GENERIC HVAC ABBREVIATIONS

(REFER TO CONTROL ABBREVIATIONS FOR ADDITIONAL NOMENCLATURE)

°F	DEGREES FAHRENHEIT
°C	DEGREES CELSIUS
Ø	DIAMETER
AAV	AUTOMATIC AIR VENT
AC	AIR CONDITIONING
ACC	AIR COOLED CONDENSER
ACCU	AIR COOLED CONDENSING UNIT
ACD	AUTOMATIC CONTROL DAMPER (W/ACCESS
DOOR)	
ACU	AIR CONDITIONING UNIT
ACV	AUTOMATIC CONTROL VALVE
AD	ACCESS DOOR
ADA	AMERICAN'S WITH DISABILITIES ACT
AF	AIR FOIL
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
ALT	ALTERNATE
AP	ACCESS PANEL
APD	AIR PRESSURE DROP
ARCH	ARCHITECT
AS	AIR SEPARATOR
ATC	AUTOMATIC TEMPERATURE CONTROL
BDD	BACKDRAFT DAMPER
BI	BACKWARD INCLINED
BHP	BRAKE HORSEPOWER
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BTU	BRITISH THERMAL UNIT
BTU/H	BRITISH THERMAL UNIT PER HOUR
CAP	CAPACITY
CFM	CUBIC FEET PER MINUTE
C.L.	CENTERLINE
C.O.	CLEAN-OUT
CUH	CABINET UNIT HEATER
CHWR (# °F)	CHILLED WATER RETURN
CHWS (# °F)	CHILLED WATER SUPPLY
CWR (# °F)	CONDENSER WATER RETURN
CWS (# °F)	CONDENSER WATER SUPPLY
D	DRAIN
DB	DRY BULB TEMPERATURE
DDC	DIRECT DIGITAL CONTROL
DDCFP	DIRECT DIGITAL CONTROL FIELD
PANEL	
DIA	DIAMETER
DN	DOWN
DOV	DRAIN OFF VALVE
DWG	DRAWING
DWDI	DOUBLE WIDTH DOUBLE INLET
DX	DIRECT EXPANSION
EAT	ENTERING AIR TEMPERATURE
EFF	EFFICIENCY
ELEV	ELEVATION
EMS	ENERGY MANAGEMENT SYSTEM
ENT	ENTERING
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
FA	FREE AREA
FB	FAN BOX
FC	FORWARD CURVED
FCU	FAN COIL UNIT
FD	FIRE DAMPER (W/ ACCESS DOOR)
FPI	FINS PER INCH
FTR	FINNED TUBE RADIATION
FPM	FEET PER MINUTE
FSD	FIRE SMOKE DAMPER
FT	FEET
FT/SEC	FEET FT FEET PER SECOND
GA	GAUGE
GAL	GALLONS
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GWB	GYPSUM WALL BOARD
H	HEIGHT
HD	HEAD
HP	HORSEPOWER
HZ	HERTZ
HB	HOSE BIBB CONN W/CHAINED CAP
HRC	HEAT RECOVERY COIL - GLYCOL HW HOT
WATER	
HWR (# °F)	HOT WATER RETURN
HWS (# °F)	HOT WATER SUPPLY
HPU	HEAT PUMP UNIT

ID	INSIDE DIAMETER
IN	INCHES
INSUL	INSULATION
KW	KILOWATT
KVA	KILOVOLT AMPERE
L	LENGTH
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LVG	LEAVING
LWT	LEAVING WATER TEMPERATURE
M	ONE THOUSAND
MAV	MANUAL AIR VENT
MAX	MAXIMUM
MBH	THOUSAND BRITISH THERMAL UNITS PER
HOUR	
MCA	MINIMUM CIRCUIT AMPS
MCC	MOTOR CONTROL CENTER
MD	MOTORIZED DAMPER
MIN	MINIMUM
N/A	NOT APPLICABLE
NC	NOISE CRITERIA
NIC	NOT IN CONTRACT
NOM	NOMINAL
NTS	NOT TO SCALE
NPSH	NET POSITIVE SUCTION HEAD
OA	OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
OED	OPEN END DUCT
OB	OCTAVE BAND
ODP	OPEN DRIP PROOF
OV	OUTLET VELOCITY
P	PUMP
PD	PRESSURE DROP
PH	PHASE
POS	PROVIDED BY OTHER SECTION(S)
PSID	POUNDS PER SQUARE INCH DIFFERENTIAL
PSIG	POUNDS PER SQUARE INCH GAUGE
PVC	POLYVINYL CHLORIDE
RD	REFRIGERANT DISCHARGE (HOT GAS)
RHC	REHEAT COIL
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION
RTU	ROOF TOP UNIT
RH	RELATIVE HUMIDITY
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SATT	SOUND ATTENUATOR
SD	SMOKE DAMPER (W/ACCESS DOOR)
SDET	SMOKE DETECTOR
SENS	SENSIBLE
SQFT	SQUARE FEET
S.S.	STAINLESS STEEL
SFD	COMBINATION SMOKE/FIRE DAMPER
(W/ACCESS	
DOOR)	
SGD	SLIDE GATE DAMPER
SP	STATIC PRESSURE
SWSI	SINGLE WIDTH SINGLE INLET
TEMP	TEMPERATURE
TOD	TOP OF DUCT
TOP	TOP OF PIPE
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
V	VOLTS
VD	VOLUME DAMPER (MANUAL)
VEL	VELOCITY
VFD	VARIABLE FREQUENCY DRIVE
W	WIDTH
WB	WET BULB TEMPERATURE
WC	WATER COLUMN
WCC	WATER COOLED CONDENSER
WCCU	WATER COOLED CONDENSING UNIT
WPD	WATER PRESSURE DROP
WMS	WIRE MESH SCREEN
X	EXISTING EQUIPMENT TO BE REMOVED
XM	EXISTING EQUIPMENT TO REMAIN
XN	EXISTING EQUIPMENT IN NEW LOCATION
XR	EXISTING EQUIPMENT TO BE RELOCATED

GENERAL NOTES

1. GENERAL NOTES, SYMBOLS LIST AND DETAILS ARE APPLICABLE TO ALL "M-XXX" SERIES DRAWINGS.
2. REFER TO REFLECTED CEILING PLANS FOR EXACT LOCATIONS OF AIR TERMINAL DEVICES.
3. DRAWINGS ARE DIAGRAMMATIC, DETERMINE EXACT LOCATIONS OF SYSTEMS AND COMPONENTS IN FIELD.
4. COORDINATE WORK OF THIS SECTION WITH THAT OF OTHER SECTIONS.
5. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
6. COORDINATE ROOF PENETRATIONS WITH WORK OF OTHER SECTIONS AND WITH FLASHING REQUIREMENTS.
7. SHEETMETAL FITTINGS SHOWN ARE TO BE PROVIDED. NO SUBSTITUTES SHALL BE ALLOWED WITHOUT PRIOR CONSENT FROM ENGINEER.
8. RUN DUCTS AND PIPING CONCEALED, UNLESS SPECIFIED OTHERWISE, AND CLEAR OF CEILING INSERTS. ALL DUCTWORK SHALL BE INSTALLED AS CLOSE AS POSSIBLE TO WALL AND UNDERSIDE OF BEAMS AND JOISTS.
9. ALL EQUIPMENT REQUIRING ACCESS AND MAINTENANCE SHALL BE INSTALLED A MAXIMUM OF 2 FEET ABOVE FINISHED CEILING UNLESS OTHERWISE INDICATED ON FLOOR PLANS OR BY BUILDING ENGINEER.
10. INSTALL THERMOSTATS AT LOCATIONS SHOWN ON PLANS OR AS DIRECTED BY ARCHITECT. MOUNTING HEIGHT AFF SHALL COMPLY WITH ADA.
11. EXTERIOR LOUVERS ARE INDICATED FOR LOCATION ONLY.
12. ALL WORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN PIPING AND DUCTS (INCLUDING DIVIDED DUCTS) AND TRANSITIONS AROUND OBSTRUCTIONS SHALL BE PROVIDED AT NO ADDITIONAL COST.
13. VERIFY ALL EQUIPMENT CONNECTIONS WITH MANUFACTURER'S CERTIFIED DRAWINGS. VERIFY AND PROVIDE DUCT TRANSITIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DIMENSIONS BEFORE FABRICATION.
14. ACCESS PANELS SHALL BE PROVIDED TO CLEAN COILS AND SERVICE DAMPERS, HEATERS, VALVES AND ALL CONCEALED MECHANICAL EQUIPMENT.
15. SUPPORT ALL EQUIPMENT, PIPING AND DUCTWORK FROM BUILDING STRUCTURE TO PROVIDE A VIBRATION FREE INSTALLATION. PROVIDE TO GC A LIST OF ALL WEIGHTS AND METHODS OF SUPPORT FOR COORDINATION. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
16. SMOKE DETECTORS SHALL BE FURNISHED AND WIRED TO THE FIRE ALARM SYSTEM BY DIVISION 28. DIVISION 23 SHALL MOUNT THE DETECTORS IN DUCTWORK, WHERE REQUIRED BY CODE, DIVISION 28 SHALL WIRE THE DETECTORS TO THE BAS SYSTEM AND FAN STARTERS FOR SHUTDOWN.
17. ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH NEC, AND DIV. 26 SPECIFICATIONS.
18. INTERNAL AIR FLOW DIMENSIONS ARE SHOWN FOR DUCTS. CONTRACTOR SHALL INCREASE SIZE FOR LINER IF APPLICABLE.
19. ALL MATERIALS AND EQUIPMENT SHALL BE NEW.
20. PROVIDE FIRE DAMPERS OR SMOKE/FIRE DAMPERS AND ASSOCIATED ACCESS PANELS WHERE SHOWN ON DRAWINGS IN COMPLIANCE WITH IMC 2018 AND NFPA 90A. FOR DUCTS THAT PENETRATE FIRE WALLS, FLOORS AND PARTITIONS PROVIDE SLEEVES WHERE PENETRATIONS ARE NOT PERPENDICULAR TO SURFACE PENETRATED. ENCLOSE DAMPERS IN 10 GAUGE STEEL SLEEVE.
21. PROVIDE FLEXIBLE CONNECTIONS ON ALL DUCTS CONNECTING TO FANS AND AIR HANDLING UNITS UNLESS INTERNALLY ISOLATED. ALL DUCTS TO BE GROUNDED ACROSS FLEXIBLE CONNECTION WITH FLEXIBLE COPPER GROUNDING STRAPS.
22. ALL RETURN AIR OPENINGS ABOVE CEILING SHALL BE PROVIDED WITH A 1/2" MESH ALUMINUM SCREEN (80% FREE AREA MINIMUM).
23. ANY DEMOLITION SHALL BE COORDINATED WITH OWNER, ARCHITECT, G.C. AND ENGINEER.
24. ELBOWS IN DUCT SYSTEMS SHALL BE FULL RADIUS (CENTERLINE RADIUS = 1.5 DUCT WIDTH) WHERE SPACE PERMITS. WHERE LIMITED CLEARANCE OCCURS, PROVIDE SHORT RADIUS ELBOW WITH FULL LENGTH SPLITTER VANES PER SMACNA. MITERED (SQUARE) ELBOWS WITH TURNING VANES MAY NOT BE SUBMITTED WITHOUT WRITTEN CONSENT FROM THE ENGINEER.
25. MANUAL DAMPERS ARE NOT SHOWN ON THE DRAWINGS IN ORDER FOR DRAWING CLARITY. PROVIDE MANUAL ADJUSTABLE DAMPERS ON EACH LOW PRESSURE SUPPLY RETURN AND EXHAUST DUCT TAKE OFF, AND AT EACH TAKE OFF TO REGISTERS, GRILLES AND DIFFUSERS.
26. CONDENSATE DRAIN PIPING SHALL PITCH AT 1/8"/FOOT.
27. PROVIDE HANGERS, CLAMPS, OFFSETS, EXPANSION JOINTS, ANCHORS AND GUIDES AS NECESSARY TO PREVENT STRESS ON PIPING.
28. PROVIDE VENTS AT HIGH POINTS IN PIPING SYSTEMS AND DRAIN VALVES AT LOW POINTS.
29. PROVIDE AT LEAST THREE-ELBOW SWING FOR PIPE TAKE-OFFS TO TERMINAL EQUIPMENT AND RISERS.
30. ISOLATION VALVES IN PIPING SYSTEMS ARE NOT SHOWN ON PLANS (FOR CLARITY) BUT ARE REQUIRED AT ALL PIPE BRANCHES AND CONNECTIONS TO EQUIPMENT REFER TO DETAIL SHEETS AND FLOW DIAGRAMS.
31. CONTRACTOR SHALL REVIEW BASE BUILDING STANDARDS AND COMPLY WITH CONSTRUCTION PROCEDURES AND REQUIREMENTS THROUGHOUT.
32. ALL PIPING, DUCTWORK, AND HVAC SHALL BE LABELED IN ACCORDANCE WITH THE GUIDANCE SET FORTH IN THE MEP DESIGN STANDARDS.
33. ACCESS PANELS MUST BE PROVIDED FOR ALL BASE BUILDING COMPONENTS TO INCLUDE, BUT NOT LIMITED TO, ISOLATION VALVES, SMOKE FIRE DAMPERS/ACTUATORS AND CONTROL VALVES.

DUCTWORK LEGEND

SINGLE LINE | DOUBLE LINE

- ROUND SUPPLY DUCT UP
- SUPPLY DUCT UP
- ROUND SUPPLY DUCT DN
- SUPPLY DUCT DN
- STANDARD RADIUS ELBOW (R = W) SUPPLY/RETURN EXHAUST
- BULLHEAD SPLIT SUPPLY (GOOD FOR TAKEOFF TO RING DUCT)
- DUCT MOUNTED DIFF/ GRILLE WITH BRANCH TAKEOFF VOLUME DAMPER ACOUSTICALLY LINED DUCT
- EXISTING DUCT TO BE REMOVED
- OPEN ENDED DUCT WITH VOLUME DAMPER AND 1/2"x1/2" WMS
- FLEXIBLE DUCT
- TAKEOFF TO DIFF/ GRILLE WITH BRANCH TAKEOFF VOLUME DAMPER (HARD ELBOW)
- 90° TAKEOFF WITH BRANCH TAKEOFF VOLUME DAMPER (VD IN LOW PRESSURE SYSTEMS ONLY) (-OR-)
- 1 RING DUCT

SINGLE LINE | DOUBLE LINE

- ROUND RETURN OR EXHAUST DUCT UP
- RETURN OR EXHAUST DUCT UP
- ROUND RETURN OR EXHAUST DUCT DN
- RETURN OR EXHAUST DUCT DN
- HORIZONTAL OFFSET SUPPLY/RETURN/EXHAUST
- RISE OR DROP SUPPLY/RETURN/EXHAUST (RISE/DROP -OR-)
- BULLHEAD CONVERGING RETURN/EXHAUST WITH BRANCH TAKE-OFF VOLUME DAMPER
- SIDEWALL DUCT MTD REGISTER/GRILLE W/BRANCH TAKE-OFF VOLUME DAMPER
- SUPPLY SIDEWALL LINEAR DIFF (W/INTERNALLY LINED SHEETMETAL PLENUM) BRANCH CONNECTION WITH VOLUME DAMPER FOR EVERY 4'-0" OF LINEAR DIFFUSER. PLENUM BY LINEAR DIFF MANUFACTURER
- SUPPLY CEILING LINEAR DIFF (W/INTERNALLY LINED SHEETMETAL PLENUM) BRANCH CONNECTION WITH VOLUME DAMPER FOR EVERY 4'-0" OF LINEAR DIFFUSER. PLENUM BY LINEAR DIFF MANUFACTURER
- FIRE DAMPER INSTALLED WITHIN RATED PARTITION WITH DUCT MOUNTED ACCESS PANEL (FD; FIRE RATED PARTITION; DUCT ACCESS PANEL)

RVD	REMOTE ADJUSTABLE VOLUME DAMPER
VD	MANUAL VOLUME DAMPER
FD	SELF-CLOSING FIRE DAMPER W/ACCESS DOOR
ACD	AUTOMATIC CONTROL DAMPER W/ACCESS DOOR
SD	SMOKE DAMPER W/ACCESS DOOR
SFD	COMBINATION SMOKE/FIRE DAMPER W/ACCESS DOOR
BDD	BACKDRAFT DAMPER

- STANDARD 4-WAY BLOW SUPPLY DIFFUSER
- BLANKED FOR 3-WAY BLOW SUPPLY DIFFUSER
- BLANKED FOR 2-WAY BLOW SUPPLY DIFFUSER (OR)
- BLANKED FOR 1-WAY BLOW SUPPLY DIFFUSER
- 4'-0" AND 5'-0" LONG LINEAR DIFFUSER AIR PATTERN CONTROL SETTINGS
- 2'-0" LONG LINEAR DIFFUSER AIR PATTERN CONTROL SETTING

CALL OUT SYMBOLS

- CONNECT NEW TO EXISTING
- LIMIT OF REMOVAL
- SECTION DESIGNATION / SHEET NUMBER (H3.1)
- DETAIL DESIGNATION / SHEET NUMBER (H3.1)
- S/R # — DUCTWORK OR PIPING RISER DESIGNATION
- 1 — REVISION NUMBER
- DIFFUSER, GRILLE, REGISTER LETTER DESIGNATOR (See schedule for ATD type) — DESIGN CFM (A(200))
- T — TEMPERATURE SENSOR OR HUMIDISTAT
- T — TEMPERATURE SENSOR WITH INSULATED BASE
- H — HUMIDITY SENSOR OR HUMIDISTAT
- P — PRESSURE TRANSMITTER
- C — CARBON DIOXIDE SENSOR
- RS — REFRIGERANT SENSOR
- T LV — LINE VOLTAGE THERMOSTAT
- UC (1/2") — UNDERCUT DOOR (UNDER CUT DIMENSION)
- LVDR (1.5) — LOUVERED DOOR (FREE AREA OF LOUVER IN SQUARE FEET)
- RETURN OR EXHAUST AIR FLOW
- SUPPLY AIR FLOW
- 24X24 ACCESS PANEL

EQUIPMENT SYMBOLS

SYMBOL	IDENTIFICATION/ TAG	DESCRIPTOR
		VARIABLE AIR VOLUME TERMINAL BOX WITHOUT HEATING COIL
		VARIABLE AIR VOLUME TERMINAL BOX WITH HEATING COIL
	FCU # (GPM)	CONCEALED FAN COIL UNIT (WITH AUXILIARY DRAIN PAN)

PIPE AND VALVE LEGEND

GATE VALVE	VACUUM BREAKER
BALL VALVE	SOLENOID VALVE
BALL VALVE WITH MEMORY STOP (BALANCING VALVE)	PRESSURE/TEMPERATURE WELL
BALL VALVE WITH HOSE BIBB, CAP & CHAIN (DRAIN VALVES)	AUTOMATIC AIR VENT WITH ISOLATION VALVE
BUTTERFLY VALVE	MANUAL AIR VENT (UTILIZING PLUG VALVE)
BUTTERFLY VALVE WITH MEMORY STOP (BALANCING VALVE)	REDUCER (ECCENTRIC-FLAT ON BOTTOM OR FLAT ON TOP)
GLOBE VALVE	REDUCER (CONCENTRIC)
PLUG VALVE	FLEXIBLE CONNECTION
PRESSURE REDUCING VALVE	EXPANSION JOINT
CHECK VALVE	PIPE GUIDE
STRAINER W/BALL VALVE, HOSE BIBB & CAP (GATE VALVE FOR STEAM)	ANCHOR
AUTOMATIC CONTROL VALVE, MODULATING ACTUATOR	RISE (SINGLE LINE - PLAN VIEW)
AUTOMATIC CONTROL VALVE, TWO POSITION ACTUATOR	DROP (SINGLE LINE - PLAN VIEW)
THREE WAY AUTOMATIC CONTROL VALVE, MODULATING ACTUATOR	TOP TAKEOFF
AUTOMATIC FLOW CONTROL VALVE (PRESSURE INDEPENDENT)	BOTTOM TAKEOFF
COMBINATION FLOWMETER/SHUT OFF/BALANCING VALVE (CIRCUIT SETTER)	PIPE BREAK (SINGLE LINE)
FLOW MEASURING DEVICE	DIRT LEG
SAFETY RELIEF VALVE	C.O. — CLEAN OUT FOR CONDENSATE DRAIN
UNION OR FLANGE (AS INDICATED BY PIPE SIZE)	DIRECTION OF FLOW IN PIPE
END CAP	UP — PITCH PIPE UP IN DIRECTION OF FLOW
PRESSURE GAUGE WITH GAUGE COCK	DN — PITCH PIPE DOWN IN DIRECTION OF FLOW
THERMOMETER	SUPPLY LINES (NEW)
RISE (DOUBLE LINE - PLAN VIEW)	RETURN LINES (NEW)
DROP (DOUBLE LINE - PLAN VIEW)	EXISTING
PIPE BREAK (DOUBLE LINE)	DEMO/EXISTING TO BE REMOVED

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SCALE	12" = 1'-0"

REVISIONS

LEGEND

M-2

DRAWING PRINTED FULL SIZE (100%) - 30"HAT; DRAWING PRINTED HALF SIZE (50%) WILL FIT ON A SHEET 15"X24" WITH 1.5" OF EXTRA SPACE ON ALL FOUR SIDES; DRAWING PRINTED NEARLY THREE SIZE (37.5%) = 11.25"X15.75" WILL FIT TIGHTLY ON 11"x17". INDIVIDUAL 1/2", 1/4", 1/8", 1/16" AND 1/32" VIEW SCALES WILL TRANSLATE BY WALLTRUNG THE DENOMINATOR BY 2 AND MAKING THE NUMERATOR 1. FOR EXAMPLE, 1/8"=1'-0" AT 37.5% WILL BE 3/64"=1'-0" FOR SCALES AT 34", 38", 3.75" AND 3/32" THE TRANSLATION IS CLOSE ENOUGH TO USE THE DENOMINATOR EQUIVALANT AND CHANGE THE NUMERATOR TO 1. EXAMPLE 3/4"=1'-0" AT 37.5% WILL BE NEARLY TO 1/4"=1'-0"

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