MECHANICAL SYMBOL LEGEND

ANNOTATIONS

- X / X-X — EQUIPMENT IDENTITY (SEE EQUIPMENT ABBREVIATION LIST AND SCHEDULES); EQUIPMENT NUMBER; SYSTEM NUMBER (IF APPLICABLE)
- X / X — INDICATES DETAIL, PLAN, SECTION, AND/OR DIAGRAM/APPLIES ONLY WHERE INDICATED ON DRAWINGS); INDICATES DRAWING ON WHICH DETAIL APPEARS
- TYP / X — INDICATES TYPICAL DETAIL (APPLIES TO ALL CONTRACT DRAWINGS); INDICATES DRAWING ON WHICH DETAIL APPEARS
- X / X — INDICATES SECTION NUMBER; INDICATES ON WHICH DRAWING SECTION APPEARS
- X — INDICATES REVISION & NUMBER
- X — KEYED NOTE NUMBER
- M — CONTROL DAMPER- OPPOSED BLADE WITH ACTUATOR
- U — UNDERCUT DOOR
- L — DOOR LOUVER, TITUS CT-700L OR EQUAL
- SUPPLY AIR
- RETURN AIR
- EXHAUST AIR
- FD — FIRE DAMPER W/ ACCESS DOOR
- FSD — FIRE SMOKE DAMPER W/ ACCESS DOOR
- VD — VOLUME DAMPER
- S — SMOKE DAMPER W/ ACCESS DOOR
- CONNECT NEW TO EXISTING
- DEMOLISH TO THIS POINT
- EXISTING ITEMS TO BE REMOVED
- EXISTING TO REMAIN
- NEW

DUCTWORK

DOUBLE LINE		SINGLE LINE
VD	MANUAL VOLUME DAMPER (MVD) MOTOR OPERATED DAMPER (MOD)	VD
AD	ACCESS DOOR	AD
	RADIUS ELBOW (R=1.5)	
	ELBOW W/ TURNING VANES	
	REC. BRANCH DUCT TAKE-OFF W/ VD	
	ROUND BRANCH DUCT TAKE-OFF W/ VD	
D R	RISE OR DROP DIRECTION OF AIR FLOW	D R
	FLEXIBLE CONNECTION (FXC)	
	DIFFUSER	
A CFM		A CFM
A CFM	SUPPLY AIR GRILLE (G) OR SUPPLY AIR REGISTER (R)	A CFM

PIPING

- PIPE RISING UP
- PIPE DROPPING DOWN
- DIRECTION OF FLOW
- GATE VALVE
- BUTTERFLY VALVE
- BALL VALVE
- CHECK VALVE
- AUTOMATIC CONTROL VALVE (2-WAY)
- AUTOMATIC CONTROL VALVE (3-WAY)
- PIPE REDUCING FITTING
- WM — WATER METER
- PRESSURE REDUCING VALVE (PSI)
- STRAINER
- FS — FLOW SWITCH
- THERMOMETER
- PRESSURE GAUGE
- PIPE WELL

SENSORS

S	DUCT SMOKE DETECTOR	CO	CARBON MONOXIDE DETECTOR
T	THERMOSTAT	NO	NITROGEN OXIDE DETECTOR
T	TEMPERATURE SENSOR	R	REMOTE MANUAL PULL FOR HOOD
H	HUMIDISTAT		

GENERAL NOTES

1. DO NOT SCALE FROM THESE DRAWINGS. EXACT DIMENSIONS SHALL BE TAKEN FROM ARCHITECTURAL DRAWINGS.
2. ALL INDICATED WORK SHALL BE PERFORMED BY THE MECHANICAL CONTRACTOR UNLESS OTHERWISE NOTED.
3. MECHANICAL DRAWINGS ARE DIAGRAMMATIC. ALL REQUIRED OFFSETS, RISES AND DROPS DUE TO POSSIBLE OBSTRUCTIONS OF PIPE RUNS ARE NOT NECESSARILY SHOWN. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRANSITIONS, FITTINGS, ELBOWS, DUCTWORK, PIPING, SUPPORTS, ETC. NECESSARY FOR A PROPER INSTALLATION AND OPERATION OF NEW HVAC SYSTEM. MECHANICAL CONTRACTOR SHALL INCLUDE A CONTINGENCY IN HIS BID TO OFFSET ANY COST REQUIRED FOR ADDITIONAL FITTINGS AND LABOR THAT MAY BE REQUIRED.
4. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF ALL APPLICABLE CODES AND REGULATIONS INCLUDING BUT NOT LIMITED TO NATIONAL, CITY, STATE AND LOCAL ORDINANCES WHICH MAY BE IN EFFECT. ALL MECHANICAL MATERIALS, INSTALLATION PROCEDURES AND SYSTEM LAYOUTS SHALL BE APPROVED BY ALL APPLICABLE CODE ENFORCEMENT AUTHORITIES HAVING JURISDICTION, AND IT SHALL BE THE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO PAY FOR ALL NECESSARY PERMITS AND APPROVALS FOR THIS INSTALLATION.
5. IT IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO REVIEW THESE PLANS AND SPECIFICATIONS, AS WELL AS THE RELATED PLUMBING, FIRE PROTECTION, ELECTRICAL, STRUCTURAL, ARCHITECTURAL, INTERIOR DECOR, AND SITE ENGINEERING DRAWINGS TO BECOME FAMILIAR WITH THE FULL PROJECT SCOPE. IN ADDITION, THIS CONTRACTOR MUST COORDINATE WITH AN OWNER REPRESENTATIVE TO FULLY UNDERSTAND ALL REQUIREMENTS WHICH MAY NOT BE SPECIFIED HEREIN AND WHICH THE OWNER MAY CONSIDER PART OF THIS CONTRACT. DURING THE COURSE OF CONSTRUCTION COORDINATION AND ACTUAL CONSTRUCTION, IT IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO WORK CLOSELY WITH ALL ACCOMPANYING CONTRACTORS AND TRADESMEN IN ORDER TO ENSURE A SMOOTH RUNNING AND CAREFULLY COORDINATED INSTALLATION.
6. ANY DISCREPANCIES OR INADEQUACIES WITHIN THESE BID DOCUMENTS OR BETWEEN THESE BID DOCUMENTS AND THE RELATED PLUMBING, FIRE PROTECTION, ELECTRICAL, STRUCTURAL, ARCHITECTURAL, INTERIOR DECOR AND SITE ENGINEERING DRAWINGS, OR BETWEEN THESE BID DOCUMENTS AND FIELD CONDITIONS MUST BE BROUGHT TO THE ATTENTION OF THE OWNER, ARCHITECT AND ENGINEER PRIOR TO BID SUBMISSION.
7. WHERE CONFLICTS EXIST BETWEEN THE INFORMATION INCLUDED IN THESE DRAWINGS OR BETWEEN INFORMATION PROVIDED IN THESE DRAWINGS AND THE PROJECT SPECIFICATIONS OR WITHIN THE PROJECT SPECIFICATIONS, THE MORE STRINGENT AND/OR HIGHEST COST REQUIREMENTS SHALL APPLY. SHOULD THE CONTRACTOR REQUIRE FURTHER CLARIFICATION, A WRITTEN RFI SHALL BE SUBMITTED FOR CLARIFICATION. WHERE CONFLICTS DO EXIST, THE PROJECT ENGINEER OF RECORD SHALL HAVE THE SOLE DISCRETION AND RIGHT TO PROVIDE INTERPRETATION OF INTENT OF THE CONTRACT DOCUMENTS AS REQUIRED AND THIS INTERPRETATION SHALL SERVE TO DIRECT THE CONTRACTOR IN ACCORDANCE WITH THE IMPLIED INTENT OF THE CONSTRUCTION DOCUMENTS WITHOUT ADDITIONAL COST TO THE PROJECT.
8. PRIOR TO PROCUREMENT OF MATERIALS AND EQUIPMENT, SUBMIT COMPLETE COORDINATED LAYOUT DRAWINGS FOR ALL NEW SYSTEMS, EXISTING SYSTEMS TO BE MODIFIED, AND EXISTING SYSTEMS IN THE PROJECT AREA. COORDINATION DRAWINGS SHALL INCLUDE ALL RELEVANT BUILDING SYSTEMS AS REQUIRED TO DEMONSTRATE A MECHANICAL INSTALLATION COORDINATED WITH ALL BUILDING TRADES. THIS SHALL INCLUDE HVAC, ELECTRICAL, PLUMBING, STRUCTURAL, ARCHITECTURAL AND LOW VOLTAGE. MECHANICAL CONTRACTOR SHALL COORDINATE EXACT LOCATIONS OF NEW MECHANICAL EQUIPMENT WITH LIGHT LOCATIONS AND TILE LOCATIONS. REFER TO ARCHITECTS REFLECTED CEILING PLAN LAYOUT. FAILURE TO SUBMIT COORDINATION DRAWINGS SHALL INDICATE THAT THE CONTRACTOR HAS TAKEN FULL RESPONSIBILITY FOR CROSS-DISCIPLINE COORDINATION EFFORT AND IS PROCEEDING AT HIS OWN RISK.
9. ALL DUCT DIMENSIONS SHOWN ON DRAWINGS ARE CLEAR INSIDE DIMENSIONS. SUPPLY AIR DEVICE VELOCITY SHALL NOT EXCEED 0.10 INCH PRESSURE DROP PER 100 FEET OF DUCT.
10. RUN ALL DUCTWORK AND PIPING WITH AS FEW OFFSETS AS POSSIBLE THROUGHOUT THE ENTIRE BUILDING. COORDINATE AND VERIFY WITH OTHER CONTRACTORS AS NOT TO INTERFERE WITH PLUMBING, FIRE PROTECTION PIPING, LIGHTING SYSTEMS, ETC.
11. ALL EXPOSED HORIZONTAL AND VERTICAL DUCTWORK AND PIPING SHALL BE INSTALLED IN A NEAT ARRANGEMENT IN LOCATIONS WHICH ARE THE MOST INCONSPICUOUS. VERTICAL DROPS SHALL BE KEPT TO AN ABSOLUTE MINIMUM AND THEIR FINAL LOCATIONS SHALL BE COORDINATED AND RUN WITHIN CHASES, WALLS, SOFFITS WITH OTHER MECHANICAL/ ELECTRICAL FEEDS. ALL SUCH LOCATIONS ARE TO BE REVIEWED WITH AN OWNER REPRESENTATIVE AND ARCHITECT PRIOR TO INSTALLATION.
12. ALL BRANCH DUCTS TO AIR DEVICES ABOVE ACCESSIBLE CEILINGS SHALL BE PROVIDED WITH A VOLUME DAMPER IN THE BRANCH CONNECTION. ALL ROUND BRANCH DUCT CONNECTIONS SHALL BE PROVIDED WITH CONICAL SPIN-IN FITTING WITH AN INTEGRAL VOLUME DAMPER. ABOVE NON-ACCESSIBLE CEILINGS, PROVIDE FACE ADJUSTABLE VOLUME DAMPER AT EACH AIR DEVICE.
13. ALL DUCT PENETRATIONS THROUGH A ONE-HOUR RATED ASSEMBLY SHALL BE PROVIDED WITH A FIRE DAMPER.
14. PROVIDE CEILING RADIATION DAMPER FOR EACH PENETRATION OF A FIRE RATED ASSEMBLY CEILING MEMBRANE.
15. DUCT SMOKE DETECTOR LOCATIONS SHOWN ON PLANS ARE DIAGRAMMATIC. REFER TO MANUFACTURER'S INSTRUCTIONS FOR EXACT/OPTIMUM LOCATION IN DUCTWORK. DUCT SMOKE DETECTORS SHALL BE PURCHASED BY THE FIRE ALARM CONTRACTOR AND INSTALLED BY THE MECHANICAL CONTRACTOR. POWER AND WIRING INSTALLATION SHALL BE BY THE ELECTRICAL CONTRACTOR.
16. CONNECTIONS TO ANY GAS FIRED EQUIPMENT TO BE BY THE PLUMBING CONTRACTOR, REGARDLESS OF WHO PROVIDES EQUIPMENT.
17. CONDENSATE SHALL BE PIPED FULL SIZE TO THE NEAREST APPROVED FLOOR OR HUB DRAIN VIA AN INDIRECT CONNECTION. CONDENSATE PIPING SHALL BE BY THE MECHANICAL CONTRACTOR.
18. INSULATE EACH REFRIGERANT LINE-SET PER SPECIFICATIONS.
19. MOUNT ALL THERMOSTATS ABOVE FINISHED FLOOR AT HEIGHT APPROVED BY ARCHITECT. COORDINATE LOCATION WITH ARCHITECTURAL INTERIOR ELEVATIONS AND LIGHTING CONTROL LOCATIONS.
20. INSTALL SLEEVES FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS. INSTALL CHROME PLATED ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS. REFER TO ARCHITECTURAL ROOF DETAILS FOR ROOF PENETRATIONS.
21. WOOD SUPPORTS FOR PIPING OR DUCTWORK ROUTED ALONG THE ROOF ARE NOT ACCEPTABLE. USE PIPE SUPPORTS, PATE OR EQUAL.
22. ALL PLUMBING VENTS AND BUILDING EXHAUST SHALL BE LOCATED A MINIMUM OF 10 FEET FROM BUILDING INTAKES.
23. MAINTAIN MANUFACTURER'S RECOMMENDED SERVICE CLEARANCES AROUND EQUIPMENT AT A MINIMUM. DO NOT ROUTE PIPING, DUCTWORK, CONTROL WIRE, ETC. THROUGH THE SERVICE CLEARANCE AREAS.
24. ALL PIPING, CONDUITS AND REFRIGERANT PIPING ROUTED IN VERTICAL CHASES SHALL BE SECURELY INSTALLED AND SUPPORTED BY A UNISTRUT RACK WITHIN THE CHASE. ANY PENETRATIONS OF THE CHASE WALLS WITH THESE ITEMS SHALL UTILIZE A UL LISTED 3M FIRE BARRIER PASS-THROUGH DEVICE RATED IN ACCORDANCE WITH THE PENETRATED ASSEMBLY.
25. ALL DUCT PENETRATIONS THROUGH CHASE WALLS SHALL BE PROTECTED WITH A UL LISTED COMBINATION FIRE/SMOKE DAMPER WITH FUSIBLE LINK, DUCT SMOKE DETECTOR AND 120V ACTUATOR RATED IN ACCORDANCE WITH THE PENETRATED ASSEMBLY UNLESS OTHERWISE NOTED. DAMPER SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S LISTED INSTALLATION INSTRUCTIONS AND IN ACCORDANCE WITH THE UL LISTING. ALL DAMPERS SHALL BE ACCESSIBLE EITHER THROUGH THE USE OF AN ACCESS DOOR OR THROUGH THE REMOVAL OF THE AIR DEVICE IN PERMANENT CONSTRUCTION. COORDINATE EXACT POWER AND FIRE ALARM INTERCONNECT REQUIREMENTS WITH PROJECT ELECTRICAL CONTRACTOR AND FIRE ALARM CONTRACTOR.
26. ALL EQUIPMENT LOCATED ABOVE NON-ACCESSIBLE CEILINGS SHALL BE PROVIDED WITH AN ACCESS PANEL SIZED TO ALLOW FOR MAINTENANCE AND REMOVAL OF THE EQUIPMENT. COORDINATE THE SIZING, LOCATION AND FINISH OF THE ACCESS PANELS WITH THE ARCHITECT PRIOR TO INSTALLATION.
27. ALL MECHANICAL EQUIPMENT SHALL BE PROVIDED WITH A FACTORY DISCONNECT SWITCH, STARTER, VFD OR MOTOR RATED SWITCH AS REQUIRED FOR CODE COMPLIANT OPERATION OF ALL MOTORIZED EQUIPMENT IN ACCORDANCE WITH CODE AND THE DESIGN INTENT ASSOCIATED WITH THESE DRAWINGS. COORDINATE ALL DISCONNECTS AND STARTER REQUIREMENTS WITH THE PROJECT ELECTRICAL CONTRACTOR PRIOR TO BID TO ENSURE A COORDINATED INSTALLATION.
28. CONTRACTOR SHALL INSTALL ALL EQUIPMENT WITH VIBRATION ISOLATION AND SEISMIC SUPPORTS IN ACCORDANCE WITH ASHRAE APPLICATION HANDBOOK CHAPTER 48 - NOISE AND VIBRATION CONTROL TABLE 47 AND CODES.
29. REFER TO PROJECT SPECIFICATIONS, DIVISION 23, FOR ADDITIONAL INFORMATION.
30. ANY COST INCURRED AS A RESULT OF VALUE ENGINEERING OR DEVIATIONS FROM THE BASIS OF DESIGN INDICATED IN THE CONTRACT DOCUMENTS (E.G. ELECTRICAL MODIFICATIONS TO ACCOMMODATE ALTERNATE EQUIPMENT SELECTIONS, DESIGN RELATED EXPENSES FOR REQUIRED DRAWING MODIFICATIONS, ETC.) SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. NO INCREASE IN CONTRACT COST WILL BE GRANTED UNLESS BORNE BY AND APPROVED IN WRITING BY THE OWNER. CONTRACT DOCUMENTS ARE DEFINED TO INCLUDE ALL DISCIPLINES AND DIVISIONS OF THE CONTRACT.
31. THE MECHANICAL CONTRACTOR SHALL PROVIDE THE OWNER WITH A COMPLETE SET OF RECORD "AS-BUILT" DRAWINGS INDICATING THE PRECISE LOCATION OF ALL SYSTEMS, EQUIPMENT CONCEALED OR EMBEDDED PIPING, PIPING CONNECTIONS AND ACCESS DOORS. THESE DRAWINGS SHALL ALSO INCLUDE ALL CHANGES AND DEVIATIONS FROM THE BID DOCUMENTS AND SHALL BE IN DIGITAL FORMAT, SEE SPECIFICATIONS FOR ALL REQUIREMENTS.

ABBREVIATIONS

A	AMPERE(S)	KW	KILOWATT(S)
AFF	ABOVE FINISHED FLOOR	L	LENGTH
AFG	ABOVE FINISHED GRADE	LAT	LEAVING AIR TEMPERATURE
AHJ	AUTHORITY HAVING JURISDICTION	LBS	POUNDS
AHRI	AIR-CONDITIONING, HEATING, AND REFRIGERATION INSTITUTE	LEED	LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN
AHU	AIR HANDLING UNIT	LRA	LOCKED ROTOR AMPS
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE	MAX	MAXIMUM
		MBH	THOUSAND BTUH
ASHRAE	AMERICAN SOCIETY OF HEATING REFRIGERATION AIR CONDITIONING ENGINEERS	MC	MECHANICAL CONTRACTOR
		MCA	MINIMUM CIRCUIT AMPACITY
		MERV	MINIMUM EFFICIENCY REPORTING VALUE
BHP	BRAKE HORSE POWER		
BLDG	BUILDING	MHP	MULTI-ZONE HEAT PUMP
BMS	BUILDING MANAGEMENT SYSTEM	MIN	MINIMUM
BOD	BOTTOM OF DUCT	MISC	MISCELLANEOUS
BOP	BOTTOM OF PIPE	MOCP	MAXIMUM OVERCURRENT PROTECTION
BTUH	BRITISH THERMAL UNIT PER HOUR		
CD	CONDENSATE	MFR	MANUFACTURER
CF	CUBIC FEET	OA	OUTDOOR AIR
CFM	CUBIC FEET PER MINUTE	N/A	NOT APPLICABLE
CH	CHILLER	NC	NORMALLY CLOSED
CLG	CEILING	NEC	NATIONAL ELECTRIC CODE
CO	CARBON MONOXIDE	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
CO2	CARBON DIOXIDE		
COP	COEFFICIENT OF PERFORMANCE	NO	NITROGEN OXIDE
CT	CURRENT TRANSFORMER	NO	NORMALLY OPEN
CU	CONDENSING UNIT	NTS	NOT TO SCALE
DB	DRY BULB	P	PRESSURE
DN	DOWN	PD	PRESSURE DROP
DIV	DIVISION	PSI	POUNDS PER SQUARE INCH
DP	DIFFERENTIAL PRESSURE	PH/□	PHASE
DOAS	DEDICATED OUTDOOR AIR SYSTEM	PVC	POLYVINYL CHLORIDE
DWG	DRAWING	RA	RELIEF AIR
EA	EXHAUST AIR	RA	RETURN AIR
EAT	ENTERING AIR TEMPERATURE	RD	ROUND
EC	ELECTRICAL CONTRACTOR	RFI	REQUEST FOR INFORMATION
ECH	ELECTRIC CABINET HEATER	RH	RELATIVE HUMIDITY
EER	ENERGY EFFICIENCY RATIO	RS/L	REFRIGERANT SUCTION / LIQUID
EF	EXHAUST FAN	RTU	PACKAGED UNIT
ERV	ENERGY RECOVERY VENTILATOR	SA	SUPPLY AIR
ESP	EXTERNAL STATIC PRESSURE	SEER	SEASONAL ENERGY EFFICIENCY RATIO
EUH	ELECTRIC UNIT HEATER		
EX	EXISTING	SF	SQUARE FEET
F	FARENHEIT	TYP	TYPICAL
FC	FAN COIL	UG	UNDERGROUND
FD	FIRE DAMPER	UL	UNDERWRITER'S LABORATORIES
FSD	FIRE SMOKE DAMPER	UNO	UNLESS NOTED OTHERWISE
FLA	FULL LOAD AMPS	V	VOLT(S)
FPM	FEET PER MINUTE	VAV	VARIABLE AIR VOLUME
FT	FEET	VD	VOLUME DAMPER
GC	GENERAL CONTRACTOR	VFD	VARIABLE FREQUENCY DRIVE
GPM	GALLONS PER MINUTE	VRF	VARIABLE REFRIGERANT FLOW
H	HEIGHT	W	WATT(S)
HP	HEAT PUMP	W	WIDTH
HP	HORSE POWER	WB	WET BULB
HSPF	HEATING SEASONAL PERFORMANCE FACTOR	WG	WATER GAUGE
		W/	WITH
IAQ	INDOOR AIR QUALITY	W/O	WITHOUT
IEER	INTEGRATED EER		
IN	INCH		

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GENERAL NOTES & LEGENDS

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