HUMIDITY	(50.0, 20.0 to 80.0)	HUMIDITY SETPOINT FOR THIS STEP (N)
STEP (N) COOL MODE		COOLING MODE FOR THIS STEP (N)
	H2O & AIR	TURN COOLING WATER AND AIR ON AT THE SAME TIME.
	H2O > AIR	TURN COOLING WATER ON THEN COOLING AIR ON 30S LATER.
	AIR > H2O	TURN COOLING AIR ON THEN COOLING WATER ON 30S LATER.
	H2O	TURN COOLING WATER ON ONLY
	AIR	TURN COOLING AIR ON ONLY
STEP (N) MINIMUM DAMPER	(30%, 0 to 100%)	MINIMUM DAMPER POSITION FOR THIS STEP (N)
STEP (N) MAXIMUM DAMPER	(100%, 0 to 100%)	MAXIMUM DAMPER POSITION FOR THIS STEP (N)
STEP (N) HUM ALARMS	(ENABLED, DISABLED)	ENABLE OR DISABLE HUMIDITY ALARMS FOR THIS STEP (N)
STEP (N) DEHUMIDIFICATION	(ENABLED, DISABLED)	ENABLE OR DISABLE DEHUMIDIFICATION FOR THIS STEP (N)
STEP (N) HEAT OFFSET	(-0.3, -3.0 to 0.0)	HEAT OFFSET FOR THIS STEP (N)
EXIT		JUMP TO MAIN SCREEN
BACK		BACK TO DISPLAY THIS STEP (N)

TABLE 5. STEP PROGRAM SETUP

10.7.1.22.2 LOOP STEP

[ENTER STEP NUMBER (N) USED TO RESART PROGRAM AUTOMATICALLY **NONE**, ALSO 2-15)]

10.7.1.22.3 EXIT STEP

[THE STEP (N) THE PROGRAM WILL STOP (**15**, 1-15)]

10.7.1.22.4 EXIT

[JUMP TO MAIN SCREEN]

10.7.1.22.5 BACK

[BACK TO STEP PROGRAM SETUP]

10.7.1.23 SET STEP MODE

[SELECT OPTION TO RUN MACHINE ON FIXED SETPOINTS OR TO RUN STEP PROGRAM (**FIXED**, **STEP**)]

10.7.1.24 SET PASSWORD...

[SET PASSWORD (XXXX – FOUR NUMBERS)]

10.7.1.25 EXIT

[JUMP BACK TO MAIN SCREEN]

10.7.1.26 BACK

[BACK TO SETUP]

10.8 EXIT

[EXIT]

11. VORTECH MACHINE CONTROLLER HARDWARE COMPONENTS

11.1 VORTECH CONTROL CPU BOARD

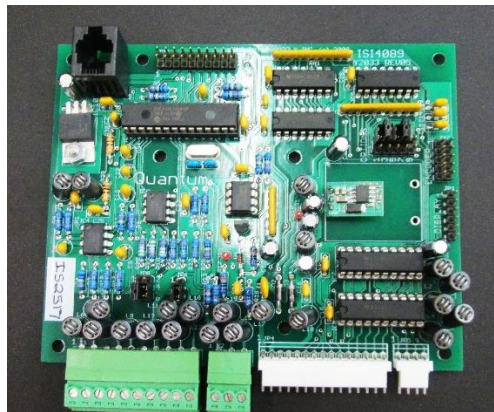
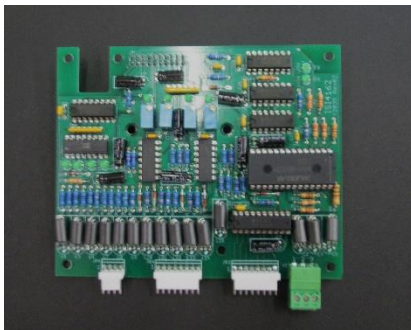


FIG. 1 VORTECH CONTROL CPU BOARD

11.2 VORTECH EXPANSION BOARD(S)



**FIG. 2 VORTECH COMMUNICATION
EXPANSION PCB FULL POPULATION**



**FIG. 3 VORTECH EXPANSION 8 SWITCH
INPUTS 4-20MA W/ COM**

11.3 VORTECH DISPLAY BOARD

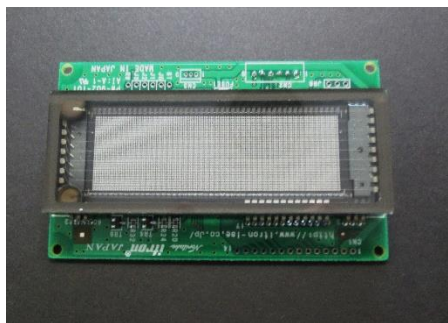


FIG. 4 VORTECH DISPLAY BOARD

11.4 VORTECH ENCODER

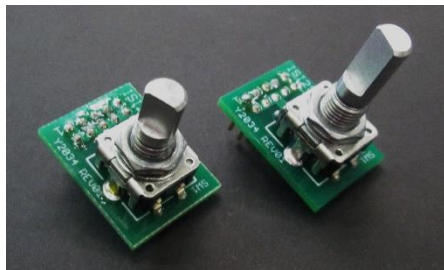


FIG. 5 VORTECH ENCODER

11.5 VORTECH RELAY BOARD

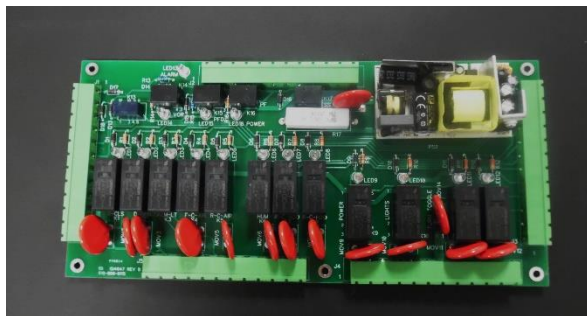
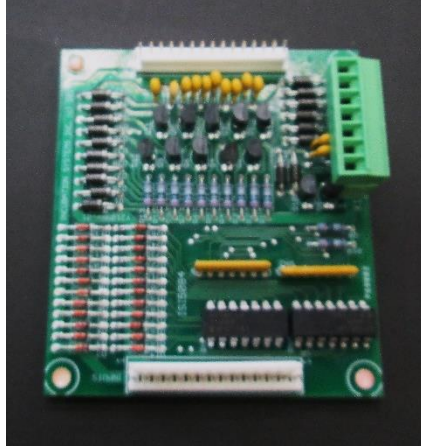


FIG. 6 VORTECH RELAY BOARD

11.6 VORTECH SOURCING BOARD**FIG. 7 VORTECH SOURCING BOARD****11.7 VORTECH CONTROL CPU BOARD CONFIGURATION**

1. INSTALL THE VORTECH CPU JUMPERS FOR YOUR TYPE OF MACHINE.
2. INSTALL THE VORTECH CPU BOARD IN YOUR MACHINE AND POWER UP.
3. LOAD NEW VORTECH SOFTWARE IF NECESSARY.
 - (1) INSTALL SD CARD WITH DESIRED SOFTWARE VERSION INTO FIELD PROGRAMMER.
 - (2) PLUG FIELD PROGRAMMER INTO VORTECH CPU PROGRAMMING JACK AND VERIFY PROGRAMMER LIGHT IS LIT (GREEN).
 - (3) PRESS PROGRAMMER BUTTON TO START PROGRAMMING AND VERIFY PROGRAMMER LIGHT IS LIT (RED).
 - (4) AFTER A FEW MINUTES THE PROGRAMMER LIGHT WILL TURN (GREEN) INDICATING PROGRAMMING IS COMPLETE.
 - (5) THE VORTECH CONTROLLER WILL RESTART AFTER PROGRAMMING AND DISPLAY THE NEW SOFTWARE VERSION AT STARTUP.
4. CONFIGURE THE VORTECH CPU TO YOUR MACHINE BY FOLLOWING STEPS (1) THROUGH (6).
 - (1) PRESS AND HOLD THE VORTECH SELECTOR KNOB UNTIL THE **OPERATION** MENU APPEARS.
 - (2) ROTATE THE VORTECH SELECTOR KNOB AND SELECT THE **SETUP . . .** MENU.
 - (3) ROTATE THE VORTECH SELECTOR KNOB AND SELECT THE **MACHINE SETUP . . .** MENU.
 - (4) ROTATE THE VORTECH SELECTOR KNOB AND SELECT **SET FACTORY DEFAULTS** MENU.
 - (5) ROTATE THE VORTECH SELECTOR KNOB TO SELECT YOUR TYPE OF MACHINE.
(VERIFY **SAVED** FLASHES BRIEFLY ON THE DISPLAY)
 - (6) ROTATE THE VORTECH SELECTOR KNOB AND SELECT **EXIT** TO RETURN TO THE MAIN MENU.

NOTE: THIS PROCEDURE ALSO RESETS ALL SETPOINTS TO THE DEFAULT VALUES.

5. CONFIGURE MACHINE SETPOINTS AS DESIRED.

NOTE: IF CHANGING HUMIDITY JUMPERS THEN THE VORTECH SOFTWARE WILL NEED TO BE RELOADED ONTO THE MACHINE CONTROL USING A FIELD PROGRAMMER IN ORDER FOR THE CHANGES TO TAKE EFFECT. (THIS IS NOT THE CASE IF CHANGING ZONE, TEMP OR PROPORTIONAL DAMPER JUMPERS AS THESE CHANGES WILL TAKE EFFECT IMMEDIATELY).

VORTECH CPU Jumpers

Options Jumpers

JP3	No Jumper	Jumper
1-2	2 Zone	1 Zone
3-4	Temp F	Temp C
5-6	Humidity WB	Humidity RH
7-8	Proportional Damper	No Proportional Damper
9-10	Spare	Spare

TABLE 6. VORTECH CPU OPTIONS JUMPERS

Humidity Setting Jumpers

JP6		JP8		JP8	
1-2	Relative	1-3	Relative	2-4	Relative
2-3	Wet Bulb	3-5	Wet Bulb	4-6	Wet Bulb

TABLE 7. VORTECH CPU HUMIDITY SETTING JUMPERS

JP3	576 Setter	1152 Setter	192 Hatcher	ISIS Setter	ISIS Hatcher	S3 Setter	S3 Hatcher	TES Hatcher	S2 Setter	S2 Hatcher	Ultra Setter	Ultra Hatcher	CS768 Setter
1-2	Jumper	Jumper	Jumper		Jumper		Jumper	Jumper		Jumper		Jumper	
3-4													
5-6	Jumper	Jumper	Jumper										
7-8				Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper
9-10													
JP6	576 Setter	1152 Setter	192 Hatcher	ISIS Setter	ISIS Hatcher	S3 Setter	S3 Hatcher	TES Hatcher	S2 Setter	S2 Hatcher	Ultra Setter	Ultra Hatcher	CS768 Setter
1-2	Jumper	Jumper	Jumper										
2-3				Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper
JP8	576 Setter	1152 Setter	192 Hatcher	ISIS Setter	ISIS Hatcher	S3 Setter	S3 Hatcher	TES Hatcher	S2 Setter	S2 Hatcher	Ultra Setter	Ultra Hatcher	CS768 Setter
1-3	Jumper	Jumper	Jumper										
3-5				Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper
2-4	Jumper	Jumper	Jumper										
4-6				Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper	Jumper

TABLE 8. VORTECH CPU JUMPER SETTINGS BASED ON TYPE OF MACHINE

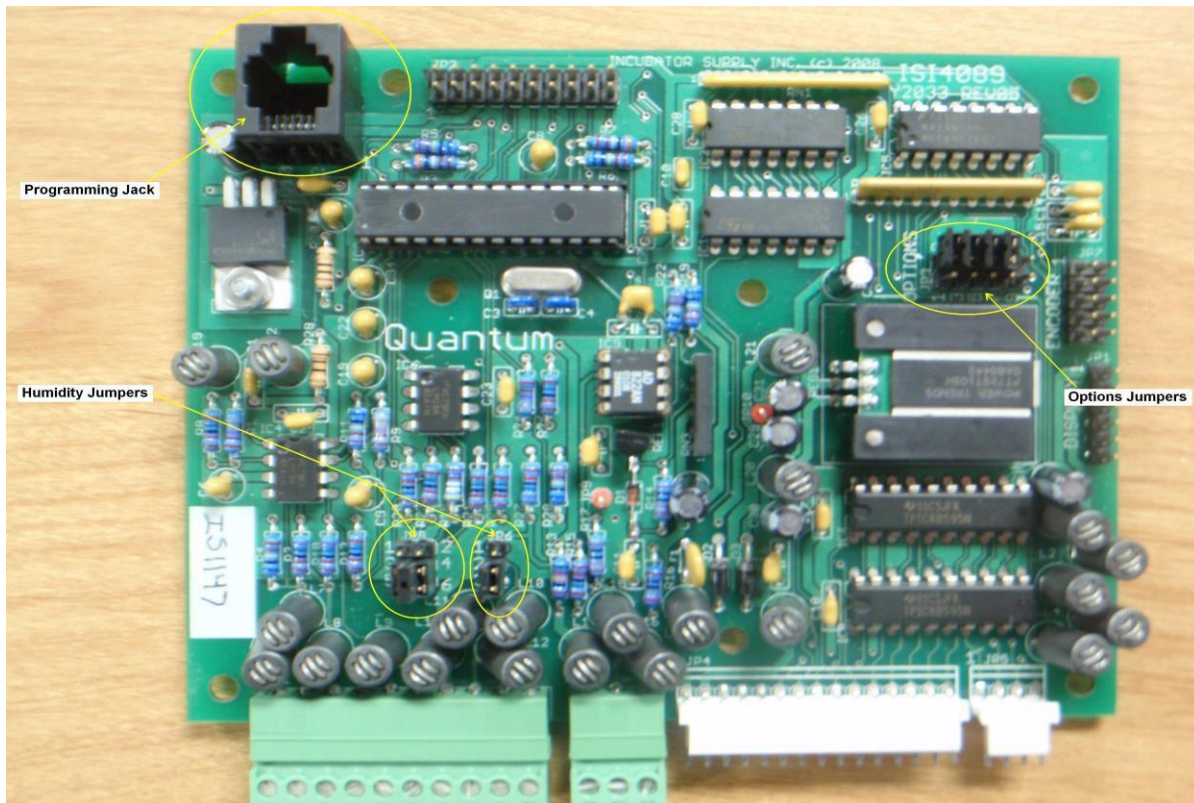


FIG. 8 VORTECH CPU BOARD JUMPER LOCATIONS

11.8 TOROID CURRENT SENSITIVITY ADJUSTMENT PROCEDURE

TOROID SENSITIVITY ADJUSTMENT SHOULD BE PERFORMED DURING INITIAL INSTALLATION OF A VORTECH CONTROL OR UPGRADE THAT INCLUDES TOROID CURRENT SENSING, OR, WHENEVER REPLACING THE VORTECH EXPANSION BOARD IN A CONTROL THAT INCLUDES TOROID CURRENT SENSING.

- ADJUSTMENT ONLY NEEDS TO BE PERFORMED FOR EACH CHANNEL WITH AN ATTACHED TOROID.

I.E. A HATCHER WOULD NOT REQUIRE A TURN TOROID ADJUSTMENT.
- VERIFY ALL ELECTRICAL CONNECTIONS ARE CORRECT BEFORE PERFORMING ADJUSTMENTS.
- TURN **ON** MACHINE AND PLACE IN **RUN** CONDITION WITH FAN AND TURNING CIRCUIT BREAKERS **ON**.

NOTE: POTENTIOMETERS ARE 20 TURNS FROM MINIMUM SETTING TO MAXIMUM SETTING.

1. ADJUST (FAN A) POTENTIOMETER **VR1** CLOCKWISE UNTIL **LED7** GOES **OFF**, ADJUST **VR1** COUNTER-CLOCKWISE UNTIL **LED7** COMES BACK **ON** PLUS ONE FULL TURN.
TEST ADJUSTMENT
BY TURNING **OFF** (FAN A) CIRCUIT BREAKER, WAIT ABOUT 30 SECONDS AND VERIFY **LED7** GOES **OFF**.
TURN (FAN A) CIRCUIT BREAKER BACK **ON**.
2. ADJUST (FAN B) POTENTIOMETER **VR2** CLOCKWISE UNTIL **LED8** GOES **OFF**, ADJUST **VR2** COUNTER-CLOCKWISE UNTIL **LED8** COMES BACK **ON** PLUS ONE FULL TURN.
TEST ADJUSTMENT BY TURNING **OFF** (FAN B) CIRCUIT BREAKER, WAIT ABOUT 30 SECONDS AND VERIFY **LED8** GOES **OFF**.
TURN (FAN B) CIRCUIT BREAKER BACK **ON**.

NOTE: TURNING MOTOR MUST BE RUNNING DURING ADJUSTMENT IN STEP 3.

3. ADJUST **TURN** POTENTIOMETER **VR3** CLOCKWISE UNTIL **LED9** GOES **OFF**, ADJUST **VR3** COUNTER-CLOCKWISE UNTIL **LED9** COMES BACK **ON** PLUS ONE FULL TURN.
TEST ADJUSTMENT BY VERIFYING **LED9** GOES **OFF** ABOUT 30 SECONDS AFTER THE TURNING MOTOR STOPS RUNNING.
- RETURN EQUIPMENT TO ITS NORMAL OPERATING CONDITION.

11.9 PROBE CALIBRATION PROCEDURE

A PROBE CALIBRATION PROCEDURE SHOULD BE PERFORMED DURING INITIAL INSTALLATION OF A VORTECH CONTROL OR WHEN REPLACING A CPU BOARD OR PROBES. AFTER PERFORMING AN INITIAL CALIBRATION PROCEDURE IT SHOULD BE PERFORMED EVERY SO OFTEN TO ENSURE THAT THE PROBES ARE PROVIDING ACCURATE DATA. THIS CAN BE DONE ANNUALLY, QUARTERLY, OR EVEN MONTHLY IF DESIRED.

USING A CALIBRATION KIT ISI4976 THE PROBE CALIBRATION CAN BE PERFORMED AS FOLLOWS: (NOTE: IF USING ANOTHER TYPE OF CALIBRATION DEVICE OR KIT THESE DIRECTIONS CAN BE USED AS A GENERAL GUIDELINE IN HOW TO PERFORM THE CALIBRATION PROCEDURE):

MASTER THERMOMETER IS ENCLOSED IN THE KIT; TEMPERATURE RANGES FROM 93°F TO 105 °F.

- 1) PLUG IN THE UNIT NEAR THE MACHINE AND TURN IT ON
- 2) ATTACHING PROBES:
 - A. ATTACH THE FRONT PROBE (PROBE IS CLEARLY MARKED ON KIT) TO THE FRONT SENSOR IN THE MACHINE, USE A RUBBER BAND OR SOMETHING SIMILAR IF POSSIBLE.
 - B. ATTACH THE REAR PROBE (PROBE IS CLEARLY MARKED ON KIT) TO THE REAR SENSOR IN THE MACHINE, USE A RUBBER BAND OR SOMETHING SIMILAR IF POSSIBLE TO ATTACH THE TWO TOGETHER. TRY TO HAVE THEM AS CLOSE TOGETHER AS YOU CAN IF THEY CANNOT BE ATTACHED TOGETHER.
 - C. TAKE THE WICK OFF OF THE HUMIDITY SENSOR. ATTACH THE HUMIDITY PROBE TO THE HUMIDITY SENSOR IN THE MACHINE, USE A RUBBER BAND OR SOMETHING SIMILAR IF POSSIBLE.
- 3) WAIT FOR THE MACHINE TO STABILIZE (THIS MAY BE AIDED BY TURNING OFF ALL HEATING AND COOLING AND WAITING A SUFFICIENT AMOUNT OF TIME FOR THE MACHINE TO STABILIZE.)

*****THIS STEP IS CRUCIAL AS A CONSTANT NON-VARIABLE TEMPERATURE MUST FIRST BE ESTABLISHED, WITHIN THE RANGE OF THE MASTER THERMOMETER, OR THE CALIBRATION WILL BE UNSUCCESSFUL*****

- 4) CALIBRATE THE MACHINE ACCORDING TO WHAT IS DISPLAYED ON THE SCREEN OF THE KIT (FRONT TEMP, REAR TEMP AND HUMIDITY ARE THE THREE READINGS DISPLAYED ON THE KIT, AND THE MACHINE SHOULD BE CALIBRATED TO THESE THREE READINGS).
(see sec. 10.7.1.18, sec. 10.7.1.19, & sec. 10.7.1.20).

[NOTE: IT IS ALSO IMPORTANT TO PERIODICALLY CALIBRATE THE KIT ITSELF USING THE MASTER THERMOMETER. FOR MORE ON THIS PROCEDURE REFER TO THE INSTRUCTIONS SENT WITH ISI4976.]