1.7 Drawings and Other Detailed Information

1.7.1 Electrical and Instrumentation and Control Drawings

Instrument and control functional diagrams, electrical one-line diagrams, and onsite standby diesel generator loading sequence and initiating circuit logic diagrams are listed in Table 1.7-1.

The legend for electrical power, control, lighting, and communication drawings are provided in Figure 1.7-1, sheets 1, 2, and 3. The index, notes, and symbols for instrument and control functional diagrams are provided in Figure 7.1-1.

1.7.2 Piping and Instrumentation Diagrams

Table 1.7-2 contains a list of piping and instrumentation diagrams (P&IDs) and the corresponding DCD figure numbers. The three letter system names are provided in Table 1.7-2. Figures appear at the end of the respective text section. The P&ID legend, Figure 1.7-2, sheets 1, 2, and 3, provides an explanation of AP1000 symbols and characters used in these DCD figures.

1.7.3 Combined License Information

This section has no requirement for additional information to be provided in support of the combined license application.

Table 1.7-1

I&C FUNCTIONAL AND ELECTRICAL ONE-LINE DIAGRAMS

DCD Figure Number	Title
7.2-1 (Sheet 1)	Index and Symbols
7.2-1 (Sheet 2)	Reactor Trip Function
7.2-1 (Sheet 3)	Nuclear Startup Protection
7.2-1 (Sheet 4)	Nuclear Overpower Protection
7.2-1 (Sheet 5)	Core Heat Removal Protection
7.2-1 (Sheet 6)	Primary Overpressure Loss of Heat Sink Protection
7.2-1 (Sheet 7)	Loss of Heat Sink Protection
7.2-1 (Sheet 8)	Loss of Heat Sink Protection
7.2-1 (Sheet 9)	Steam Line Isolation
7.2-1 (Sheet 10)	Feedwater Isolation
7.2-1 (Sheet 11)	Safeguards Isolation
7.2-1 (Sheet 12)	Core Makeup Tank Actuation and Reactor Coolant Pump Trip
7.2-1 (Sheet 13)	Containment and Other Protection
7.2-1 (Sheet 14)	Turbine Related Protection
7.2-1 (Sheet 15)	Automatic Reactor Coolant System Overpressurization Valve Sequencing
7.2-1 (Sheet 16)	Incontainment Refueling Water Storage Tank Actuations
7.2-1 (Sheet 17)	Passive Residual Heat Removal and Core Makeup Tank Isolation Valve Interlocks
7.2-1 (Sheet 18)	Normal Residual Heat Removal System Isolation Valve Interlocks
7.2-1 (Sheet 19)	Diverse Actuation System Logic, Automatic Actuations
7.2-1 (Sheet 20)	Diverse Actuation System Logic, Manual Actuations
8.3.1-1	AC Power System - Station One-Line Diagram (Sheets 1 & 2)
8.3.1-2	On-site Standby Diesel Generator Initiation Circuit Logic Diagram
8.3.1-3	Post 72 Hours Temporary Electric Power One Line Diagram
8.3.2-1	Class 1E DC System One-Line Diagrams (Sheets 1 & 2)
8.3.2-2	Class 1E 208Y/120V UPS Power One-Line Diagram
8.3.2-3	Non-Class 1E DC & UPS System One-Line Diagrams (Sheets 1 & 2)

Table 1.7-2 (Sheet 1 of 3)

AP1000 SYSTEM DESIGNATORS AND SYSTEM DIAGRAMS

Designator	System (Note 1)	DCD Section	DCD Figure (Note 2)
ASS	Auxiliary Steam Supply System	10.4.10	None
BDS	Steam Generator Blowdown System	10.4.8	10.4.8-1
CAS	Compressed and Instrument Air Systems	9.3.1	9.3.1-1
CCS	Component Cooling Water System	9.2.2	9.2.2-2
CDS	Condensate System	10.4.7	10.4.7-1
CES	Condenser Tube Cleaning System	10.4.1.2.1, 10.4.5.2.3	None
CFS	Turbine Island Chemical Feed System	10.4.11	None
CMS	Condenser Air Removal System	10.4.2	None
CNS	Containment System	6.2.3	None
CPS	Condensate Polishing System	10.4.6	10.4.6-1
CVS	Chemical and Volume Control System	9.3.6	9.3.6-1
CWS	Circulating Water System (Partially out of scope)	10.4.5	None
DAS	Diverse Actuation System	7.7	7.2-1 (Sh. 19 & 20)
DDS	Data Display and Processing System	7.1 & 7.7	7.1-1
DOS	Standby Diesel Fuel Oil System	9.5.4	9.5.4-1
DRS	Storm Drain System (Wholly out of scope)	None	None
DTS	Demineralized Water Treatment System	9.2.3	None
DWS	Demineralized Water Transfer and Storage System	9.2.4	9.2.4-1
ECS	Main ac Power System	8.3.1	8.3.1-1
EDS	Non Class 1E dc and UPS System	8.3.2	8.3.2-3
EFS	Communication Systems	9.5.2	None
EGS	Grounding and Lightning Protection System	8.3.1.1	None
EHS	Special Process Heat Tracing System	8.3.1.1	None
ELS	Plant Lighting System	9.5.3	None
EQS	Cathodic Protection System (Partially out of scope)	None	None
FHS	Fuel Handling and Refueling System	9.1.1, 9.1.2, 9.1.4	9.1 - various
FPS	Fire Protection System	9.5.1, 6.5.2	9.5.1-1
FWS	Main and Startup Feedwater System	10.4.7, 10.4.9	10.4.7-1
GSS	Gland Seal System	10.4.3	10.4.3-1
HCS	Generator Hydrogen and CO_2 Systems	10.2	None
HDS	Heater Drain System	10.4.7	None
HSS	Hydrogen Seal Oil System	10.2	None
IDS	Class 1E dc and UPS System	8.3.2	8.3.2-1
IIS	In-core Instrumentation System	4.4.6	None

Table 1.7-2 (Sheet 2 of 3)

AP1000 SYSTEM DESIGNATORS AND SYSTEM DIAGRAMS

Designator	System (Note 1)	DCD Section	DCD Figure (Note 2)
LOS	Main Turbine and Generator Lube Oil System	10.2	None
MES	Meteorological and Environmental Monitoring System (Wholly out of scope)	2.3.3	None
MHS	Mechanical Handling System	9.1	None
MSS	Main Steam System	10.3	10.3.2-2
MTS	Main Turbine System	10.2	10.2-1
OCS	Operation and Control Centers System	7.1, Ch. 18	7.1-1
PCS	Passive Containment Cooling System	6.2.2	6.2.2-1
PGS	Plant Gas Systems	9.3.2	None
PLS	Plant Control System	7.1 & 7.7	7.1-1
PMS	Protection and Safety Monitoring System	Ch. 7	7.2-1
PSS	Primary Sampling System	9.3.3	9.3.3-1
PWS	Potable Water System (Partially out of scope)	9.2.5	None
PXS	Passive Core Cooling System	6.3	6.3-1
RCS	Reactor Coolant System	5.1	5.1-5
RDS	Gravity and Roof Drain Collection System (Partially out of scope)	None	None
RMS	Radiation Monitoring System	11.5	None
RNS	Normal Residual Heat Removal System	5.4.7	5.4-7
RWS	Raw Water System (Wholly out of scope)	9.2.1.2.2, 9.2.1.2.3.1, 9.2.3, 9.2.5	None
RXS	Reactor System	3.9.4, 3.9.5, 4.2.2.2, 4.2.2.3.1, 5.3	5.3-1
SDS	Sanitary Drainage System (Partially out of scope)	9.2.6	None
SES	Plant Security System (Partially out of scope)	13.6	None
SFS	Spent Fuel Pit Cooling System	9.1.3	9.1-6
SGS	Steam Generator System	10.3, 10.4.7, 10.4.9	10.3.2-1
SJS	Seismic Monitoring System	3.7.4	None
SMS	Special Monitoring System	4.4.6.4	None
SSS	Secondary Sampling System	9.3.4	None
SWS	Service Water System	9.2.1	9.2.1-1
TCS	Turbine Building Closed Cooling Water System	9.2.8	None

Table 1.7-2 (Sheet 3 of 3)

AP1000 SYSTEM DESIGNATORS AND SYSTEM DIAGRAMS

Designator	System (Note 1)	DCD Section	DCD Figure (Note 2)
TDS	Turbine Island Vents, Drains and Relief System	9.2.9.2.2, 10.4.2.2.1, 10.4.3.1.2, 10.4.3.2.2, 10.4.6.3	None
TOS	Main Turbine Control and Diagnostics System	10.2.2.4	None
TVS	Closed Circuit TV System (Wholly out of scope)	None	None
VAS	Radiologically Controlled Area Ventilation System	9.4.3	9.4.3-1
VBS	Nuclear Island Nonradioactive Ventilation System	9.4.1	9.4.1-1
VCS	Containment Recirculation Cooling System	9.4.6	9.4.6-1
VES	Main Control Room Emergency Habitability System	6.4	6.4-2
VFS	Containment Air Filtration System	9.4.7	9.4.7-1
VHS	Health Physics and Hot Machine Shop HVAC System	9.4.11	9.4.11-1
VLS	Containment Hydrogen Control System	6.2.4	6.2.4 - various
VRS	Radwaste Building HVAC System	9.4.8	9.4.8-1
VTS	Turbine Building Ventilation System	9.4.9	9.4.9-1
VUS	Containment Leak Rate Test System	6.2.5	6.2.5-1
VWS	Central Chilled Water System	9.2.7	9.2.7-1
VXS	Annex/Auxiliary Non-Radioactive Ventilation System	9.4.2	9.4.2-1
VYS	Hot Water Heating System	9.2.10	None
VZS	Diesel Generator Building Ventilation System	9.4.10	9.4.10-1
WGS	Gaseous Radwaste System	11.3	11.3-2
WLS	Liquid Radwaste System	11.2	11.2-2
WRS	Radioactive Waste Drain System	9.3.5, 11.2	9.3.5-1
WSS	Solid Radwaste System	11.4	11.4-1
WWS	Waste Water System (Partially out of scope)	9.2.9	None
ZAS	Main Generation System (Note 3)	8.1	None
ZBS	Transmission Switchyard and Offsite Power System (Wholly out of scope)	8.2	None
ZOS	Onsite Standby Power System	8.2.1, 8.3.1	8.3.1-4, 8.3.1-5
ZVS	Excitation and Voltage Regulation System	10.2.2.3	None

Notes:

1. For the System names:
   a) An entry with the system name only means the system is wholly in the scope of the AP1000 design certification.
   b) An entry with the system name followed by (Partially out of scope) means the system is partially in the scope of the AP1000 design certification.
   c) An entry with the system name followed by (Wholly out of scope) means the system is not in the scope of the AP1000 design certification.

2. For the DCD Figures:
   In the AP1000 design documentation system, Piping and Instrumentation Diagrams are numbered xxx-M6-yyy, where xxx is the system designator and yyy is the sheet number. Electrical One-Line Diagrams are numbered xxx-E3-yyy, where xxx is the system designator and yyy is the sheet number. I&C Functional Logic Diagrams are numbered xxx-J1-yyy, where xxx is the I&C system designator and yyy is the sheet number.

3. For the Main Generation System:
   The high side voltage of the main step-up transformer and the reserve auxiliary transformer is site specific.

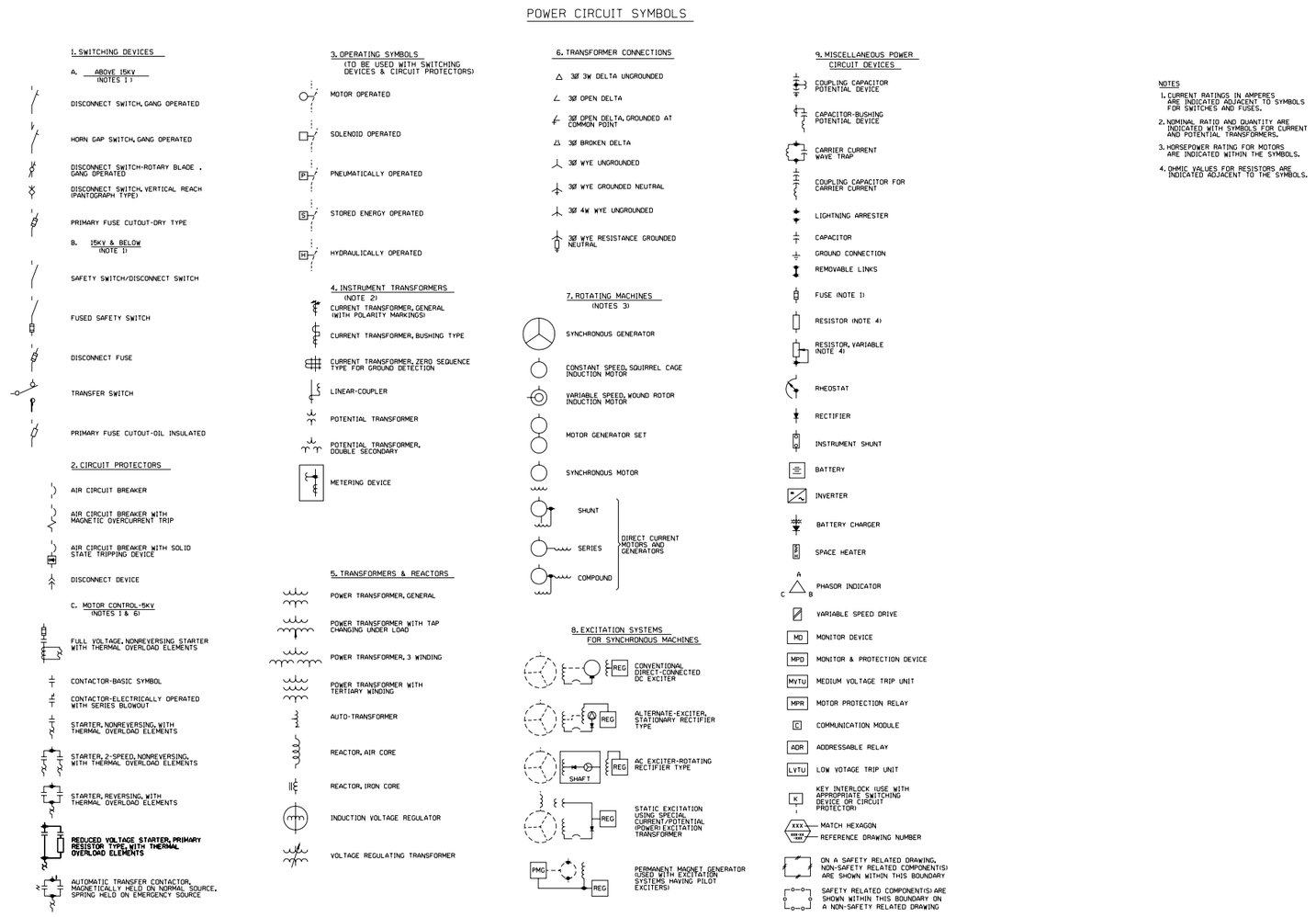


Figure 1.7-1 (Sheet 1 of 3)

Legend for Electrical Power, Lighting, and Communication Drawings

POWER CIRCUIT SYMBOLS (CONTINUED)

10. METERS AND INSTRUMENTS

PREFIX R INDICATES RECORDING TYPE

- A — AMMETER
- AH — AMPERE-HOUR METER
- D — DEMAND METER
- F — FREQUENCY METER
- GD — GROUND DETECTOR
- OHM — OHMMETER
- OSC — OSCILLOGRAPH
- PD — PRINTING DEMAND METER
- PF — POWER FACTOR METER
- RT — RUNNING TIME METER
- SY — SYNCHROSCOPE
- T — TEMPERATURE METER
- THC — THERMAL CONVERTER
- TI — TEMPERATURE INDICATOR
- TLM — TELEMETERING
- TM — TRANSMITTER
- TR — TEMPERATURE RECORDER
- •/T — TRANSDUCER
  - A-INDICATES AMPS
  - V-INDICATES VOLTS
  - VAR-INDICATES VARS
  - W-INDICATES WATTS
- V — VOLTMETER
- VAR — VARMETER
- VARH — VAR-HOUR METER
- VV — DOUBLE VOLTMETER
- W — WATTMETER
- WH — WATTHOUR METER
- WHD — WATTHOUR DEMAND METER

11. METER & INSTRUMENT SWITCHES

- AS — AMMETER SWITCH
- VS — VOLTMETER SWITCH
- SS — SYNCHRONIZING SWITCH
- MSS — METERING SELECTOR SWITCH

12. CONTROL SWITCHES & PUSHBUTTON STATIONS

- CONTROL SWITCH WITH RED & GREEN INDICATING LIGHTS, P-INDICATES PERMISSIVE
- CONTROL SWITCH WITH RED,GREEN & AMBER INDICATING LIGHTS
- START-STOP MAINTAINED CONTACT PUSH BUTTON
- START-STOP MAINTAINED CONTACT PUSH BUTTON WITH RED & GREEN INDICATING LIGHTS
- START-STOP MOMENTARY CONTACT PUSH BUTTON
- START-STOP MOMENTARY CONTACT PUSH BUTTON WITH RED & GREEN INDICATING LIGHTS
- RED & GREEN INDICATING LIGHTS
- SELECTOR SWITCH WITH RED & GREEN INDICATING LIGHTS
- HAND-OFF-AUTOMATIC SELECTOR SWITCH
- TEST SWITCH WITH RED & GREEN INDICATING LIGHTS
- COMBINATION CONTROL & TEST SWITCH WITH RED & GREEN INDICATING LIGHTS
- LOCK-OUT PUSH BUTTON

13. MISCELLANEOUS DEVICES

- 20 — ELECTRICALLY OPERATED VALVE
- 23 — TEMPERATURE CONTROL DEVICE
- 24 — BUS TIE CIRCUIT BREAKER
- 25 — SYNCHRONIZING DEVICE
- 26 — APPARATUS THERMAL DEVICE
- 28 — FLAME DETECTOR
- 33 — POSITION SWITCH (POSITION OR LIMIT SWITCH)
- 41 — FIELD CIRCUIT BREAKER
- 42 — MOTOR STARTER
- 43 — TRANSFER DEVICE
- 52 — AC CIRCUIT BREAKER
- 63P — SUDDEN PRESSURE SWITCH
- 65 — GOVERNOR DEVICE
- 69 — PERMISSIVE CONTROL DEVICE
- 70 — RHEOSTAT DEVICE
- 71 — LIQUID OR GAS LEVEL SWITCH
- 72 — DC CIRCUIT BREAKER
- 75 — POSITION CHANGING MECHANISM
- 77 — IMPULSE TRANSMITTER DEVICE
- 89 — FUSE DISCONNECT
- 90 — REGULATING DEVICE
- 95 — METERING TRANSFER DEVICE
- 96 — BATTERY MONITOR
- 97 — BATTERY CHARGER FAILURE

14. RELAYS

- 21 — DISTANCE (IMPEDANCE)
- 27 — UNDERVOLTAGE
- 30 — ANNUNCIATOR
- 32 — REVERSE POWER
- 37 — UNDERCURRENT OR UNDERPOWER
- 40 — FIELD
- 46 — REVERSE PHASE (NEGATIVE PHASE SEQUENCE)
- 47 — PHASE SEQUENCE
- 48 — INCOMPLETE SEQUENCE
- 49 — THERMAL
- 50 — INSTANTANEOUS OVERCURRENT
- 50D — HIGHDROPOUT OVERCURRENT USED AS MOTOR DIFFERENTIAL
- 50G — INSTANTANEOUS GROUND CURRENT
- 50/51 — INSTANTANEOUS OVERCURRENT & TIME DELAY
- 51 — AC TIME OVERCURRENT
- 51G — GROUND CURRENT TIME DELAY
- 51N — RESIDUAL GROUND OVERCURRENT
- 51V — OVERCURRENT-TIME DELAY-VOLTAGE RESTRAINT
- 55 — POWER FACTOR
- 56 — FIELD APPLICATION
- 58 — RECTIFICATION FAILURE
- 59 — OVERVOLTAGE
- 60 — VOLTAGE BALANCE
- 62 — TIME DELAY
- 64 — GROUND PROTECTIVE
- 67 — AC DIRECTIONAL OVERCURRENT
- 68 — BLOCKING
- 74 — ALARM
- 76 — DC OVERCURRENT
- 78 — PHASE ANGLE
- 79 — AC RECLOSING
- 81 — FREQUENCY
- 83 — AUTOMATIC SELECTIVE CONTROL
- 85 — CARRIER OR PILOT-WIRE RECEIVER
- 86 — LOCKING-OUT
- 87 — DIFFERENTIAL
- 94 — TRIPPING OR TRIP-FREE

CONTROL SYMBOLS

A. CONTROL DEVICES

- BLOCKING DIODE (SEMICONDUCTOR RECTIFIER)
- PUSH BUTTON-MOMENTARY CONTACT NORMALLY CLOSED
- PUSH BUTTON-MOMENTARY CONTACT NORMALLY OPEN
- PUSH BUTTON LOCK-OUT
- PUSH BUTTON-MAINTAINED CONTACT
- 49 — CONTACTS OF OVERLOAD DEVICES
- OFF — SELECTOR SWITCH (TWO OR THREE POSITIONS)
- SOLENOID
- NORMALLY OPEN CONTACT (NO)
- NORMALLY CLOSED CONTACT (NC)
- MOTOR OPERATED VALVE POSITION LIMIT SWITCH
- MOTOR OPERATED VALVE TORQUE SWITCH

B. OPERATING COIL & COMPONENTS

- CC — CONTACTOR COIL
- CR — CONTROL RELAY
- LR — LATCHING RELAY
- M — MOTOR STARTER OPERATING COIL
- MC — VALVE MOTOR STARTER CLOSE COIL
- MO — VALVE MOTOR STARTER OPEN COIL
- TDDO — TIME DELAY DROPOUT
- TDPU — TIME DELAY PICKUP
- 42-C — REVERSING MAGNETIC CONTACTOR CLOSING COIL
- 42-MX — MOTOR STARTER AUXILIARY RELAY
- 42-O — REVERSING MAGNETIC CONTACTOR OPENING COIL
- 52-CC — CIRCUIT BREAKER CLOSE COIL
- 52-TC — CIRCUIT BREAKER TRIP COIL

C. MISCELLANEOUS DEVICES

- CS — CONTROL SWITCH
- dPS — DIFFERENTIAL PRESSURE SWITCH
- dPSH — DIFFERENTIAL PRESSURE SWITCH HIGH
- E/P — ELECTRO-PNEUMATIC CONVERTER
- EP — ELECTRO-PNEUMATIC SWITCH
- FM — FLOW METER
- FR — FIRE RELAY
- FS — FLOW SWITCH
- FT — FLOW TRANSMITTER
- H — HUMIDISTAT
- LMS — LIMIT SWITCH
- LS — LEVEL SWITCH
- LT — LEVEL TRANSMITTER
- PE — PNEUMATIC-ELECTRIC RELAY
- PIL — POTENTIAL INDICATING LIGHT
- PMS — PERMISSIVE SWITCH
- PS — PRESSURE SWITCH
- PT — PRESSURE TRANSMITTER
- RTD — RESISTANCE TEMPERATURE DETECTOR
- SD — SMOKE DETECTOR
- SS — SELECTOR SWITCH
- SV — SOLENOID VALVE CONTACT
- T — THERMOSTAT
- T/C — THERMOCOUPLE
- TE — TEMPERATURE ELEMENT
- THD — THERMODETECTOR IN MOTOR
- TS — TEMPERATURE SWITCH

- INDICATING LIGHT R=RED G=GREEN W=WHITE A=AMBER B=BLUE C=CLEAR
- INDICATING LIGHT WITH RESISTOR (LIGHT COLOR CODE AS ABOVE)
- BA — BELL ALARM CONTACT
- ANNUNCIATOR POINT
- COMPUTER INPUT OR OUTPUT SIGNAL
- THERMOCOUPLE
- RTD — RESISTANCE TEMPERATURE DETECTOR
- E — ELECTRICAL INTERLOCK
- M — MECHANICAL INTERLOCK
- K — KEY INTERLOCK
- SINGLE CONDUCTOR WITH SHIELD-UNGROUNDED
- SINGLE CONDUCTOR WITH SHIELD-GROUNDED

ABBREVIATIONS
(USED WITH POWER TRANSFORMER SYMBOLS)

- AA — OPEN DRY TYPE
- GA — GAS FILLED DRY TYPE
- OA — OIL FILLED, SELF COOLED TYPE
- FA — OIL FILLED, FORCED AIR COOLED TYPE
- FOA — OIL FILLED, FORCED OIL, FORCED AIR COOLED TYPE

ABBREVIATIONS
(COMMON TO ALL ELECTRICAL DRAWINGS)

- AFF — ABOVE FINISHED FLOOR
- BD — BUS DUCT
- BTG — BOILER TURBINE GENERATOR
- CB — CONTROL BOARD
- CAC — CLOSED AFTER CLOSED
- CAT — CLOSE AFTER TRIP
- CND — CONDUIT
- CL — CURRENT LIMITING
- CP — CONTROL PANEL
- CS — CONTROL SWITCH
- CT — CURRENT TRANSFORMER
- DB — DIRECT BURIAL CABLE
- DT — DUST TIGHT
- DPST — DOUBLE POLE SINGLE THROW
- DPDT — DOUBLE POLE DOUBLE THROW
- ECB — EMERGENCY CONTROL BOARD
- EP — EXPLOSION PROOF
- EXC — EXCITER
- GEN — GENERATOR
- GND — GROUND
- **ILC — INTEGRATED LOGIC CABINET**
- INTLK — INTERLOCK
- I & C — INSTRUMENT AND CONTROL
- IPB — ISOLATED PHASE BUS DUCT
- **IPC — INTEGRATED PROTECTION CABINET**
- LB — LOAD BREAK
- LC — LOAD CENTER
- LCD — LOAD CENTER POWERED FROM DIESEL
- LDP — LIGHTING DISTRIBUTION PANEL
- LP — LIGHTING PANEL
- MBB — MECHANICAL BENCH BOARD
- MCB — MAIN CONTROL BOARD
- MCC — MOTOR CONTROL CENTER
- MOV — MOTOR OPERATED VALVE
- MR — MULTI-RATIO
- MTS — MANUAL TRANSFER SWITCH
- MU — MAKE UP
- MUX — MULTIPLEXER
- NEG — NEGATIVE
- NC — NORMALLY CLOSED
- NO — NORMALLY OPEN
- NSR — NUCLEAR SAFETY RELATED
- PB — PUSHBUTTON
- PDP — POWER DISTRIBUTION PANEL
- PELEC — PHOTOELECTRIC
- POS — POSITIVE
- PP — POWER PANEL
- PT — POTENTIAL TRANSFORMER
- REG — REGULATOR
- RL — REMOTE LOCATION
- RMS — RADIATION MONITORING SYSTEM
- RP — RELAY PANEL
- SHLD — SHIELD
- SLS — SELECTOR SWITCH
- SOLV — SOLENOID OPERATED VALVE
- SWGR — SWITCHGEAR
- SWYD — SWITCHYARD
- TDC — TIME DELAY CLOSE
- TDO — TIME DELAY OPEN
- UPS — UNINTERRUPTIBLE POWER SUPPLY
- VCB — VERTICAL CONTROL BOARD
- VP — VAPOR PROOF
- VT — VOLTAGE TRANSFORMER
- WP — WEATHERPROOF OR WEATHER PROTECTED
- WT — WATERTIGHT (SUBMERSIBLE)
- XFMR — TRANSFORMER

Figure 1.7-1 (Sheet 2 of 3)

Legend for Electrical Power, Lighting, and Communication Drawings

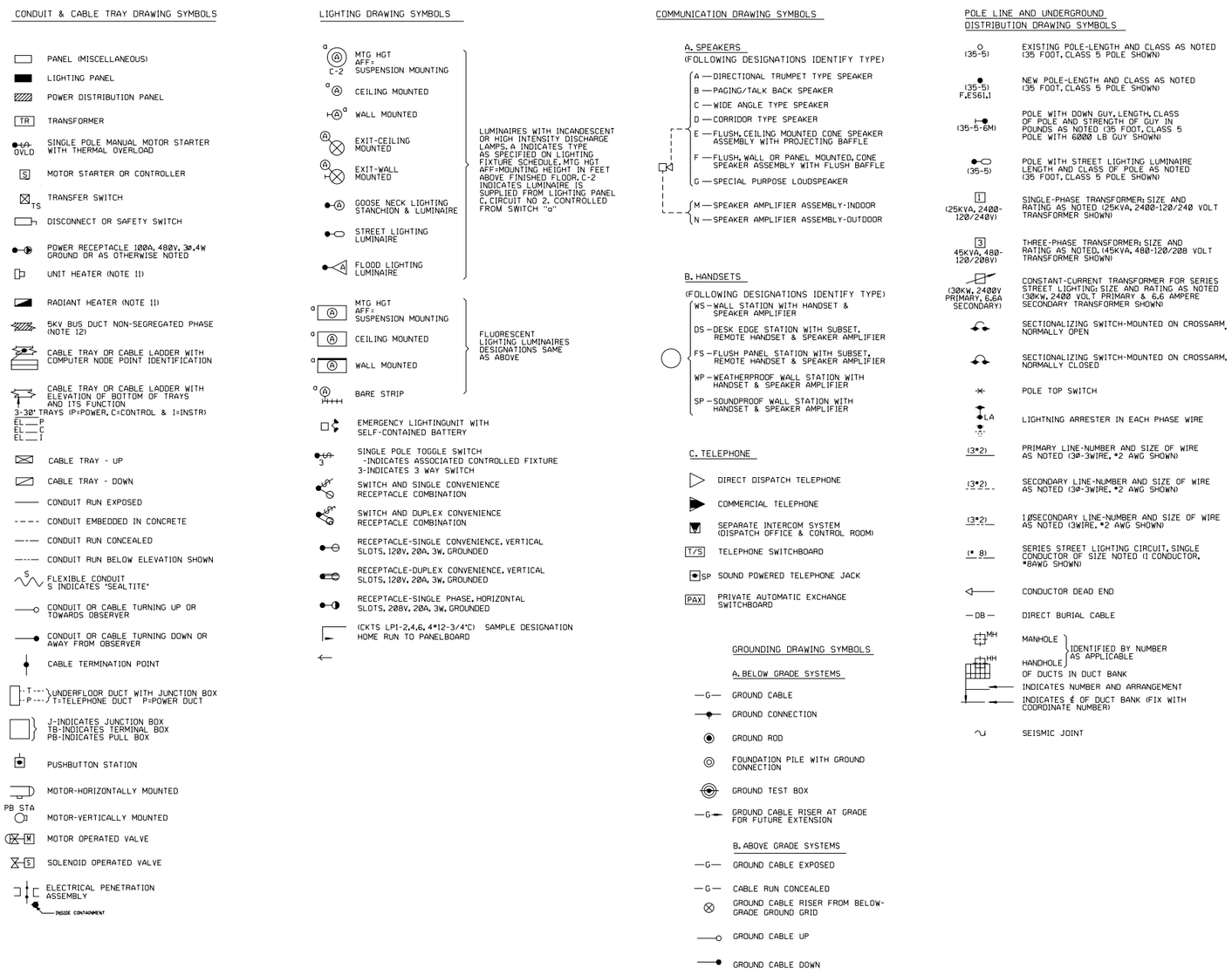


Figure 1.7-1 (Sheet 3 of 3)

Legend for Electrical Power, Lighting, and Communication Drawings

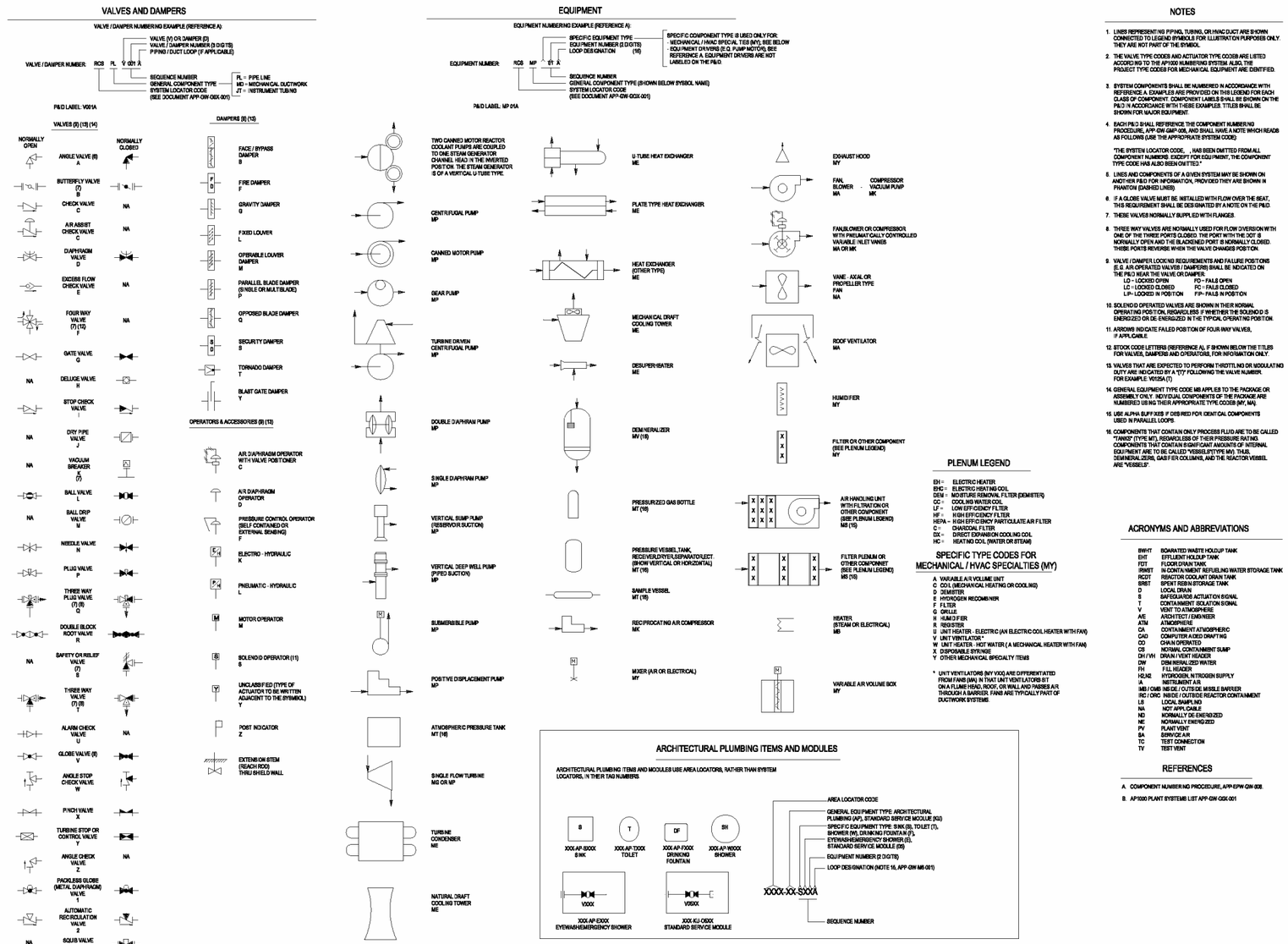
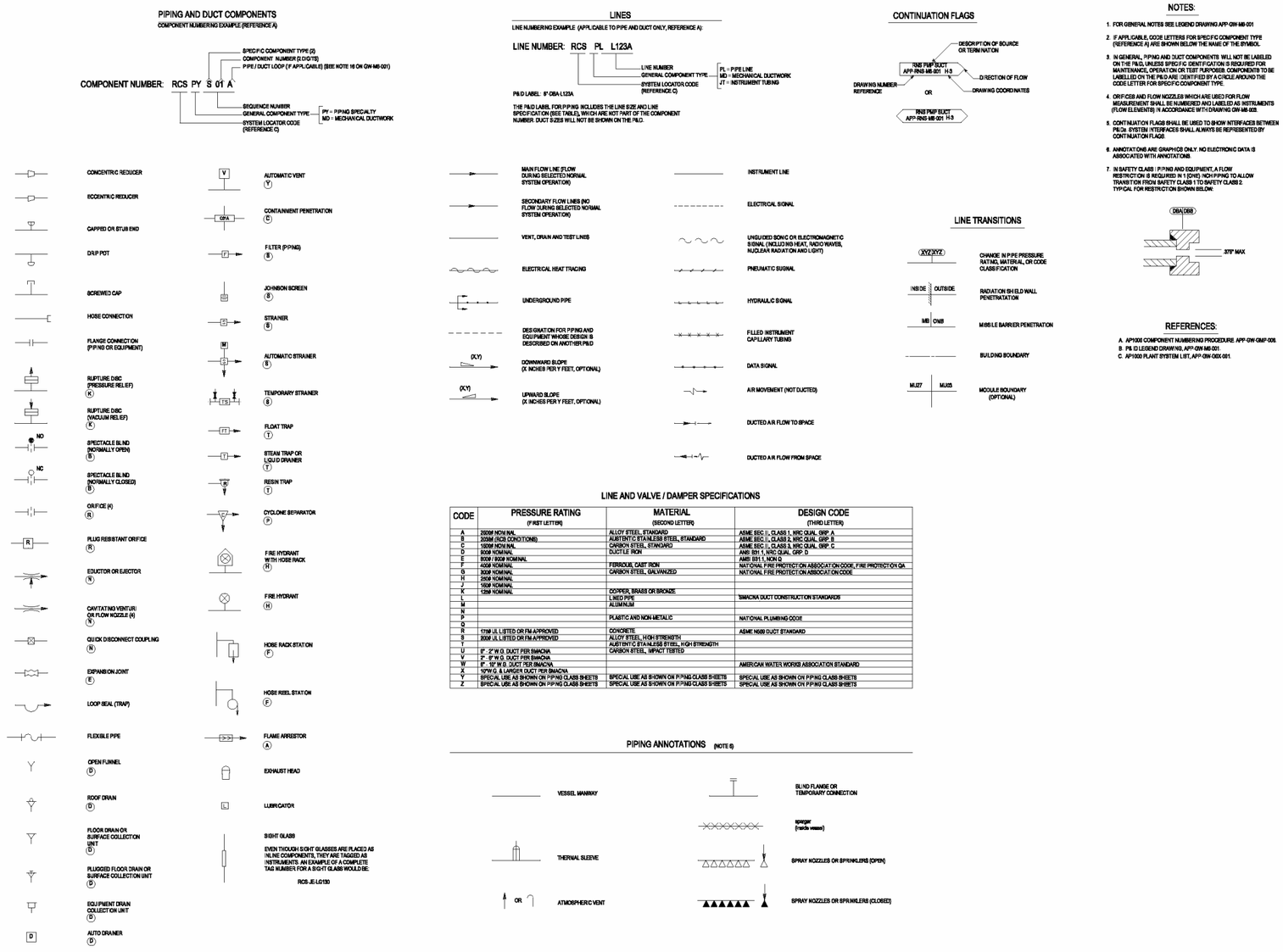


Figure 1.7-2 (Sheet 1 of 3)

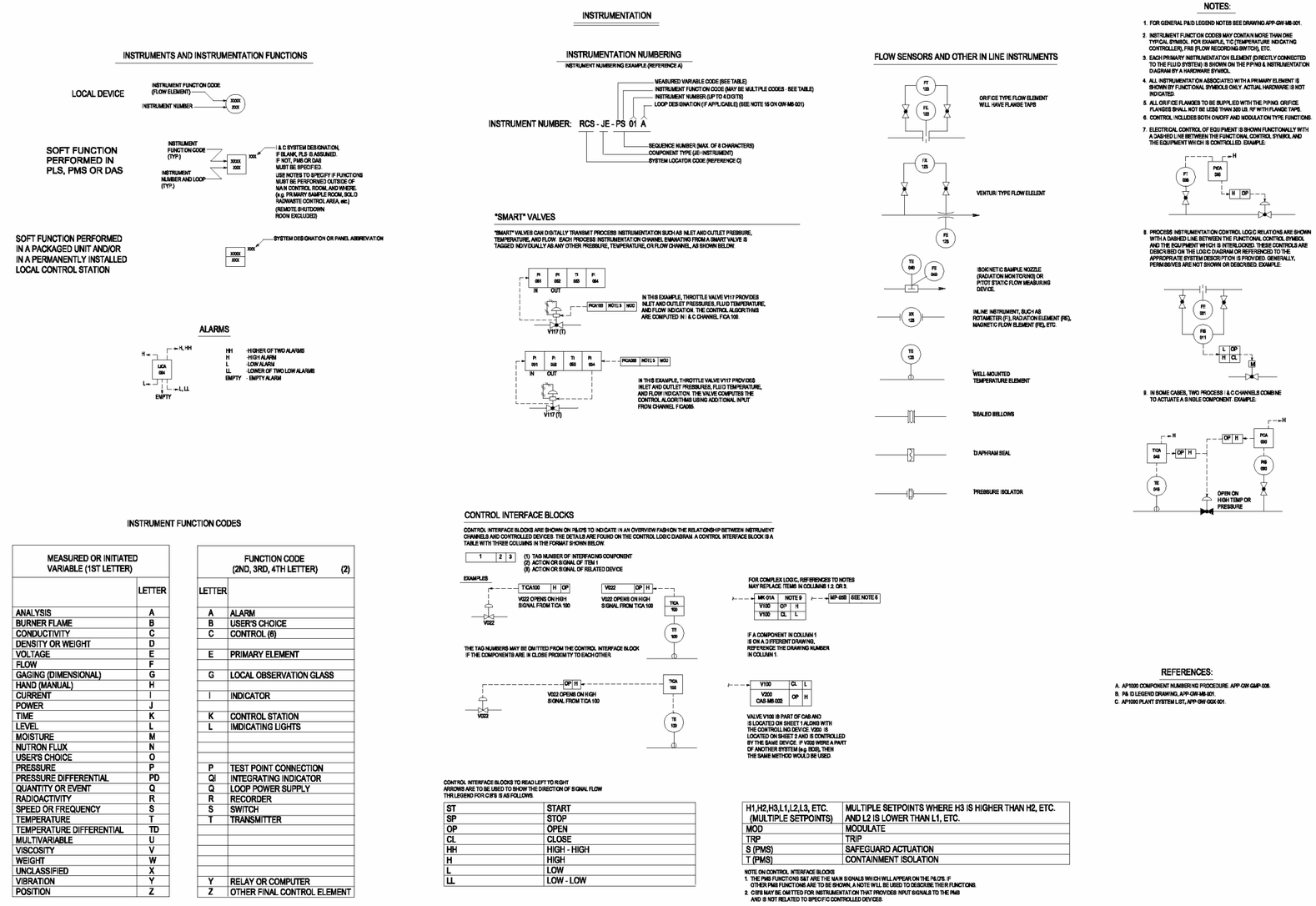
Piping and Instrumentation Diagram Legend



CODE	PRESSURE RATING (FIRST LETTER)	MATERIAL (SECOND LETTER)	DESIGN CODE (THIRD LETTER)
A	2500# NOMINAL	ALLOY STEEL, STANDARD	ASME SEC III, CLASS 1, NRC QUAL, GRP. A
B	2500# (RCS CONDITIONS)	AUSTENITIC STAINLESS STEEL, STANDARD	ASME SEC III, CLASS 2, NRC QUAL, GRP. B
C	1500# NOMINAL	CARBON STEEL, STANDARD	ASME SEC III, CLASS 3, NRC QUAL, GRP. C
D	900# NOMINAL	DUCTILE IRON	ANSI B31.1, NRC QUAL, GRP. D
E	600# / 900# NOMINAL		ANSI B31.1, NON Q
F	400# NOMINAL	FERROUS, CAST IRON	NATIONAL FIRE PROTECTION ASSOCIATION CODE, FIRE PROTECTION QA
G	300# NOMINAL	CARBON STEEL, GALVANIZED	NATIONAL FIRE PROTECTION ASSOCIATION CODE
H	250# NOMINAL		
J	150# NOMINAL		
K	125# NOMINAL	COPPER, BRASS OR BRONZE	
L		LINED PIPE	SMACNA DUCT CONSTRUCTION STANDARDS
M		ALUMINUM	
N			
P		PLASTIC AND NON METALIC	NATIONAL PLUMBING CODE
Q			
R	175# UL LISTED OR FM APPROVED	CONCRETE	ASME N509 DUCT STANDARD
S	300# UL LISTED OR FM APPROVED	ALLOY STEEL, HIGH STRENGTH	
T		AUSTENITIC STAINLESS STEEL, HIGH STRENGTH	
U	6", 2" W.G. DUCT PER SMACNA	CARBON STEEL, IMPACT TESTED	
V	2", 6" W.G. DUCT PER SMACNA		
W	6", 30" W.G. DUCT PER SMACNA		AMERICAN WATER WORKS ASSOCIATION STANDARD
X	10"W.G. & LARGER DUCT PER SMACNA		
Y	SPECIAL USE AS SHOWN ON PIPING CLASS SHEETS	SPECIAL USE AS SHOWN ON PIPING CLASS SHEETS	SPECIAL USE AS SHOWN ON PIPING CLASS SHEETS
Z	SPECIAL USE AS SHOWN ON PIPING CLASS SHEETS	SPECIAL USE AS SHOWN ON PIPING CLASS SHEETS	SPECIAL USE AS SHOWN ON PIPING CLASS SHEETS

Figure 1.7-2 (Sheet 2 of 3)

Piping and Instrumentation Diagram Legend



MEASURED OR INITIATED VARIABLE (1ST LETTER)	LETTER
ANALYSIS	A
BURNER FLAME	B
CONDUCTIVITY	C
DENSITY OR WEIGHT	D
VOLTAGE	E
FLOW	F
GAGING (DIMENSIONAL)	G
HAND (MANUAL)	H
CURRENT	I
POWER	J
TIME	K
LEVEL	L
MOISTURE	M
NUTRON FLUX	N
USER'S CHOICE	O
PRESSURE	P
PRESSURE DIFFERENTIAL	PD
QUANTITY OR EVENT	Q
RADIOACTIVITY	R
SPEED OR FREQUENCY	S
TEMPERATURE	T
TEMPERATURE DIFFERENTIAL	TD
MULTIVARIABLE	U
VISCOSITY	V
WEIGHT	W
UNCLASSIFIED	X
VIBRATION	Y
POSITION	Z

FUNCTION CODE (2ND, 3RD, 4TH LETTER) (2)	
LETTER	
A	ALARM
B	USER'S CHOICE
C	CONTROL (6)
E	PRIMARY ELEMENT
G	LOCAL OBSERVATION GLASS
I	INDICATOR
K	CONTROL STATION
L	IMDICATING LIGHTS
P	TEST POINT CONNECTION
QI	INTEGRATING INDICATOR
Q	LOOP POWER SUPPLY
R	RECORDER
S	SWITCH
T	TRANSMITTER
Y	RELAY OR COMPUTER
Z	OTHER FINAL CONTROL ELEMENT

ST	START
SP	STOP
OP	OPEN
CL	CLOSE
HH	HIGH - HIGH
H	HIGH
L	LOW
LL	LOW - LOW

H1,H2,H3,L1,L2,L3, ETC. (MULTIPLE SETPOINTS)	MULTIPLE SETPOINTS WHERE H3 IS HIGHER THAN H2, ETC. AND L2 IS LOWER THAN L1, ETC.
MOD	MODULATE
TRP	TRIP
S (PMS)	SAFEGUARD ACTUATION
T (PMS)	CONTAINMENT ISOLATION

NOTE ON CONTROL INTERFACE BLOCKS:
1. THE PMS FUNCTIONS S&T ARE THE MAIN SIGNALS WHICH WILL APPEAR ON THE P&IDTS. IF OTHER PMS FUNCTIONS ARE TO BE SHOWN, A NOTE WILL BE USED TO DESCRIBE THEIR FUNCTIONS.
2. C&FS MAY BE OMITTED FOR INSTRUMENTATION THAT PROVIDES INPUT SIGNALS TO THE PMS AND IS NOT RELATED TO SPECIFIC CONTROLLED DEVICES.

Figure 1.7-2 (Sheet 3 of 3)

Piping and Instrumentation Diagram Legend