

HVAC Control System Functional Description and Truth Table

General:

1	The HVAC system shall be controlled by a PLC or computer based digital control system, using software designed to work with industry standard signals and devices that allows local control and local and remote (internet) control and monitoring of all system functions, data logging, and programming by the building manager. System to allow direct integration of building lighting controls in the future. Initial setup to the requirements of this functional description, and one additional week of training and system tuning shall be included in the contract price.
2	Provide a wall mounted attractive temperature indicating transmitter in each area supplied by a heating and cooling coil and in each office space supplied by radiant baseboard heaters
3	Provide a temperature and pressure indicating transmitter on each zone header and on the main glycol loop in and out of the mechanical room.
4	Provide an outdoor air temperature indicating transmitter located in the mechanical room
5	Provide boiler controls to stage boilers to maintain a return water mixed temperature of 140 F for heating , and open and close electric block valves based on boiler operation. Provide return water temperature reset based on outdoor air temperature for boilers, and a separate reset temperature for the perimeter radiation by modulating the perimeter loop bypass valve.
6	Provide MAU controls to modulate air temperatures for zone control, and provide return air, mixed air and outside based on the occupancy schedule of the zone. Full outside air shall be provided during occupied modes for Economizer operation. Dampers shall be closed and fans shut off in unoccupied modes. Variable speed supply fans and exhaust shall provide supply air and recirculation volumes noted for occupied and unoccupied modes. (VSD are presently installed on Supply and exhaust fans for the first and second floors only. New supply and exhaust VFD drives will be installed for the basement and third floor).
7	Provide MAU controls to allow economizer damper operation in the summer cooling mode.
8	Note: The existing kitchen exhaust hood must be interlocked to the supply fan as per NFPA 98 and to the fire suppression system and gas valve.
9	Provide main circulating pump and boiler pump controls to provide a constant head to the system under all operating conditions.
10	Provide individual perimeter zone, forced flow heater and unit heater valve controls to maintain individual space temperatures.
11	Provide control of all lighting contactors as provided by the electrical contractor for each zone based on the occupancy schedule.
12	Provide an indication and data log of electric power consumption and gas and water use based on input signals from the CT's and meters provided
13	Provide a building manager changeable occupancy schedule interface and temperature and lighting control schedule for each of the controllable zones.
14	Provide local HMI and remote (cell phone or pager) alarms for all critical conditions, and log the alarms. Provide hard drive storage for 12 months data.
15	Provide economizer controls to use full outside air for cooling when possible for the basement, first, second and third floors.
16	Automatic heating / cooling changeover shall be provided as follows:
A	When one floor zone is calling for cooling, if the economizer setting cannot provide any additional cooling, and the zone exceeds 2.5 degrees F higher than the setpoint, fans shall modulate to minimum occupied make-up air flow, and the DX system shall start for mechanical cooling for the first, second, third and basement MAU.
B	When a floor zone is calling for heating, and the zone exceeds 2.5 degrees F lower than the setpoint, DX cooling shall be turned off and the MAU coils and boilers shall be turned on for heating for the first, second, third floors and basement.
C	Final perimeter zones have not been established and no mechanical cooling is presently available for the offices. This will be addressed at a later date but the DDC system should allow for this work.
D	There is presently no mechanical cooling for the third floor. This will be installed at a later date.
17	Provide operation of DWH circulation pumps during programmed operating hours.
18	Provide operation of bathroom exhaust fans during programmed operating hours.

Notes: The existing DDC system controls for the first and second floor are attached.

CIRCULATION PUMP SCHEDULE

PUMP #	ZONE OR SPACE	FUNCTION	Glycol FLOW USGPM	TDH FT Glycol HWH	Type	Est. BHP
HP1	All	Unit Heaters	60	40	Fixed speed	1
HP2	All	MAU Coils	101	40	Fixed speed	1.7
HP3	All	Wall radiation	35	50	Fixed speed	0.8
HP4	All	Boiler 1	60	20	Fixed speed	0.5
HP5	All	Boiler 2	60	20	Fixed speed	0.5
HP6	All	Boiler 3	60	20	Fixed speed	0.5
HP7	All	Boiler 4	60	20	Fixed speed	0.5
				DHW		
HP10	All	HW circ	0.5	30	Fixed speed	0.1

AS BUILT

DATE: _____



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Mechanical/HVAC Functional Description Planet Bingo	
REV.	DATE
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