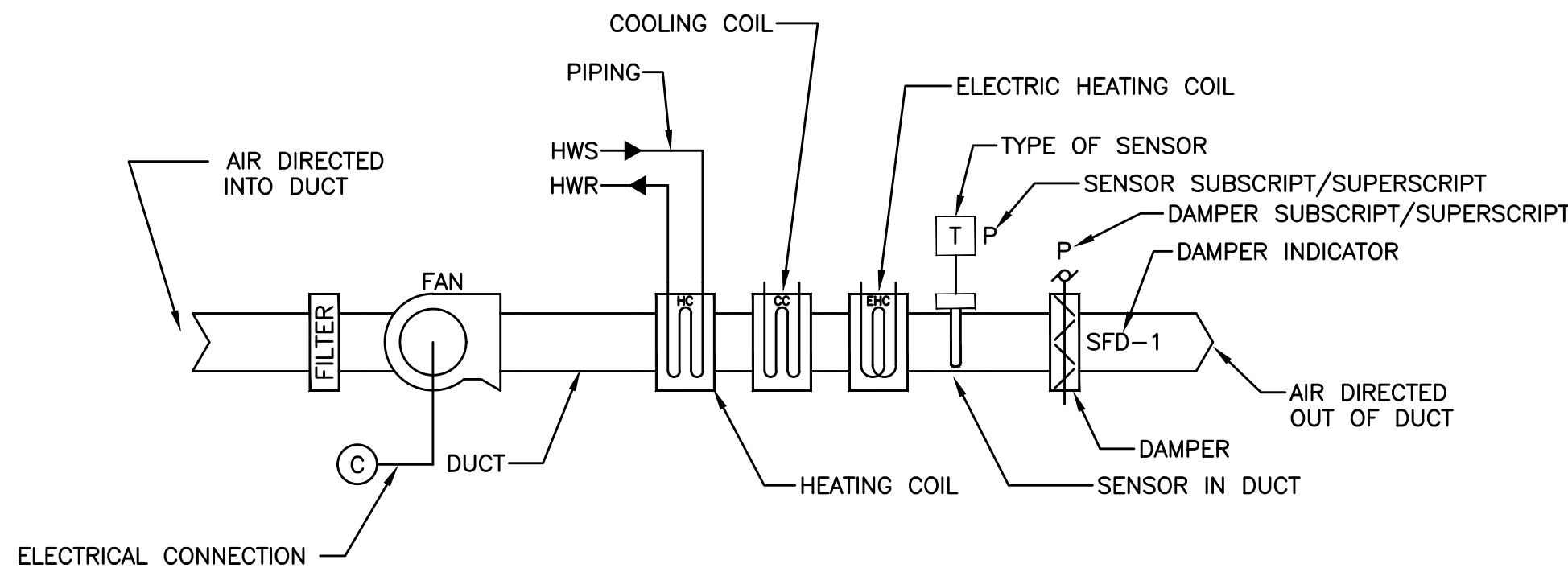




LEGEND

EQUIPMENT ABBREVIATIONS :

P - PUMP
SP - SUMP PUMP
BP - BOOSTER PUMP
HWP - HEATING WATER PUMP
CHP - CHILLED WATER PUMP
E - CONDENSING WATER PUMP
CSP - COOLING TOWER SUMP PUMP
HWRP - DOMESTIC HOT WATER RECIRCULATION
VFD - VARIABLE FREQUENCY DRIVE
CT - CONTACTOR
CC - CONTROL COMPRESSOR
CH - CHILLER
B - BOILER
EF - EXHAUST FAN
RF - RETURN/RELIEF FAN
AH - AIR HANDLER
VAV - VARIABLE AIR VOLUME DAMPER BOX
AD - AREA DAMPER
SD - SMOKE DAMPER
SFD - FIRE SMOKE COMBINATION DAMPER
H - HUMIDIFIER
V - VALVE
WH - WATER HEATER
BAS - BUILDING AUTOMATION SYSTEM

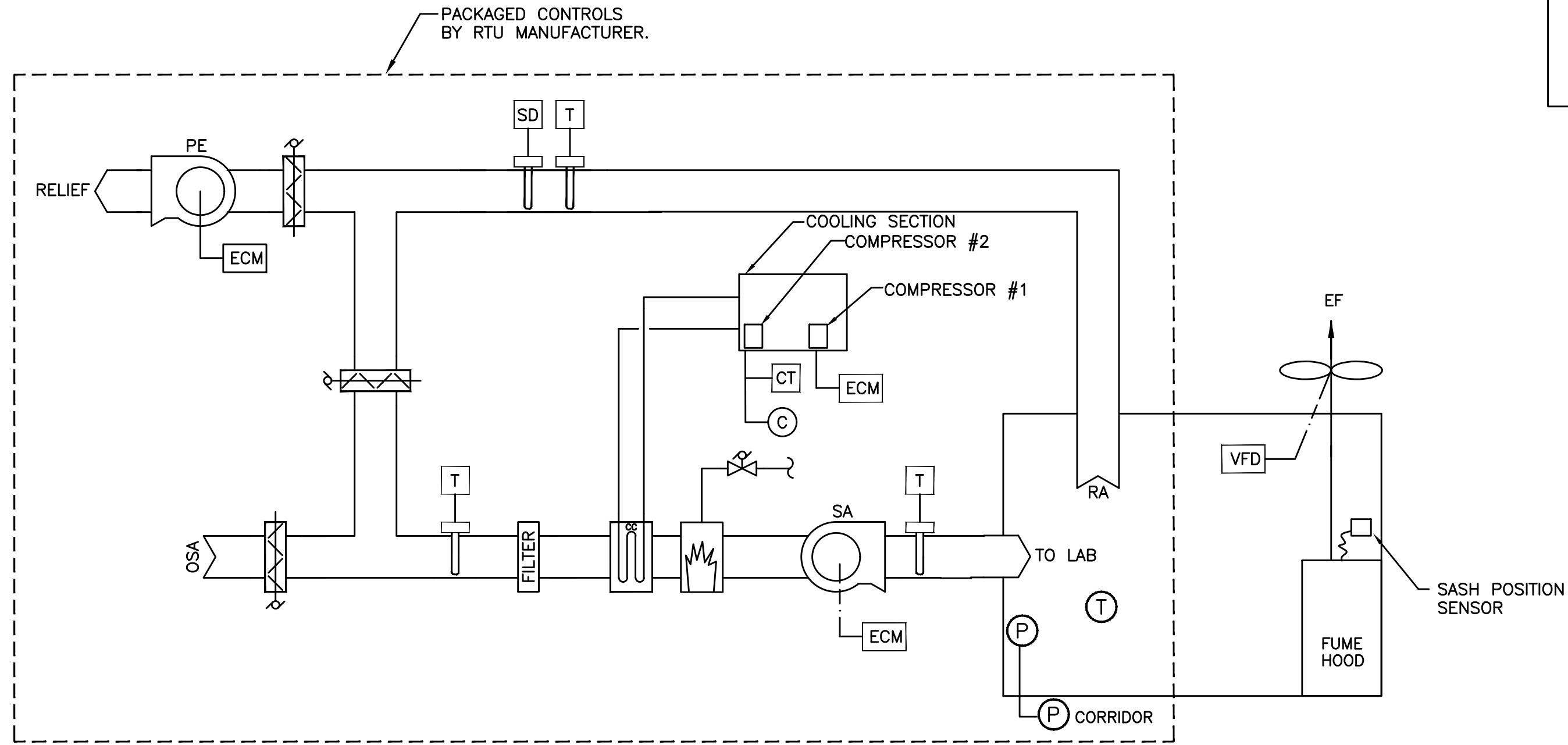
PLUMBING ABBREVIATIONS:

HWS - HEATING WATER SUPPLY
HWR - HEATING WATER RETURN
HW - DOMESTIC HOT WATER
CW - DOMESTIC COLD WATER
GPM - GALLONS PER MINUTE
DB - DOUBLE VALVE OPERATOR

AIR FLOW ABBREVIATIONS :

OSA - OUTSIDE AIR
RA - RETURN AIR
SA - SUPPLY AIR
EXH - EXHAUSTED AIR

CONTROLS FOR LABS 7, 8 & 9					
POINT DESCRIPTION	INPUT		OUTPUT		ALARM
	DIGITAL	ANALOG	DIGITAL	ANALOG	
EXH FAN VFD SPEED				X	
FUME HOOD VFD SPEED				X	
SPACE PRESSURE		X			
CONTROLS FOR LAB 5					
POINT DESCRIPTION	INPUT		OUTPUT		ALARM
	DIGITAL	ANALOG	DIGITAL	ANALOG	
SPACE PRESSURE		X			



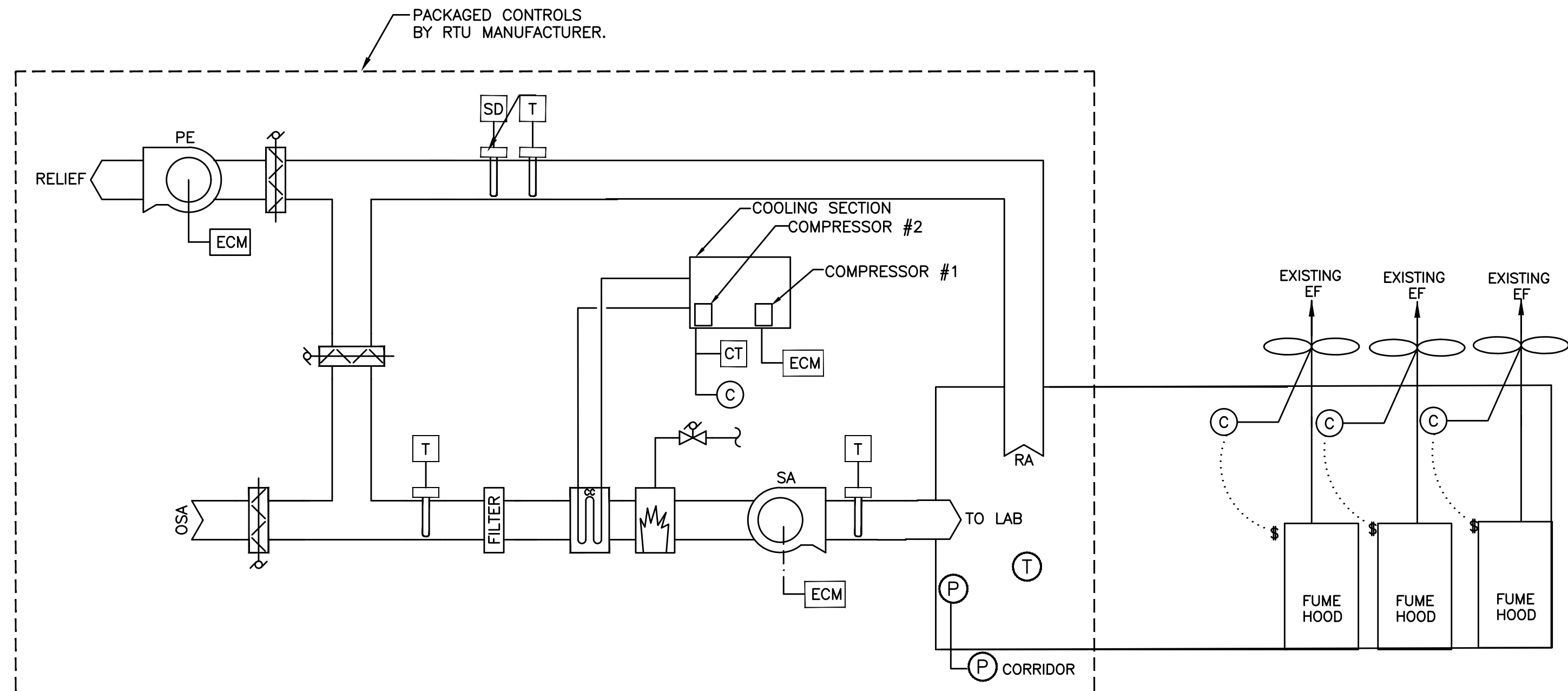
SEQUENCE OF OPERATION:

THIS SYSTEM OPERATES TO MAINTAIN SPACE TEMPERATURE 24/7.
COORDINATE SCHEDULE AND OFF HOURS TEMP SET POINT WITH OWNER.

FUME HOOD EXH FAN: OPERATE @ 100% DESIGN (1800CFM) WHEN HOOD SASH IS OPEN.
OPERATE @ 50% DESIGN (900CFM) WHEN HOOD SASH IS CLOSED.

SUPPLY FAN: OPERATES AT CONSTANT SPEED
POWER EXHAUST(PE) FAN: OPERATES TO MAINTAIN -0.05" SPACE PRESSURE.

1 RTU-7A, 8A, 9A
M5.0 SCALE: N/A



SEQUENCE OF OPERATION:

THIS SYSTEM OPERATES TO MAINTAIN SPACE TEMPERATURE 24/7.
COORDINATE SCHEDULE AND OFF HOURS TEMP SET POINT WITH OWNER.

FUME HOOD EXH FAN: ON/OFF FROM LOCAL SWITCH

SUPPLY FAN: OPERATES AT CONSTANT SPEED
POWER EXHAUST(PE) FAN: OPERATES TO MAINTAIN -0.05" SPACE PRESSURE.

2 RTU-5A
M5.0 SCALE: N/A

M Consulting Engineers
2007 S.E. Ash St.
Portland, OR 97214
PHN: (503) 234-0548
FAX: (503) 234-0677
INC. WWW.MFIA-ENG.COM
CONTACT: TAKAKO BAKER

PLAN REVIEW APPROVAL STAMP

BEND RESEARCH, INC.
TUMALO - LABS 5 & 6 UPGRADES



BLAISE CACCIOLA
ARCHITECT
1465 SW Knoll Avenue, Suite 250
Bend, OR 97702
Phone: 541.728.0375
www.BCA-Architect.com

BEND RESEARCH, INC
BRI-TUMALO
LABS 5 & 6 UPGRADES
64550 RESEARCH RD.
BEND, OREGON 97701

DRAWN/ CHECKED:

ISSUED:

MECHANICAL CONTROLS

M5.1