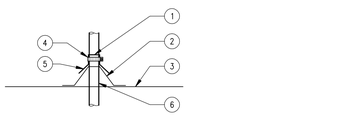
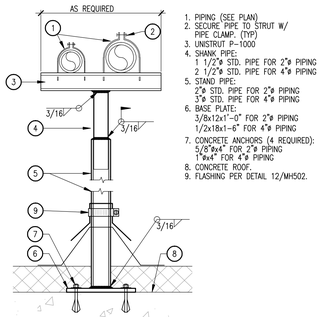


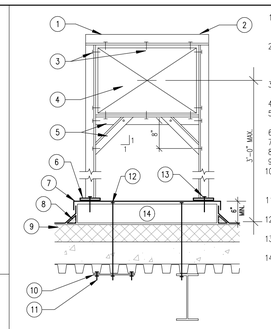
1. SILICONE SEAL.
2. SHORT CONE FLASHING.
3. ROOF.
4. SCREW BAND HOSE CLAMP.
5. COUNTER FLASHING.
6. PIPE THRU ROOF.

12 PIPE THRU ROOF
NTS



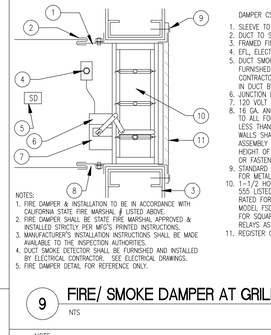
1. PIPING (SEE PLAN)
2. SECURE PIPE TO STRUT W/ PIPE CLAMP. (TYP)
3. UNISTRUT P-1000
4. SHANK, PIPE:
   1 1/2"ø STD. PIPE FOR 2"ø PIPING
   2 1/2"ø STD. PIPE FOR 4"ø PIPING
5. STAND PIPE:
   2"ø STD. PIPE FOR 2"ø PIPING
   3"ø STD. PIPE FOR 4"ø PIPING
6. BASE PLATE:
   3/8x12x1'-0" FOR 2"ø PIPING
   1/2x18x1-6" FOR 4"ø PIPING
7. CONCRETE ANCHORS (4 REQUIRED):
   5/8"ø x4" FOR 2"ø PIPING
   1"ø x4" FOR 4"ø PIPING
8. CONCRETE ROOF.
9. FLASHING PER DETAIL 12/MH502.

13 PIPE SUPPORT
NTS



1. 1-1/4"x1-1/4"x1/4" WELDED ANGLE IRON FRAME (3 SIDES), PAINT FLAT BLACK.
2. PROVIDE ANGLE IRON SUPPORT AS FOLLOWS: (1) WITHIN 12" OF DUCT TO ERV UNIT CONNECTION, EQUAL SPACING 4'-0" O.C.
3. #14 S/M SCREWS @ EACH CORNER WITH EQUAL SPACING @ 8" O.C.
4. GALVANIZED SHEET METAL AIR DUCT.
5. 1-1/4"x1-1/4"x1/4" WELDED ANGLE IRON SUPPORTS, PAINT FLAT BLACK.
6. 3"x3"x3/8" PLATE WELDED TO FRAME.
7. GALV. S/M FLASHING WITH SEALANT.
8. CANT STRIP.
9. ROOF W/ RIGID INSULATION, SEE ARCH.
10. 10 GAUGE PLATE AS REQUIRED TO SPAN ACROSS LOW FLUTES OF METAL ROOF DECK.
11. 1/2"ø BOLT WITH WASHER & NUT THRU PLATE, (TYP. 2 PER PLATE).
12. 1/2"ø BOLT WITH WASHER & NUT THRU RUNNER AND PLATE (TYP.).
13. 3/8"ø x3" LAG SCREW WITH SILICONE SEALANT, (TYPICAL).
14. S/M COVERED 4x6 REDWOOD RUNNER, FIRE RETARDANT TREATED, (LENGTH DETERMINED BY DUCT WIDTH).

8 DUCT ON ROOF SUPPORT
NTS



DAMPER CSFM LISTING NO: 3225-0245:005 & 102

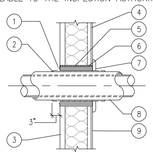
1. SLEEVE TO EXTEND 3" BEYOND WALL.
2. DUCT TO SLEEVE CONNECTION (S-LOCK).
3. FRAMED FIRE RATED WALL, SEE ARCHITECTURAL DWGS.
4. EFL, ELECTRIC RESET LINK, RESET ON OUTSIDE OF DMP.
5. DUCT SMOKE DETECTOR SHALL BE FURNISHED AND CONNECTED BY ELECTRICAL CONTRACTOR. DETECTOR TO BE INSTALLED IN DUCT BY MECH. CONTRACTOR.
6. JUNCTION BOX.
7. 120 VOLT ELECTRIC ACTUATOR.
8. 16 GA. ANGLE FRAME, WELDED BOLTED OR SCREWED TO ALL FOUR SIDES OF SLEEVE. ANGLE FRAME NOT LESS THAN 1-1/2" ANGLE. NET OPENING IN FRAMED WALLS SHALL EXCEED NET O.D. OF THE DAMPER ASSEMBLY BY 1/8" FOR EACH FOOT OF WIDTH AND HEIGHT OF DAMPER ASSEMBLY. USE S/M SCREWS OR FASTENERS AS REQUIRED TO SECURE ASSEMBLY.
9. STANDARD REGISTER SCREW INTO FRAMING MEMBER FOR METAL FRAMED WALLS.
10. 1-1/2 HOUR FIRE/SMOKE DAMPER SHALL BE U.L. 555 LISTED FOR FIRE AND U.L. 555S LEAKAGE RATED FOR NO LESS THAN CLASS II. RUSKIN MODEL FSD36 WITH FACTORY C-STYLE ENCLOSURE FOR SQUARE OR RECTANGULAR DUCTS. PROVIDE w/ RELAYS AS REQUIRED BY SMOKE DETECTORS.
11. REGISTER OR GRILLE, SEE MECHANICAL PLAN.

NOTES:

1. FIRE DAMPER & INSTALLATION TO BE IN ACCORDANCE WITH CALIFORNIA STATE FIRE MARSHAL & LISTED ABOVE.
2. FIRE DAMPER SHALL BE STATE FIRE MARSHAL APPROVED & INSTALLED STRICTLY PER MFG'S PRINTED INSTRUCTIONS.
3. MANUFACTURER'S INSTALLATION INSTRUCTIONS SHALL BE MADE AVAILABLE TO THE INSPECTION AUTHORITIES.
4. DUCT SMOKE DETECTOR SHALL BE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR. SEE ELECTRICAL DRAWINGS.
5. FIRE DAMPER DETAIL FOR REFERENCE ONLY.

9 FIRE/ SMOKE DAMPER AT GRILLE INSTALLATION
NTS

NOTE:
PENETRATIONS IN WALL, FLOOR OR CEILING REQUIRING PROTECTED. OPENING SHALL BE FIRE STOPPED. FIRE STOPPING SHALL BE OF AN APPROVED MATERIAL, SECURITY INSTALLED AND CAPABLE OF MAINTAINING ITS INTEGRITY WHEN SUBJECTED TO THE TIME-TEMPERATURE CURVE OF STATE FIRE MARSHAL STANDARD 12-43-3 AND STANDARD 12-43-L MANUFACTURER'S INSTALLATIONS INSTRUCTIONS SHALL BE MADE AVAILABLE TO THE INSPECTION AUTHORITY AND KEPT AT THE JOB SITE.

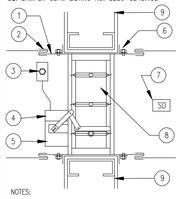


1. SEALANT-JOINT, 1/4" MIN. WIDTH BY 3/8" DEEP.
2. METAL JACKET ON INSULATED PIPE.
3. EXTERIOR FACE OF WALL.
4. FRAMED WALL.
5. BACKUP MATERIAL.
6. SLEEVE.
7. ESCUTCHEON.
8. INSULATION WHERE INDICATED.
9. INTERIOR FACE OF WALL.

FIRE PROOFING MATERIALS: U.L. 1479 TO ARCHIVE FIRE RATING NOTED ON DRAWINGS IN ACCORDANCE WITH THE UNDERWRITERS LABORATORIES INC. FIRE RESISTANCE DIRECTORY, THROUGH PENETRATION FIRE STOP SYSTEM NUMBER 147 AND 148

10 TYPICAL PIPE THRU FIRE RATED WALL
NTS

RD. DAMPER CSFM LISTING NO: 3225-0245:107
RD. DAMPER CSFM LISTING NO: 3230-0245:108
SQ. DAMPER CSFM LISTING NO: 3225-0245:005
SQ. DAMPER CSFM LISTING NO: 3230-0245:109



1. SLEEVE TO EXTEND 3" BEYOND WALL.
2. DUCT TO SLEEVE CONNECTION (S-LOCK).
3. EFL, ELECTRIC RESET LINK, RESET ON OUTSIDE OF DMP.
4. JUNCTION BOX.
5. 120 VOLT ELECTRIC ACTUATOR.
6. 16 GA. ANGLE FRAME, WELDED, BOLTED OR SCREWED TO ALL FOUR SIDES OF SLEEVE. ANGLE FRAME NOT LESS THAN 1-1/2" ANGLE. NET OPENING IN FRAMED WALLS SHALL EXCEED NET O.D. OF THE DAMPER ASSEMBLY BY 1/8" FOR EACH FOOT OF WIDTH AND HEIGHT OF DAMPER ASSEMBLY. USE SHEET METAL SCREWS OR FASTNERS AS REQUIRED TO SECURE ASSEMBLY.
7. DUCT SMOKE DETECTOR SHALL BE FURNISHED AND CONNECTED BY ELECTRICAL CONTRACTOR. DETECTOR TO BE INSTALLED IN DUCT BY MECH. CONTRACTOR.
8. 1-1/2 HOUR FIRE/SMOKE DAMPER SHALL BE U.L. 555 LISTED FOR FIRE AND U.L. 555S LEAKAGE RATED FOR NO LESS THAN CLASS II. RUSKIN MODEL FSDR25 FOR ROUND DAMPERS & RUSKIN MODEL FSD36 FOR SQUARE OR RECTANGULAR DUCTS. PROVIDE WITH RELAYS AS REQUIRED BY SMOKE DETECTORS.
9. FIRE RATED WALL, SEE ARCHITECTURAL DWGS.

NOTES:

1. FIRE DAMPER & INSTALLATION TO BE IN ACCORDANCE WITH CALIFORNIA STATE FIRE MARSHAL & LISTED ABOVE.
2. FIRE DAMPER SHALL BE STATE FIRE MARSHAL APPROVED & INSTALLED STRICTLY PER MFG'S PRINTED INSTRUCTIONS.
3. MANUFACTURER'S INSTALLATION INSTRUCTIONS SHALL BE MADE AVAILABLE TO THE INSPECTING AUTHORITIES.
4. CEILING ACCESS PANELS SHALL BE PROVIDED IN ALL GYPSUM BOARD CEILINGS FOR FIRE DAMPER ACCESS.
5. DUCT SMOKE DETECTOR SHALL BE FURNISHED AND CONNECTED BY ELECTRICAL, MECHANICAL TO INSTALL IN DUCT.
6. FIRE DAMPER DETAIL FOR REFERENCE ONLY.

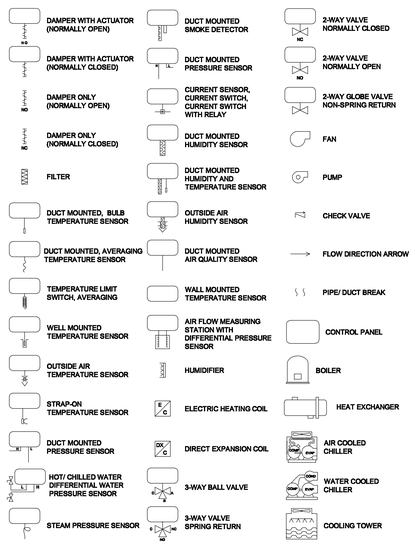
11 FIRE/ SMOKE DAMPER AT WALL INSTALLATION
NTS

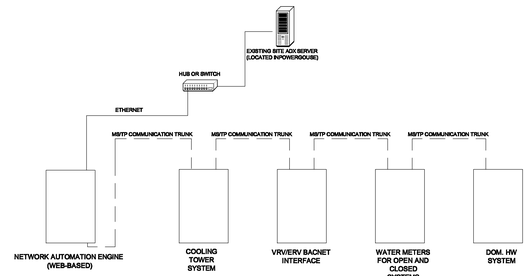
18 MECHANICAL DETAILS
SCALE: NTS

GENERAL ABBREVIATIONS

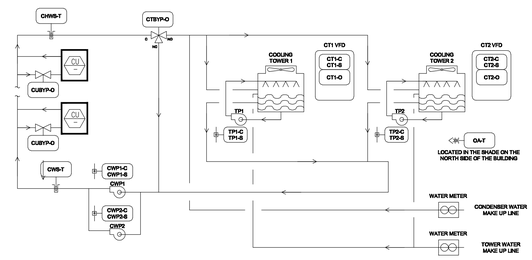
AIR-Q	Air Quality Sensor	DA-T	Discharge Air Temperature	PHFBD-O	Preheat Face-Bypass Damper Output
BLR1-A	Boiler 1 Alarm	DAT-SP	Discharge Air Temperature Setpoint	PH-O	Preheat Output
BLR1-C	Boiler 1 Command	DA-VP	Discharge Air Velocity Pressure	PHP-C	Preheat Pump Command
BLR1-EN	Boiler 1 Enable	DC-A	Dual Cool Unit Alarm	PHP-S	Preheat Pump Status
BLR1-O	Boiler 1 Output	EAD-C	Exhaust Air Damper Command	PH-T	Preheat Temperature
BLR2-A	Boiler 2 Alarm	EA-H	Exhaust Air Humidity	RAD-C	Return Air Damper Command
BLR2-C	Boiler 2 Command	EAHR-T	Exhaust Air After Heat Recovery Temp	RA-H	Return Air Humidity
BLR2-EN	Boiler 2 Enable	EA-T	Exhaust Air Temperature	RA-Q	Return Air Quality
BLR2-O	Boiler 2 Output	EA-VP	Exhaust Air Velocity Pressure	RA-T	Return Air Temperature
BLR3-A	Boiler 3 Alarm	EFDC-EN	Exhaust Fan/Dual Cool Unit Enable	RA-VP	Return Air Velocity Pressure
BLR3-C	Boiler 3 Command	EF1-C	Exhaust Fan 1 Command	RF-C	Return Fan Command
BLR3-EN	Boiler 3 Enable	EF1-S	Exhaust Fan 1 Status	RF-O	Return Fan Output
BLR3-O	Boiler 3 Output	EF2-C	Exhaust Fan 2 Command	RF-S	Return Fan Status
BP1-C	Boiler Pump 1 Command	EF2-S	Exhaust Fan 2 Status	RH-O	Reheat Output
BP1-S	Boiler Pump 1 Status	EF-C	Exhaust Fan Command	RVLV-C	Reversing Valve Command
BP2-C	Boiler Pump 2 Command	EF-O	Exhaust Fan Output	SF-A	Supply Fan Alarm
BP2-S	Boiler Pump 2 Status	EF-S	Exhaust Fan Status	SF-C	Supply Fan Command
BP-SP	Building Pressure Setpoint	EXH-O	Exhaust Air Damper	SFH-C	Supply Fan HI Command
C1CHWV-S	Chill Water Valve 1 Status	FAN-C	Fan Command	SFL-C	Supply Fan LO Command
C1CWV-S	Cond Water Valve 1 Status	FAN-O	Fan Output	SFM-C	Supply Fan MED Command
C2CHWV-S	Chill Water Valve 2 Status	FBD-O	Face-Bypass Damper Output	SF-O	Supply Fan Output
C2CWV-S	Cond Water Valve 2 Status	FLT-S	Filter Status	SF-S	Supply Fan Status
C3CHWV-S	Chill Water Valve 3 Status	GLS-T	Glycol Loop Supply Temperature	STMJP	Steam Pressure
CD-C	Combustion Damper Command	GLYP1-C	Glycol Pump 1 Command	SUPHTG-C	Supplemental Heating Command
CD-P	Cold Deck Static Pressure	GLYP1-S	Glycol Pump 1 Status	SUPHTG-O	Supplemental Heating Output
CD-S	Combustion Damper Status	GLYP2-C	Glycol Pump 2 Command	W-C	Warmup Command
CD-T	Cold Deck Temperature	GLYP2-S	Glycol Pump 2 Status	WC1-ADJ	Zone 1 Warmer/Cooler
CH1-AMP	Chiller 1 Current	GLYR-T	Glycol Return Temperature	WC2-ADJ	Zone 2 Warmer/Cooler
CH1-EN	Chiller 1 Enable	GLYS-T	Glycol Supply Temperature	WC3-ADJ	Zone 3 Warmer/Cooler
CH2-AMP	Chiller 2 Current	GLYV-O	Glycol Valve Output	WC4-ADJ	Zone 4 Warmer/Cooler
CH2-EN	Chiller 2 Enable	HC-C	Heating/Cooling Command	WC5-ADJ	Zone 5 Warmer/Cooler
CH3-AMP	Chiller 3 Current	HC-O	Heating/Cooling Output	WC6-ADJ	Zone 6 Warmer/Cooler
CH3-EN	Chiller 3 Enable	HD-O	Hot Deck Damper Output	WC7-ADJ	Zone 7 Warmer/Cooler
CHWP1-C	Chill Water Pump 1 Status	HD-P	Hot Deck Static Pressure	WC8-ADJ	Zone 8 Warmer/Cooler
CHWP1-S	Chill Water Pump 1 Status	HD-T	Hot Deck Temperature	WC-ADJ	Warmer Cooler Adjustment
CHWP2-C	Chill Water Pump 2 Status	HD-VP	Hot Deck Velocity Pressure	W-SP	Warmup Setpoint
CHWP2-S	Chill Water Pump 2 Status	HR-O	Heat Recovery Output	ZN1HTG1-C	Zone 1 Heating Stage 1
CHWP3-C	Chill Water Pump 3 Status	HRP-C	Heat Recovery Pump Command	ZN1HTG2-C	Zone 1 Heating Stage 2
CHWP3-S	Chill Water Pump 3 Status	HRP-S	Heat Recovery Pump Status	ZN1HTG-O	Zone 1 Heating Output
CHWR-T	Chill Water Return Temp	HR-T	Heat Recovery Temperature	ZN1-O	Zone 1 Output
CHWS-T	Chill Water Supply Temp	HTG1-C	Heating Stage 1 Command	ZN1-T	Zone 1 Temperature
CLG1-C	Cooling Stage 1 Command	HTG2-C	Heating Stage 2 Command	ZN2HTG1-C	Zone 2 Heating Stage 1
CLG2-C	Cooling Stage 2 Command	HTG3-C	Heating Stage 3 Command	ZN2HTG2-C	Zone 2 Heating Stage 2
CLG3-C	Cooling Stage 3 Command	HTG4-C	Heating Stage 4 Command	ZN2HTG-O	Zone 2 Heating Output
CLG4-C	Cooling Stage 4 Command	HTG5-C	Heating Stage 5 Command	ZN2-O	Zone 2 Output
CLG5-C	Cooling Stage 5 Command	HTG6-C	Heating Stage 6 Command	ZN2-T	Zone 2 Temperature
CLG6-C	Cooling Stage 6 Command	HTG7-C	Heating Stage 7 Command	ZN3HTG1-C	Zone 3 Heating Stage 1
CLG7-C	Cooling Stage 7 Command	HTG8-C	Heating Stage 7 Command	ZN3HTG2-C	Zone 3 Heating Stage 2
CLG8-C	Cooling Stage 8 Command	HTG-A	Heating Alarm	ZN3HTG-O	Zone 3 Heating Output
CLG-A	Cooling Alarm	HTG-C	Heating Command	ZN3-O	Zone 3 Output
CLG-C	Cooling Command	HTG-O	Heating Output	ZN3-T	Zone 3 Temperature
CLG-O	Cooling Output	HUM-C	Humidifier Command	ZN4HTG1-C	Zone 4 Heating Stage 1
COMP1-C	Compressor 1 Command	HUM-O	Humidifier Output	ZN4HTG2-C	Zone 4 Heating Stage 2
COMP2-C	Compressor 2 Command	HW-DP	Hot Water Diff Pressure	ZN4HTG-O	Zone 4 Heating Output
CP-C	Cooling Pump Command	HWP1-C	Hot Water Pump 1 Command	ZN4-O	Zone 4 Output
CP-S	Cooling Pump Status	HWP1-O	Hot Water Pump 1 Output	ZN4-T	Zone 4 Temperature
CT1-C	Cooling Tower 1 Command	HWP1-S	Hot Water Pump 1 Status	ZN5HTG-O	Zone 5 Heating Output
CT1-HI	Cooling Tower 1 High Speed	HWP2-C	Hot Water Pump 2 Command	ZN5-O	Zone 5 Output
CT1-LO	Cooling Tower 1 Low Speed	HWP2-O	Hot Water Pump 2 Output	ZN5-T	Zone 5 Temperature
CT1-O	Cooling Tower 1 Output	HWP2-S	Hot Water Pump 2 Status	ZN6HTG-O	Zone 6 Heating Output
CT1-S	Cooling Tower 1 Status	HWP3-C	Hot Water Pump 3 Command	ZN6-O	Zone 6 Output
CT2-C	Cooling Tower 2 Command	HWP3-S	Hot Water Pump 3 Status	ZN6-T	Zone 6 Temperature
CT2-HI	Cooling Tower 2 High Speed	HWR-T	Hot Water Return Temp	ZN7HTG-O	Zone 7 Heating Output
CT2-LO	Cooling Tower 2 Low Speed	HWS-T	Hot Water Supply Temp	ZN7-O	Zone 7 Output
CT2-O	Cooling Tower 2 Output	HWV-O	Hot Water Valve Output	ZN7-T	Zone 7 Temperature
CT2-S	Cooling Tower 2 Status	HX-O	Heat Exchanger Output	ZN8HTG-O	Zone 8 Heating Output
CTBYP-O	Cooling Tower Bypass Valve	HX-O1	Heat Exch Valve 1 Output	ZN8-O	Zone 8 Output
CWP1-C	Cond Water Pump 1 Status	HX-O2	Heat Exch Valve 2 Output	ZN8-T	Zone 8 Temperature
CWP1-S	Cond Water Pump 1 Status	MAD-O	Mixed Air Damper Output	ZN-CO2	Zone Carbon Dioxide
CWP2-C	Cond Water Pump 2 Status	MA-T	Mixed Air Temperature	ZN-H	Zone Humidity
CWP2-S	Cond Water Pump 2 Status	OAD-C	Outside Air Damper Command	ZN-Q	Zone Air Quality
CWR-T	Cond Water Return Temp	OAD-ES	Outside Air Damper End Switch	ZN-T	Zone Temperature
CWS-T	Cond Water Supply Temp	OA-H	Outside Air Humidity	ZN-T/WC-ADJ	Zone Temp/Warmer Cooler
DA-P	Discharge Static Pressure	OA-T	Outside Air Temperature	ZN-T/ZN-H	Zone Temp/Zone Humidity
DAP-SP	Duct Static Pressure Setpoint	OCC-C	Occupied Command		

GENERAL SYMBOLS





4 TYPICAL NETWORK LAYOUT
NTS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