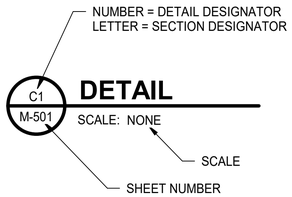
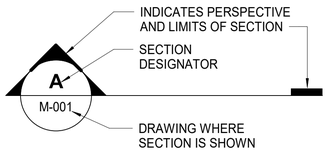
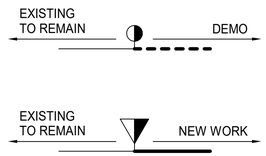
## DETAIL/SECTION TITLE




## SECTION CUT SYMBOL




## CONSTRUCTION INTERFACE




## PIPE LINE ABBREVIATIONS

| | |
|---|---|
| CHWS | CHILLED WATER SUPPLY |
| CHWR | CHILLED WATER RETURN |
| COND | CONDENSATE DRAIN |
| CW | CITY WATER (DOMESTIC WATER) |
| FSL | FIRE SPRINKLER LINE |
| HWS | HOT WATER SUPPLY |
| HWR | HOT WATER RETURN |
| LCWS | LOW-CONDUCTIVITY WATER SUPPLY |
| LCWR | LOW-CONDUCTIVITY WATER RETURN |

## GENERAL ABBREVIATIONS

| | |
|---|---|
| 24X12 | RECT. DUCT DIM. (INCHES) |
| 12Ø | ROUND DUCT DIM. (INCHES) |
| AFF | ABOVE FINISHED FLOOR |
| ACU | AIR CONDITIONING UNIT |
| ACS | AIR CONDITIONING SYSTEM |
| ACHPS | AC HEAT PUMP SYSTEM |
| AI | ANALOG INPUT |
| ALC | AUTOMATED LOGIC CONTROLS |
| AO | ANALOG OUTPUT |
| APD | AIR PRESSURE DROP |
| AV | ANALOG VALUE |
| BAS | BUILDING AUTOMATION SYSTEM |
| BFP | BACKFLOW PREVENTER |
| BHP | BRAKE HORSEPOWER |
| BI | BINARY INPUT |
| BO | BINARY OUTPUT |
| BOD | BOTTOM OF DUCT |
| BOP | BOTTOM OF PIPE |
| BV | BINARY VALUE |
| CCP | CHILLER CONTROL PANEL |
| CFM | CUBIC FEET PER MINUTE |
| CHW | CHILLED WATER |
| CL | CENTERLINE OF PIPE ELEVATION |
| CP | CONTROL PANEL |
| CPA | COMPRESSOR, AIR |
| CPD | COIL PRESSURE DROP (FLUID SIDE) |
| CV | CONTROL VALVE |
| CW | CITY WATER |
| (D) | DEMOLISH (REMOVE AND DISPOSE OF) |
| DB | DRY BULB |
| DCW | DOMESTIC COLD WATER |
| DDC | DIRECT DIGITAL CONTROL |
| DDCP | DIRECT DIGITAL CONTROL PANEL |
| DN | DOWN |
| DP | DIFFERENTIAL PRESSURE |
| DRG | DIFFUSER, REGISTER, & GRILLE |
| (E) | EXISTING-TO-REMAIN |
| EA | EXHAUST AIR |
| EAT | ENTERING AIR TEMPERATURE |
| ELEC | ELECTRICAL |
| EMT | ELECTRICAL METAL TUBING |
| ESP | EXTERNAL STATIC PRESSURE |
| ETR | EXISTING-TO-REMAIN |
| EWT | ENTERING WATER TEMPERATURE |
| EXIST | EXISTING |
| FACP | FIRE-ALARM CONTROL PANEL |
| FA | FIRE ALARM CONTROL SYSTEM LOOP |
| FC | FAIL-CLOSED |
| FE | FAN, EXHAUST |
| FFE | FILTERED-FAN, EXHAUST |
| FHE | HOOD EXHAUST FAN |
| FIP | FAIL-IN-PLACE |
| FM | FLOW METER |
| FO | FAIL-OPEN |
| FPI | FINS PER INCH |
| FR | FAN, RETURN |
| FS | FLOW SWITCH |
| FSL | FIRE SPRINKLER LINE |
| FT | FEET |
| FT. | FEET |
| HP | HORSEPOWER |
| I/O | HARD-WIRED INPUT/OUTPUT |
| ISO | ISOLATION |
| IN. | INCH |
| IN.W.C. | INCHES WATER COLUMN |
| LAT | LEAVING AIR TEMPERATURE |
| LCW | LOW-CONDUCTIVITY WATER |
| LWT | LEAVING WATER TEMPERATURE |
| MA | MIXED AIR |
| MAX | MAXIMUM |
| MAX. | MAXIMUM |
| MCC | MOTOR CONTROL CENTER |
| MCV | MOTORIZED CONTROL VALVE |
| MECH | MECHANICAL |
| MFR | MANUFACTURER |
| MHP | MOTOR HORSEPOWER |
| MIN | MINIMUM |
| MIN. | MINIMUM |
| (N) | NEW |
| NC | NORMALLY CLOSED |
| NEC | NATIONAL ELECTRICAL CODE |
| NO | NORMALLY OPEN |
| NPSH | NET POSITIVE SUCTION HEAD |
| NPSHR | NET POSITIVE SUCTION HEAD REQUIRED |
| NRTL | NATIONALLY-RECOGNIZED TESTING LABORATORY |
| NSR | NON-SPRING-RETURN |
| OA | OUTDOOR AIR |
| OB | OPPOSED BLADE |
| PB | PARALLEL BLADE |
| PCHW | PUMP, CHILLED WATER |
| POC | POINT OF CONNECTION |
| PRV | PRESSURE REDUCING VALVE |
| PS | POWER SUPPLY |
| PSIA | POUNDS, CHILLED WATER ABSOLUTE |
| PSIG | POUND PER SQUARE INCH GAUGE |
| RA | RETURN AIR |
| RCHS | CHILLER, SCREW |
| RPBFP | REDUCED PRESSURE BACKFLOW PREVENTER |
| RRV | REFRIGERANT RELIEF VENT |
| SCH | SCHEDULE |
| SA | SUPPLY AIR |
| SD | SMOKE DETECTOR |
| SDE | SEPARATOR, AIR |
| SF | SUPPLY FAN |
| SP | STATIC PRESSURE |
| SPEC | SPECIFICATION |
| SR | SPRING-RETURN |
| (T) | TEMPORARY (DURING CONSTRUCTION ONLY) |
| TA | TRANSFER AIR |
| TCA | COMPRESSED AIR TANK |
| TCHW | CHILLED WATER TANK, BUFFER |
| TCH | CHEMICAL TANK |
| TCHWX | EXPANSION TANK, CHILLED WATER |
| TCP | TEMPERATURE CONTROL PANEL |
| TEMP | TEMPERATURE |
| VAV | VARIABLE AIR VOLUME |
| VFD | VARIABLE FREQUENCY DRIVE |
| W.C. | WATER COLUMN |
| W.G. | WATER GAUGE |
| WB | WET BULB |
| XMFR | TRANSFORMER |

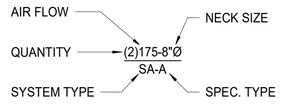
## HVAC LEGEND

- RECTANGLUAR ELBOW WITH TURNING VANES
- RECTANGULAR RADIUS ELBOW
- CONTROL DAMPER, MOTOR OPERATED
- MANUAL BALANCE DAMPER
- SQUARE OR RECTANGULAR TO ROUND TRANSITION
- SUPPLY AIR OR OUTSIDE AIR DUCTWORK SECTION
- RETURN AIR DUCTWORK SECTION
- EXHAUST AIR DUCTWORK SECTION
- DUCT-MOUNTED ACCESS DOOR
- FIRE DAMPER
- THERMOSTAT
- DUCT-MOUNTED SMOKE DETECTOR

## PIPE LINE ACCESSORIES

- BALL ISOLATION VALVE
- BUTTERFLY VALVE
- REDUCED PRESSURE BACKFLOW PREVENTER
- CHECK VALVE
- 3-WAY VALVE
- TRIPLE DUTY VALVE
- BALANCING VALVE
- RELIEF, SAFETY OR THERMAL RELIEF VALVE
- PNEUMATIC CONTROL VALVE
- ELECTRONIC CONTROL VALVE
- SUCTION DIFFUSER
- AUTOMATIC AIR VENT ASSEMBLY
- MANUAL AIR VENT - SEE SPECIFICATIONS FOR APPROPRIATE VALVE TYPE.
- FLEX CONNECTION
- PUMP
- PIPE TIE-IN POINT
- HOSE GATE VALVE DRAIN
- GLOBE VALVE
- PLUG VALVE
- THERMAL WELL
- THERMOMETER
- REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLY
- SELF CONTAINED PRESSURE REDUCING (REGULATING) VALVE
- PRESSURE GAUGE
- Y-TYPE STRAINER
- REMOVABLE CAP
- REDUCER (CONCENTRIC)
- REDUCER (ECCENTRIC)
- UNION
- BLIND FLANGE
- TEST CONNECTION
- COUPLING
- ANGLE VALVE
- REMOVABLE PLUG
- 120V/24 CONTROL POWER TRANSFORMER. DIV 26.
- ELECTRICAL DISCONNECT. DIV 26.

## AIR DISTRIBUTION DEVICE IDENTIFICATION




## GENERAL NOTES:

1. LEGEND IS GENERAL IN NATURE AND MAY INDICATE MORE INFORMATION THAN IS APPLICABLE TO PROJECT. SEE DRAWINGS FOR SPECIFIC SYMBOLS AND ABBREVIATIONS.
2. FURNISH AND INSTALL ALL MATERIALS, VALVES, HANGERS, EQUIPMENT, ETC. AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED, AS REQUIRED BY CODE, AND AS REQUIRED BY STANDARDS.
3. INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, STANDARDS, AND APPLICABLE CODES AND REGULATIONS.
4. COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH OTHER TRADES SHOWN IN CONTRACT DOCUMENT DRAWINGS.
5. MAINTAIN A MINIMUM OF 6'-8" CLEARANCE TO UNDERSIDE OF PIPES, DUCTWORKS, CONDUITS, ETC. THROUGHOUT ACCESS ROUTES.
6. LOCATE ALL MECHANICAL EQUIPMENT FOR UNOBSTRUCTED ACCESS TO UNIT ACCESS PANELS, CONTROLS, AND VALVING. MAINTAIN 4'-0" CLEAR DIRECTLY IN FRONT OF EQUIPMENT ELECTRICAL PANELS.
7. ALL ELEVATIONS ARE ABOVE FINISHED FLOOR TO BOTTOM OF DUCT, DUCT INSULATION, PIPE, OR PIPE INSULATION UNLESS NOTED OTHERWISE.
8. DUCT DIMENSIONS INDICATED REFER TO SHEET METAL DIMENSIONS. AIR OPENING SIZE AND SHEET METAL SIZE MUST BE THE SAME.
9. INSTALL WALL-MOUNTED TEMPERATURE CONTROLS AT 48" ABOVE FINISHED FLOOR UNLESS OTHERWISE INDICATED. COORDINATE INSTALLATION WITH OTHER WALL-MOUNTED DEVICES TO INSTALL ALL DEVICES AT SAME ELEVATION. COORDINATE WITH ARCHITECTURAL WALL FINISHES.
10. ALL EXISTING HVAC COMPONENTS SHOWN ON DRAWINGS ARE SCHEMATIC AND ARE BASED ON SITE SURVEYS AND AVAILABLE AS-BUILT DRAWINGS AND MAY NOT REFLECT EXACT EXISTING CONDITIONS. SUBCONTRACTOR MUST FIELD VERIFY EXISTING CONDITIONS ON JOB SITE. SUBCONTRACTOR MUST REROUTE NEW WORK TO ACCOMMODATE EXISTING CONDITIONS.
11. DESIGN DRAWINGS SHOW THE SUGGESTED EQUIPMENT LAYOUT. VARIATIONS IN EQUIPMENT LOCATIONS ARE ACCEPTABLE TO ACCOMMODATE EXISTING CONDITIONS PROVIDED THAT THE DESIGN INTENT IS MET, PROPER CLEARANCE AND ACCESS IS PROVIDED AROUND THE EQUIPMENT, AND SIGNIFICANT DEVIATIONS FROM THE DESIGN DRAWINGS HAVE BEEN APPROVED BY THE ENGINEER
12. ALL NEW PENETRATIONS THROUGH EXISTING WALLS AND FLOORS MUST BE NEATLY CORE-DRILLED TO MINIMIZE OVERSIZED AND SPALLING.
13. SUBCONTRACTOR MUST INSTALL NEW DUCTWORK CLEAR OF FIRE SPRINKLER HEADS, NEW AND EXISTING, AS REQUIRED BY NFPA 13 STANDARDS.
14. ALL NEW MECHANICAL SYSTEM INSTALLATIONS MUST NOT INTERFERE WITH EXISTING EQUIPMENT, ACCESS TO CONTROL AND ACCESS FOR MAINTENANCE.
15. WHEN DUCTWORK AND PIPING INSULATION SHOWS EVIDENCE OF "WET" INSULATION IMMEDIATELY AFTER INSTALLATION, THE DAMAGED INSULATION MUST BE REMOVED, THE PIPE AND/OR DUCT SURFACES MUST BE CLEANED AND DRIED, AND NEW INSULATION MUST BE INSTALLED.
16. MAKE TEMPORARY ALTERATIONS AND CONNECTIONS AS REQUIRED TO EXECUTE WORK SO THAT ALL SERVICES IN THE BUILDING REMAIN OPERATIONAL WITH MINIMUM POSSIBLE INTERRUPTION. TEMPORARY SHUTDOWNS MUST BE SEGREGATED AND MUST BE OF THE SHORTEST DURATION FEASIBLE. COORDINATE SHUTDOWN SCHEDULE . ALL SERVICES MUST BE KEPT IN CONTINUOUS OPERATION UNLESS PERMISSION IS OTHERWISE GRANTED .
17. ALL NEW MECHANICAL EQUIPMENT WHETHER PURCHASED, MANUFACTURED ONSITE, RENTED, OR BORROWED, THAT MAY PRESENT A SIGNIFICANT RISK TO PERSONS OR PROPERTY SHALL BE "LISTED" BY A NATIONALLY-RECOGNIZED TESTING LABORATORY (NRTL), APPROVED FOR USE BY AN NRTL FIELD EVALUATION ENGINEER, OR APPROVED FOR USE BY AN AUTHORITY HAVING JURISDICTION (AHJ) FIELD REPRESENTATIVE AND LABELED PRIOR TO USE.
18. ALL FIREWALL PENETRATIONS MUST BE MADE WITH A UL LISTED AND APPROVED FIREWALL PENETRATION SYSTEM/ASSEMBLY.
19. PRIOR TO ANY DEMOLITION ACTIVITIES, SUBCONTRACTOR MUST COORDINATE TO REVIEW FACILITY ES&H DOCUMENTS, EQUIPMENT TO BE REMOVED, MATERIALS TO BE REMOVED OR DISTURBED, AND IDENTIFY A PLAN PRIOR TO COMMENCING THE WORK. ITEMS TO REVIEW INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING: NEW WORK IN DISTURBING EXISTING WALLS, FLOORS, ROOFS, OR CEILINGS; ALL CUTTING OR DRILLING; ALL DEMOLITION; REMOVAL AND DISPOSAL.
21. SURFACE-MOUNTED WIRING/CONDUIT IN ANY ROOM OTHER THAN A MECHANICAL OR ELECTRICAL ROOM IS PROHIBITED UNLESS OTHERWISE SPECIFIED OR APPROVED BY ENGINEER.
22. CONTROLS SUBCONTRACTOR MUST FURNISH AND INSTALL CONTROLLER ENCLOSURES. REFER TO STRUCTURAL AND ELECTRICAL DRAWINGS FOR CONTROL PANEL INSTALLATION DETAILS.
23. WHERE ITEMS ARE REMOVED FROM WALLS, SUBCONTRACTOR MUST PATCH AND PAINT WALLS AS NECESSARY TO MATCH SURROUNDING FINISH UNLESS THE AREA IS SMALL AND CAN BE COVERED BY A SMALL WALL COVER PLATE (I.E. THERMOSTATS). FOR LARGER ITEMS (I.E. CONTROL PANELS), WALL MUST BE PATCHED AND PAINTED AS NECESSARY TO MATCH SURROUNDING FINISH.
24. WORKING IN PROJECT AREAS MAY REQUIRE AN ESCORT. IT IS THE RESPONSIBILITY OF THE MECHANICAL SUBCONTRACTOR TO DETERMINE THESE PROTOCOLS PRIOR TO BID AND INCLUDE ANY COSTS ASSOCIATED WITH COMPLYING WITH THESE PROTOCOLS IN THEIR BID.
25. DELEGATED DESIGN: FIRE SUPPRESSION SYSTEM NEW WORK INCLUDING FIRE SPRINKLER PIPING, HEADS, VALVES, HANGERS, SEISMIC RESTRAINT BRACKETS, DRAINS, ESCUTCHEONS, WALL PLATES AND TEST FACILITIES NECESSARY FOR A FULLY FUNCTIONING WET-PIPE AUTOMATIC SPRINKLER SYSTEM SHALL BE PROVIDED BY THE DELEGATED DESIGN SUBCONTRACTOR. WORK SHOWN ON DRAWINGS IS ESTIMATE OF FIRE SUPPRESSION SCOPE OF WORK. PROVIDE A COMPLETE DESIGN FOR AFFECTED AREAS; DEVIATION FROM DESIGN DRAWING SPRINKLER SYSTEM LAYOUT IS PERMITTED AS REQUIRED TO PROVIDE A COMPLETE AND FUNCTIONING FIRE SUPPRESSION SYSTEM. DEVIATIONS TO SPRINKLER MAIN AND SPRINKLER HEADS SHALL BE COORDINATED WITH ELECTRICAL, MECHANICAL, STRUCTURAL, AND ARCHITECTURAL CONSTRUCTION DOCUMENTS PRIOR TO SUBMISSION. DELEGATED DESIGN DRAWINGS SHALL BE SUBMITTED TO FIRE PROTECTION ENGINEERING AND BURNS & MCDONNELL CONSTRUCTION MANAGER FOR APPROVAL BEFORE PROCEEDING WITH AFFECTED WORK. REFER TO 21 00 00.
26. DEMOLITION AND NEW CONSTRUCTION OF FIRE SPRINKLER PIPING MUST BE PERFORMED BY A C16 LICENSED SUBCONTRACTOR. NOTIFY AND SUBMIT PERMIT REQUEST A MINIMUM OF TWO WEEKS BEFORE FIRE SPRINKLER DEMOLITION ACTIVITIES. PERFORM LOCAL IN-SERVICE PRESSURE TESTING ON NEW FIRE SPRINKLER PIPING AND SPRINKLER HEADS.
27. CLEAN AND FLUSH ALL NEW PIPING SYSTEMS IN ACCORDANCE WITH SPEC. 220111.13.
28. INSTALL AUTOMATIC AIR VENTS IN HYDRONIC PIPING SYSTEMS AT LOCATIONS INDICATED, AT ALL HIGH POINTS, AND ELSEWHERE AS NECESSARY TO ELIMINATE TRAPPED AIR. EXTEND VENT FROM AUTOMATIC AIR VENT TO NEAREST FLOOR DRAIN OR SOAK PIT.
29. SUBCONTRACTOR MUST SAMPLE CHILLED WATER FOR CHEMICAL TREATMENT ANALYSIS PRIOR TO CONSTRUCTION START. FORWARD REPORT AND ANY RECOMMENDATIONS FOR RESPONSE.
30. EQUIPMENT WITH 50 POUNDS OR MORE OF REFERIGERANT MUST BE TRACKED, INVENTORIED, AND MANAGED. COORDINATE DEMOLITION AND INSTALLATION REQUIREMENTS WITH CONTRUCTION MANAGER

Sheet Title
MECHANICAL ABBREVIATIONS, LEGEND, SYMBOLS AND GENERAL NOTES

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