INSTRUMENT IDENTIFICATION LETTERS

	FIRST LETTER(S)		SUCCEEDING LETTERS		
	PROCESS OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER FLAME		USERS CHOICE(*)	USERS CHOICE(*)	USERS CHOICE(*)
C	CARBON DIOXIDE			CONTROL	
D	DENSITY (S.G.)/DEWPOINT	DIFFERENTIAL		DAMPER	
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO			
G	GAUGE		GLASS	GATE	
H	HAND (MANUAL)				HIGH
I	CURRENT		INDICATE		
J	POWER	SCAN			
K	TIME OR SCHEDULE	RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOTION/MOISTURE	MOMENTARY			
N	DIAL VOLATILE OR GAME COMPUTER		USERS CHOICE(*)	USERS CHOICE(*)	USERS CHOICE(*)
O	OXYGEN		OXYGEN		
P	PRESSURE (OR VACUUM)		POINT (TEST CONNECTION)		
Q	QUANTITY OR EVENT(*)	INTEGRATE	INTEGRATE		
R	RADIATION		RECORD OR PRINT		
S	SPEED OR FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE(*)		MULTIFUNCTION(*)	MULTIFUNCTION(*)	MULTIFUNCTION(*)
V	VIBRATION, MECH ANALYSIS			VALVE	
W	WEIGHT OR FORCE		WELL		
X	CARBON MONOXIDE		UNCLASSIFIED(*)	TRANSFORMER	UNCLASSIFIED(*)
Y	EVENT (STATUS)			RELAY OR COMPUTE(*)	
Z	POSITION, DIMENSION			DRIVER, ACTUATOR OR UNCLASSIFIED FINAL CONTROL ELEMENT	

(*) WHEN USED, EXPLANATION IS SHOWN ADJACENT TO INSTRUMENT SYMBOL. SEE ABBREVIATIONS AND LETTER SYMBOLS.
EXAMPLE: PT=PRESSURE TRANSMITTER, HS=HAND SWITCH

SEQUENCE OF CONTROLS - GENERAL

1. SEQUENCES OUTLINED (UNLESS OTHERWISE SPECIFIED) SHALL BE PERFORMED BY DIRECT DIGITAL CONTROLS.

2. UNLESS OTHERWISE SPECIFIED, ALL SETPOINTS AND TIME DELAYS SHALL BE ADJUSTABLE BY THE OPERATOR THROUGH THE BAS.

3. ABILITY TO REVIEW ALL MEASURED DATA, CONTROL SETPOINTS AND FUNCTIONS SHALL BE PROVIDED AT BAS WORKSTATION.

4. PROVIDE MENU DRIVEN CAPABILITY TO OVERRIDE AUTOMATED START/STOP OR OPERATING MODES FOR EACH PIECE OF EQUIPMENT (INCLUDING FAN COIL UNITS, FANS, VAV BOXES, ETC...). IF A SEQUENCE IS DISABLED BY MANUAL INPUT AND THE BAS ATTEMPTS AN AUTOMATED CHANGE IN OPERATING MODE, AN ALARM SHALL BE INITIATED AT THE BAS STATING THAT THE SYSTEM WAS UNABLE TO CHANGE THE MODE DUE TO USER INPUT. WHERE APPLICABLE A MANUAL INPUT COMMAND WILL THEN BE REQUIRED FROM THE USER INSTRUCTING THE BAS TO START THE NEXT SEQUENTIAL PIECE OF EQUIPMENT.

5. THE DESIGN INTENT IS FOR THE BAS TO MONITOR PRESSURES, TEMPERATURES AND FLOWS. MONITORED DATA WILL BE USED TO ENERGIZE OR DE-ENERGIZE EQUIPMENT IN ACCORDANCE WITH THE SEQUENCES OUTLINED.

6. THE FOLLOWING DEFINITIONS APPLY TO THE SEQUENCES OF OPERATION:
   a. BAS: BUIDING DDC AUTOMATION SYSTEM (FX JOHNSON)
   b. END DEVICE / POINT: MONITORED SENSORS AND CONTROLLED OPERATORS FOR SPECIFIC EQUIPMENT ITEMS. END DEVICES WILL PROVIDE A VARIETY OF ANALOG OR BINARY INPUT SOURCES TO THE DDCFPS AS WELL AS RECEIVE OUTPUTS FROM LOCAL CONTROLLERS OR DDCFPS.

7. UNLESS NOTED OTHERWISE THE FOLLOWING SHALL BE INITIAL SPACETEMPERATURE SETPOINTS (ALL SETPOINTS SHALL BE ADJUSTABLE THROUGH DDC SYTEM):
   a. OFFICE SPACES, CONFERENCE ROOMS AND OTHER OCCUPIED SPACES:
      OCCUPIED 5:30 AM TO 5:00 PM MONDAY THROUGH FRIDAY
      UNOCCUPIED ALL OTHER TIME PERIODS

      DAYTIME OCCUPIED COOLING 75 DEGREES F (ADJ.)
      DAYTIME OCCUPIED HEATING 70 DEGREES F (ADJ.)

      NIGHT TIME UNOCCUPIED COOLING 85 DEGREES F (ADJ.)
      NIGHT TIME UNOCCUPIED HEATING 55 DEGREES F (ADJ.)
   b. ELECTRIC CLOSETS:
      COOLING 85 DEGREES F (ADJ.)
   c. DATA ROOMS, IDF, MDF, TELE/DATA ROOMS:
      COOLING 75 DEGREES F (ADJ.)

   * REFER TO INDIVIDUAL SEQUENCES FOR ADDITIONAL VARIABLE SETPOINTS.

8. THERMOSTATS

   ATC SHALL PROVIDE SPACE MOUNTED THERMOSTATS SHALL HAVE LED DISPLAYS WITH +/-2°F ADJUSTMENT CAPABILITIES.

9. ALL SENSORS AND DEVICES APPEARING ON THE CONTROL DIAGRAMS AND/OR DRAWINGS BUT ARE NOT REFERENCED SPECIFICALLY IN SEQUENCES SHALL BE INSTALLED AND SEND FEEDBACK TO THE DDC CONTROL SYSTEM TO ASSIST THE OPERATOR. SIMILARLY, DEVICES REQUIRED TO COMPLETE ALL SEQUENCES HEREIN WHICH ARE NOT SHOWN ON THE DESIGN DOCUMENTS SHALL BE INCLUDED UNDER THE ATC CONTRACTORS SCOPE OF WORK.

GENERAL INSTRUMENT / FUNCTION SYMBOLS

FIELD MOUNTED DEVICE

REAR OF PANEL MOUNTED DEVICE

PANEL MOUNTED DEVICE

REAR OF PANEL MOTOR CONTROL CENTER MOUNTED DEVICE

MOTOR CONTROL CENTER MOUNTED DEVICE

FMS SHARED CONTROL & DATA AQUISITION SYSTEM FUNCTION

HARDWIRED INTERLOCK RELAY LOGIC

SOFTWARE INTERLOCK LOGIC

COMMUNICATION PORT

PILOT LIGHT

MODIFIER SYMBOLS AND DESCRIPTIONS SHOWN BELOW

Δ	DIFFERENTIAL	F(x)	CHARACTERIZED
Σ	SUM	Ω	PULSE I/O
X	MULTIPLIER	|:|	REPEAT OR BOOST
÷	DIVIDE	>	SELECT HIGHEST SIGNAL
√	SQUARE ROOT	<	SELECT LOWEST SIGNAL
Ā	AVERAGE		
OC	OPEN/CLOSE		
OO	ON/OFF		
SS	START/STOP		
AUTO	AUTO		

1 PROVIDED AND INSTALLED BY UNIT MANUFACTURER.
2 PROVIDED BY MANUFACTURER, INSTALLED BY CONTRACTOR.
3 BY LSS/FIRE ALARM CONTRACTOR.

INSTRUMENT IDENTIFICATION SYMBOL

INSTRUMENT ABBREVIATION — XX
SYMBOL MODIFIER OR SETPOINT — FF
DEVICE NUMBER — ##

EQUIPMENT SYMBOLS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	CENTRIFUGAL FAN	XY	X = ANALOG(A) OR DIGITAL(D) Y = OUTPUT(O) OR INPUT(I)
	VAV BOX (STD TERMINAL BOX)		

PIPING AND CONNECTIONS

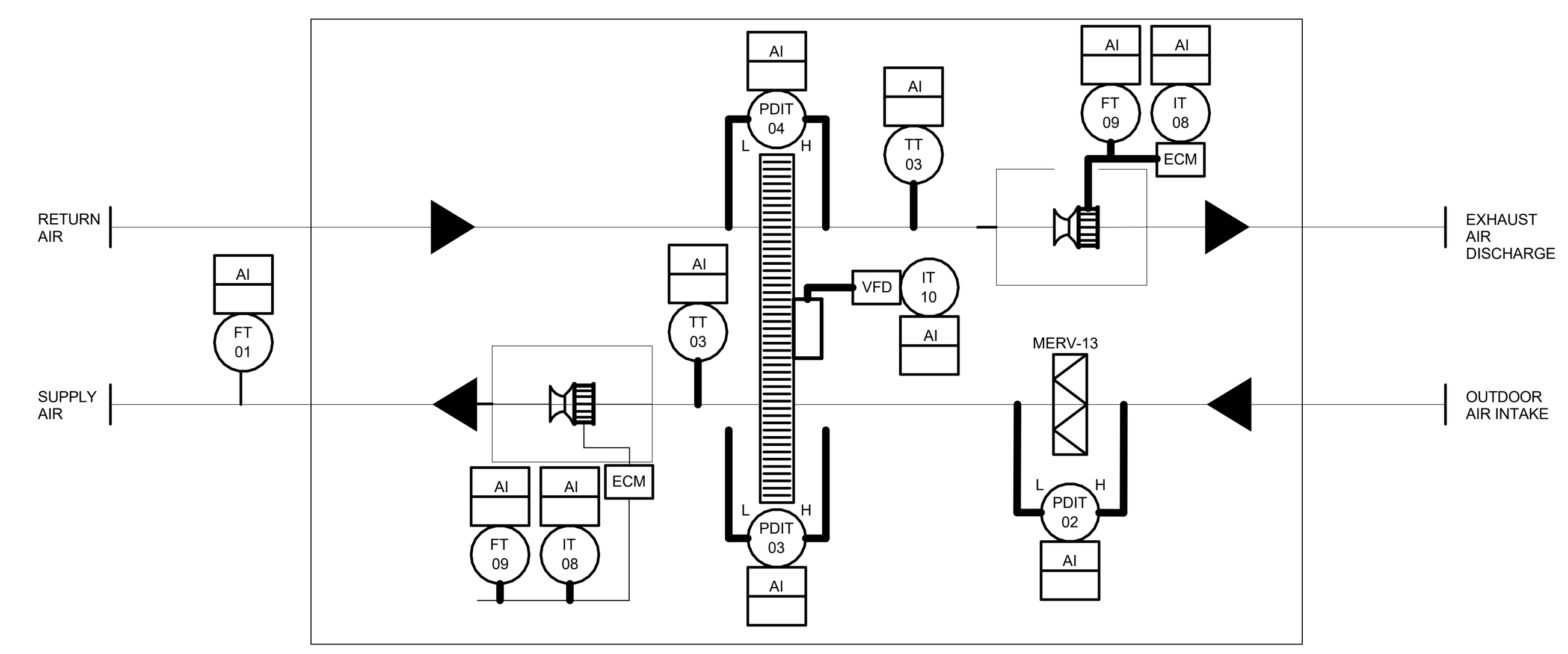
PIPING

PROCESS CONNECTION

ELECTRIC SIGNAL

DATA LINK SIGNAL

1 CONTROLS LEGEND



SEQUENCE OF OPERATION

A. GENERAL

1. REQUIREMENTS OF "SEQUENCE OF OPERATION-GENERAL" APPLY TO ALL SEQUENCES.
2. THE ERV SHALL BE CONTROLLED BY THE BASE BUILDING BMS.
3. THE ATC CONTRACTOR SHALL BE RESPONSIBLE FOR ALL INTERCONNECTING WIRING.
4. THE VENTILATION AIR TO THE INDOOR FCUs WILL BE CONTROLLED BY A DEDICATED ROOF MOUNTED ERV CONTROLLED IN RESPONSE TO OCCUPANCY SCHEDULE.
5. ERV UNIT SHALL BE CONTROLLED BY A LOCAL (BOX MOUNTED) DIRECT DIGITAL CONTROLLER COMMUNICATING WITH THE ERV PACKAGED CONTROLS.
6. ERV AIR FLOW RATE SHALL BE CONSTANT VOLUME.
7. OCCUPIED/UNOCCUPIED PERIODS SHALL BE DETERMINED BY AN OWNER SPECIFIED SCHEDULE.

B. SAFETIES

1. THE FOLLOWING SAFETIES, WHICH ARE INTEGRAL TO THE UNIT, SHALL SHUTDOWN THE UNIT.
   a. INTEGRAL UNIT FAULT SIGNALS

C. OCCUPIED/UNOCCUPIED MODE

1. THE VENTILATION AIR TO THE SPACE SHALL BE CONSTANT.
2. DURING OCCUPIED PERIODS THE ERV FANS SHALL ENERGIZE AND PROVIDE SCHEDULED AIRFLOW AT CONSTANT RATE. DURING UNOCCUPIED PERIODS THE FANS SHALL DE-ENERGIZE.

1 ENERGY RECOVERY UNIT CONTROL DIAGRAM
P&ID

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CROCKFORDS - RESORTS WORLD CATSKILLS

888 resorts World Dr
Monticello, NY 12701

JCJ ARCHITECTURE
120 HUYSHOPE AVENUE
SUITE 400
HARTFORD, CT 06106
860.247.9226

CONSULTANT:
VANDERWEIL
R.G. Vanderweil Engineers, LLP
274 Summer Street
Boston, MA 02210
617.423.7423 TEL
617.423.7401 FAX
vanderweil.com

BIDDING & CONSTRUCTION
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DRAWN	Author
SCALE	12" = 1'-0"
REVISIONS	

CONTROLS DIAGRAMS

M-15