

NO SCALE

- (1) ALL VALVE, DAMPER AND SMOKE DAMPER ACTUATORS SHALL BE ELECTRIC/ELECTRONIC.
- (2) DUCT SMOKE DETECTORS SHALL BE FURNISHED UNDER THE ELECTRICAL SECTION OF THE SPECIFICATIONS AND INSTALLED IN THE DUCT UNDER THIS SECTION OF THE SPECIFICATIONS. CONTROL AND POWER WIRING TO AND FROM THE FIRE ALARM CONTROL PANEL SHALL BE FURNISHED AND INSTALLED UNDER THE ELECTRICAL SECTION OF THE SPECIFICATIONS.
- (3) ALL CONTROL, POWER WIRING AND CONDUIT NOT INDICATED ON THE ELECTRICAL DRAWINGS AND REQUIRED FOR THE CONTROL AND OPERATING SEQUENCES AS HERE-IN-AFTER INDICATED SHALL BE FURNISHED AND INSTALLED UNDER THIS SECTION OF THE SPECIFICATIONS, IN COMPLIANCE WITH ALL DIVISION 16000 SPECIFICATIONS AND GENERAL NOTE 6 ON SHEET MO-1.
- (4) WHEN A POWER FAILURE OCCURS, ALL MECHANICAL HVAC MOTORS SHALL BE RESTARTED AT VARIABLE TIME INTERVALS TO PREVENT SUDDEN INRUSH CURRENT. SEE ELECTRICAL DRAWINGS FOR STARTING REQUIREMENTS.
- (5) ALL HAND-OFF-AUTO SWITCHES SHALL BE MOUNTED ON OR NEAR THE DCP CONTROL PANEL.
- (6) ALL CONTROL VALVES SHALL BE THREE (3) WAY UNLESS OTHERWISE INDICATED.






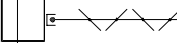

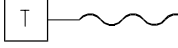
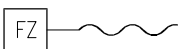



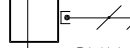
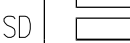

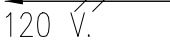
1. GENERAL:

- (A) THE DDC SYSTEM SHALL PLACE THE SYSTEMS IN OPERATION. WHEN PLACED IN OPERATION THE CONTROL SYSTEM/S SHALL BE ENERGIZED THROUGH HAND-OFF AUTO SWITCHES (WHEN IN AUTO POSITION), DAMPERS SHALL OPEN TO THEIR RESPECTIVE POSITIONS (SEE WARM-UP CYCLE AND COOL DOWN CYCLE INDICATED ON SHEET M9-3) AND AFTER A VARIABLE TIME DELAY AIR HANDLING UNIT FAN/S AND THEIR INTERLOCKED FANS SHALL START.
- (B) WHEN EVER AIR HANDLING UNIT/S ARE STOPPED CONTROL SYSTEM SHALL BE DE-ENERGIZED, ALL DAMPERS SHALL CLOSE, AIR HANDLING UNIT/S AND INTERLOCKED FANS SHALL STOP.
- (C) ANY SPACE/DUCT SMOKE DETECTOR SENSING SMOKE SHALL SIGNAL THE FIRE ALARM CONTROL PANEL. THE FIRE ALARM CONTROL PANEL SHALL SIGNAL ALL AIR HANDLING UNITS WITH-IN THE AFFECTED ZONE (SMOKE COMPARTMENT) THAT AN ALARM EXIST. THE ABOVE CONTROL IS FURNISHED AND INSTALLED UNDER THE ELECTRICAL SECTION OF THE SPECIFICATIONS. THE FOLLOWING IS FURNISHED AND INSTALLED UNDER THIS SECTION OF THE SPECIFICATIONS. WHEN AN ALARM IS RECEIVED THE AIR HANDLING UNITS WITH-IN THE AFFECTED ZONE (SMOKE COMPARTMENT) SHALL STOP, INTERLOCKED FANS SHALL STOP, UNLESS OTHERWISE INDICATED. AND ALL DAMPERS SHALL CLOSE. THE SYSTEM MAY ONLY BE RESTARTED BY THE FIRE DEPARTMENT OR OTHER QUALIFIED PERSONNEL FROM THE FIRE ALARM CONTROL PANEL. WHEN AN ALL CLEAR SIGNAL IS RECEIVED ALL SMOKE DETECTORS, ETC. SHALL BE AUTOMATICALLY RESET, DAMPERS SHALL OPEN TO THEIR RESPECTIVE POSITIONS, AFTER A VARIABLE TIME DELAY AIR HANDLING UNIT FAN/S AND INTERLOCKED FANS SHALL START. SEE (D) BELOW FOR VFD DRIVE CONTACTORS FOR BYPASS DRIVE OPERATION.
- (D) THE AIR HANDLING UNIT FAN SHALL OPERATE SUBJECT TO THE FIRE ALARM SYSTEM CONTROL. ANY TIME THAT THE VFD DRIVE SUPPLY OR RETURN AIR FAN IS PLACED IN THE "BYPASS" POSITION ALL TERMINAL UNITS ASSOCIATED WITH THAT AHU SUPPLY OR RETURN AIR FAN SHALL OPEN TO 100% AIR FLOW.
- (E) EXHAUST FANS EF1-1 THROUGH EF1-4 AND EF2-1 THROUGH EF2-3 OPERATION SHALL BE MONITORED THROUGH THE DDC SYSTEM.

WHEN THE SYSTEM IS IN OPERATION HERE-IN-BEFORE INDICATED THE FOLLOWING SEQUENCE SHALL OCCUR. THE MINIMUM OUTSIDE AIR FLOW SHALL BE MEASURED THROUGH A DUCT MOUNTED AIR FLOW MEASURING STATION LOCATED IN THE OUTSIDE AIR DUCT. WHEN THE OUTSIDE AIR TEMPERATURE IS AT OR ABOVE 21° C. THE MIN. OUTSIDE AIR DAMPER (D-1) SHALL OPEN, THE RETURN AIR AND RELIEF AIR DAMPERS (D-2 & D-3) SHALL MODULATE TO MAINTAIN THE MINIMUM OUTSIDE AIR FLOW, THE ECONOMIZER AND RELIEF AIR DAMPERS (D-4 & D-5) SHALL BE CLOSED AND COOLING COIL CONTROL VALVE (V-1) SHALL MODULATE TO MAINTAIN A DISCHARGE AIR TEMPERATURE OF 11.4° C. SET POINT TEMPERATURE. WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW 21° C. THE MIN. O.A. DAMPER (D-1) SHALL BE OPEN, RETURN AIR, ECONOMIZER AND RELIEF AIR DAMPERS (D-3, D-4 & D-5) SHALL MODULATE IN SEQUENCE WITH THE COOLING COIL CONTROL VALVE (V-1) TO MAINTAIN DISCHARGE AIR TEMPERATURE SETPOINT OF 11.4° C. TEMPERATURE AND THE MINIMUM OUTSIDE AIR FLOW SHALL BE MAINTAINED. WHEN THE OUTSIDE AIR TEMPERATURE DROPS BELOW 11.4°C. COOLING COIL CONTROL VALVE (V-1) SHALL BE CLOSED TO THE COOLING COIL AND ECONOMIZER, RELIEF AND RETURN AIR DAMPERS (D-3, D-4 & D-5) SHALL MODULATE IN SEQUENCE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE OF 11.4° C.. TWO DUCT MOUNTED STATIC PRESSURE SENSOR/CONTROLLERS SHALL MODULATE THE VARIABLE FREQUENCY DRIVES MOUNTED NEAR THE AHU, THROUGH A DISCRIMINATOR SELECTOR, TO MAINTAIN A MINIMUM STATIC PRESSURE OF 250 Pa SET POINT. THE RETURN AIR FAN SHALL TRACK THE OPERATION OF THE SUPPLY FAN BY MAINTAINING A CONSTANT DIFFERENTIAL AIR FLOW EQUAL TO THAT OF THE MINIMUM OUTSIDE AIR. SUPPLY AND RETURN AIR FLOWS SHALL BE MEASURED BY AIR FLOW MEASURING STATIONS MOUNTED IN THE FAN INLET/S. A HIGH STATIC PRESSURE SENSOR SHALL SHUT DOWN BOTH SUPPLY AND RETURN AIR FAN DRIVES WHEN DUCT PRESSURE RISES ABOVE 1250 Pa. THIS CONTROLLER SHALL BE DIRECTLY CONNECTED TO THE VFD DRIVES AND SHALL ALARM THE DDC SYSTEM ON HIGH STATIC PRESSURE SHUT DOWN.

NOTE:
1. SEE FAN SCHEDULE FOR QUANTITY OF INTERLOCKED FANS.
* SEE PLANS FOR QUANTITY



	ANALOG INPUT
	ANALOG OUTPUT
	DIGITAL INPUT
	DIGITAL OUTPUT
DP	DIFFERENTIAL PRESSURE
AFMS	AIR FLOW MEASURING STATION
SP	STATIC PRESSURE
	TEMPERATURE
	CONTROL DAMPER
	THREE WAY CONTROL VALVE
	TEMPERATURE SENSOR
	FREEZESTAT
	DIFFERENTIAL PRESSURE SENSOR
	FLOW SWITCH
	STATIC PRESSURE SENSOR
	SMOKE DAMPER
SMK. DPR.	
	SMOKE DETECTOR
SD	
AC-X	AIR CONDITIONING UNIT (PACKAGE TYPE DX)
ACCU-X	AIR COOLED CONDENSING UNIT
C.V.	ELEC. COIL
CWR	CONSTANT VOLUME
CWS	CHILLED WATER RETURN
DDC	CHILLED WATER SUPPLY
EA	DIRECT DIGITAL CONTROL
EA	EXHAUST AIR
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
LLT	LOW LIMIT HEATING THERMOSTAT
MA	MIXED AIR
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OA	OUTDOOR AIR
OAD	OUTSIDE AIR DAMPER
OAT	OUTSIDE AIR THERMOSTAT
RA	RETURN AIR
TOS	TIMED OVERRIDE SWITCH
T.U.	TERMINAL UNIT
TU STAT	TERMINAL UNIT THERMOSTAT
VAR	VARIABLE AIR VOLUME
VFD	VARIABLE FREQUENCY DRIVE
	TELEPHONE CABLE
	120 VOLT POWER

IF SHEET IS LESS THAN 28"x42", IT IS A REDUCED PRINT. SCALE REDUCED ACCORDINGLY.

M9-1

MEDICAL/DENTAL CLINIC

HVAC CONTROL DIAGRAMS

SIZE	CODE IDENT. NO.	DRAWING NO.	
F	XXXXXX	8144753	
		CONST. CONTR. NO.	
SCALE:	AS SHOWN	SPEC. 11996048	SHEET 248 OF 316