DWG	DESCRIPTION
	GENERAL
	Cover Sheet
ABAC	Anixter Building Auto. Cables
LEG	Legend & Abbreviations
PTRM1	PXCC Termination Specification
PTRM2	PXCC Termination Spec. Sheet 2
PWIR	PXCC Wiring Specification
TTRM1	TX-I/O Termination Spec.
TTRM2	TX-I/O Termination Spec. 2
TWIR	TX-I/O Wiring Specification
	CONTROL DRAWINGS
000	Riser
100	Replacement: Chiller 1
101	Replacement: Tower 1 & 2
102	Existing: Chiller 2
103	Replacement: Tower 5 & 6
104	Existing: Chiller 3
105	Existing: Tower 3
106	New: Chiller 4
107	New: Tower 4
108	Decoupler and Flow Control Valves
109	Existing Plant Points
	DDC PANEL LAYOUTS
900	Plant CHW System
900A	Alex.VAMC.CHWSYS_71470p002
900B	Alex.VAMC.CHWSYS_71470p003
901	Chiller1 (B147)
902	Chiller 2
902A	Chiller 2 Island Bus
903	Chiller 3 (B147)
904	Chiller 4 and Tower 4

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ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
DMP	DMP	JS		09/11/12

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440P-116804

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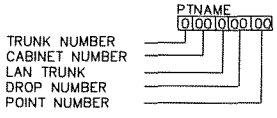
CONTROL SYMBOL	CONTROL SYMBOL DESCRIPTION
AC	AIR COMPRESSOR
AD	AIR DRYER
AE	ACTUATOR ELECTRIC
AEM	APOGEE ETHERNET MICROSERVER
AF	AIR FILTER
AFS	AIR FLOW STATION
AOP	ANALOG OUTPUT, PNEUMATIC
AP	ACTUATOR PNEUMATIC
APS	AUX. POWER SUPPLY
AT	AUTOMATIC TRAP
ATD	AUTO TANK DRAIN
ATEC	ACTUATOR TEC
AZM	AUTOZERO MODULE
BELL	BELL
BIM	BUS INTERFACE MODULE
BOIL	BOILER
CBL	CABLES
CKV	CHECK VALVE
CM	CONSTRUCTION MATERIALS
CP	COMPONENT PANEL
CPU	CENTRAL PROCESSING UNIT
CRT	CATHODE RAY TUBE
CS	CURRENT SWITCH
CT	CURRENT TRANSDUCER
CVC	CONSTANT VOLUME CONTROLLER
D	DAMPER
DDC	DUAL DUCT CONTROLLER
DEM	DEMAND ENERGY MONITOR
DP	DEW POINT TRANSMITTER
DPR	DIFFERENTIAL PRESS. REGULATOR
DPS	DIFFERENTIAL PRESSURE SWITCH
DPTE	DIFF. PRESS. TRANSMITTER ELEC.
DPTP	DIFFERENTIAL PRESSURE PNEUMATIC
DPU	DIGITAL POINT UNIT
EC	ENTHALPY COMPARITOR
EP	ELECTRO-PNEUMATIC VALVE
ES	END SWITCH
ET	ENTHALPY TRANSMITTER
EXP	EXPANSION PANEL
FAN	FAN
FHC	FUME HOOD CONTROLLER
FM	FLOW MTR. (FLOW METER STATION)
FMS	FIRE MGMT. SYSTEM
FS	FLOW SWITCH
FTP	FLOW TRANSMITTER PNEU.
G	GAUGE

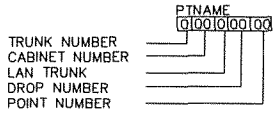
CONTROL SYMBOL	CONTROL SYMBOL DESCRIPTION
GD	GAS DETECTOR
HE	HUMIDIFIER ELECTRIC
H	HYGROSTATS
HHC	HAND-HELD OPERATOR'S TERMINAL
HL	HIGH LIMIT
HOA	HAND-OFF-AUTO SWITCH
HORN	HORN
HPC	HEAT PUMP CONTROLLER
HTD	HIGH TEMPERATURE DETECTOR
HTE	HUMIDITY TRANSMITTER ELECTRIC
HTP	HUMIDITY TRANSMITTER PNEUMATIC
INT	INTERCOM
KWM	ELECTRIC KILOWATT METER
LC	LIMIT CONTROLLER (LIMITEM)
LLS	LIQUID LEVEL SWITCH
LLT	LIQUID LEVEL TRANS.
LPR	POWER SUPPLY 24VAC/24VDC
LTDE	LOW TEMP. DETECTOR ELECTRIC
LTDP	LOW TEMP. DETECTOR PNEUMATIC
LUI	LOCAL USER INTERFACE
MBC	MODULAR BUILDING CONTROLLER
MDM	MODEM
ME	ELECTRONIC ACTUATOR
MEC	MODULAR EQUIPMENT CONTROLLER
MG	MAGNEHELIC GAUGE
MPU	MULTI-POINT UNIT
MS	MOTOR STARTER
OBS	OBSOLETE
ODP	OPERATOR DATA PANEL
P	PUMP
PA	PULSE ACCUMULATOR
PCT	PROGRAMMABLE CLOCK TIMER
PE	PRESSURE ELECTRIC SWITCH
PL	PILOT LIGHT
PM	POWER MONITOR
PNL	PANEL
PPM	POINT PICKUP MODULE
PRC	PRESSURE REG. CONTROLLER
PRV	PRESSURE REDUCING VALVE
PS	POSITIONING SWITCH
PSE	POSITION SENSOR ELECTRIC
PST	PULL STATION
PT	PITOT TUBE
PTE	PRESSURE TRANSMITTER ELECTRIC
PTP	PRESSURE TRANSMITTER PNEUMATIC
PTR	PRINTER
PV	PILOT VALVE
PXCC	PX COMPACT CONTROLLER

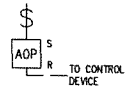
CONTROL SYMBOL	CONTROL SYMBOL DESCRIPTION
PXCM	PXC-MODULAR CONTROLLER
RBC	REMOTE BUILDING CONTROLLER
RC	RECEIVER CONTROLLER
RCU	REMOTE CONTROL UNIT
RE	RELAY ELECTRIC
RP	RELAY PNEUMATIC
RS	RESTRICTOR
RV	RELIEF VALVE
S/W	SOFTWARE
SC	STEP CONTROLLER
SCU	STAND ALONE CONTROL UNIT
SD	SMOKE DETECTOR
SE	SWITCH ELECTRIC
SPKR	SPEAKER
SPP	STATIC PRESSURE PROBE
SPR	STATIC PRESSURE REGULATOR
SV	SOLENOID VALVE
SW	SWITCH PNEUMATIC
T	ROOM THERMOSTAT, PNEUMATIC
TBC	TERMINAL BOX CONTROLLER
TC	TEMPERATURE CONTROLLER(S200)
TCU	TERMINAL CONTROL UNIT
TDR	TIME DELAY RELAY
TE	THERMOSTAT, ELECTRIC
TEC	TERMINAL EQUIPMENT CONTROLLER
TH	THERMOMETER
TI	TRUNK INTERFACE
TIE	TRUNK ISOLATOR EXTENDER
TIU	TELCOM INTERFACE UNIT
TMR	TIMER, TIME CLOCK
TTE	TEMPERATURE TRANSMITTER ELECTRIC
TTP	TEMPERATURE TRANSMITTER PNEUMATIC
TXIO	TX-I/O FAMILY CONTROLLER MODULES
UC	UNITARY CONTROLLER
UCC	UNIT CONDITIONER CONTROLLER
UVC	UNIT VENT CONTROLLER
V	VALVE
V*	VALVE SERVICE PARTS
VA	TEC VALVE ACTUATOR
VAC	VIBRATION ISOLATOR
VB	VARIABLE AIR VOLUME CONTROLLER
VTE	VELOCITY TRANSMITTER ELECTRICAL
W	WELL
XDR	TRANSDUCER
XFMR	TRANSFORMER

DDC ELECTRICAL POINT



DDC PNEUMATIC POINT

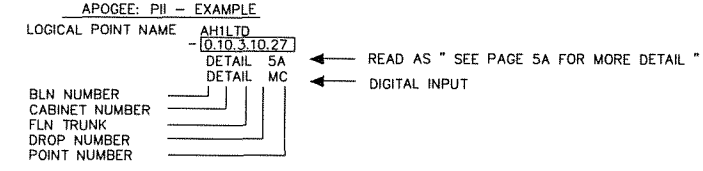




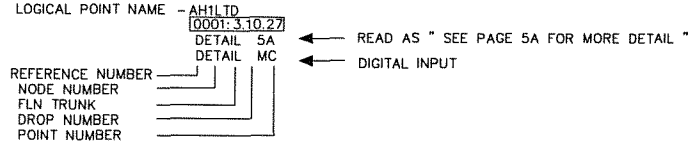
DETAILS

▭	ELECTRICAL TERMINATION
⬭	PNEUMATIC TERMINATION
DETAIL XX	STANDARD DDC TERMINATION
△	NOTE OR REVISION
DETAIL XX	PAGE REFERENCE

APOGEE: PII – EXAMPLE



APOGEE: ETHERNET – EXAMPLE



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Legend & Abbreviations

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LEG

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Anixter Building Automation Cables

Non-Plenum

SBT Part Number	Description	Print Legend
H-TP20-CM	20AWG,STR,1TP,CM,BLUE JACKET	NORTHFLEX ® H-TP20-CM "DI, DO, AI, AO" (Mfg E#) 20AWG 1P 75°C CM (UL) C(UL)
H-3C20-CM	20AWG,STR,3COND,CM,BLUE JACKET	NORTHFLEX ® H-3C20-CM "TEC V/D" (Mfg E#) 20 AWG 3C 75°C CM (UL) C(UL)
H-TP18-CMR	18AWG,STR,1TP,CMR,BLUE JACKET	NORTHFLEX ® H-TP18-CMR "DI, DO, AI, AO" (Mfg E#) 18AWG 1P 75°C CMR (UL) C(UL)
H-3C18-CMR	18AWG,STR,3COND,CMR,BLUE JACKET	NORTHFLEX ® H-3C18-CMR "TEC V/D" (Mfg E#) 18 AWG 3C 75°C CMR (UL) C(UL)
H-2C14-CL3R	14AWG,STR,2COND,CL3R,DARK BLUE JACKET	H-2C14-CL3R "LV POWER" (Mfg E#) 14 AWG 2C 75°C CL3R (UL) C(UL)
H-B-TSP24LC-CM	BLN24AWG,STR,TSP,LOCAP,CM,ORANGE JACKET	H-B-TSP24LC-CM "BLN" (Mfg E#) 24 AWG 1P 75°C CM (UL) C(UL)
H-F-TSP24LC-CM	FLN24AWG,STR,TSP,LOCAP,CM,ORANGE JACKET W/ BLUE STRIPE	NORTHFLEX ® H-F-TSP24LC-CM "FLN" (Mfg E#) 24 AWG 1P 75°C CM (UL) C(UL)
H-3P24-CMR	24AWG,SOL,3P,CMR,BLUE JACKET	NORTHFLEX ® H-3P24-CMR "TEC STAT" (Mfg E#) 24 AWG 3P 75°C CMR (UL) C(UL)
LON-1P22-CM	22AWG,STR,1PAIR,CM,ORANGE JACKET W/ WHITE STRIPE	NORTHFLEX ® LON-1P22-CM "LON FLN" (Mfg E#) 22AWG 1P 75O C CM (UL) C(UL)
LON-2P22-CM	22AWG,STR,2PAIR,CM,ORANGE JACKET W/ WHITE STRIPE	NORTHFLEX ® LON-2P22-CM "LON FLN" (Mfg E#) 22AWG 2P 75O C CM (UL) C(UL)
LON-1PS22-CM	22AWG,STR,1PAIR,OAS,CM,ORANGE JACKET W/ WHITE STRIPE	NORTHFLEX ® LON-1PS22-CM "LON FLN" (Mfg E#) 22AWG 1P 75O C CM (UL) C(UL)
LON-2PS22-CM	22AWG,STR,2PAIR,OAS,CM,ORANGE JACKET W/ WHITE STRIPE	NORTHFLEX ® LON-2PS22-CM "LON FLN" (Mfg E#) 22AWG 2P 75O C CM (UL) C(UL)
E-4TP24CAT5-CM	24AWG,SOL,4TP,CAT5,CM	NORTHFLEX ® E-4TP24CAT5-CM "ETHERNET" (Mfg E#) 24AWG 4P 75O C CM (UL C(UL)
H-A-1.5TSP24LC-CM	ALN485, 24AWG, STR, TP+1C, OAS, LOCAP, CM	NORTHFLEX ® H-A-1.5TSP24LC-CM "ALN485" 24 AWG 1P+1C 75°C CM (UL) C(UL) (Mfg E#)
H-F-1.5TSP24LC-CM	FLN485, 24AWG, STR, TP+1C, OAS, LOCAP, CM	NORTHFLEX ® H-A-1.5TSP24LC-CM "FLN485" 24 AWG 1P+1C 75°C CM (UL) C(UL) (Mfg E#)

Plenum

SBT Part Number	Description	Print Legend
H-TP20-CMP	20AWG,STR,1TP,CMP,BLUE JACKET	NORTHFLEX ® H-TP20-CMP "DI, DO, AI, AO" (Mfg E#) 20 AWG 2C 75°C CMP (UL) C(UL)
H-3C20-CMP	20AWG,STR,3COND,CMP,BLUE JACKET	NORTHFLEX ® H-3C20-CMP "TEC V/D" (Mfg E#) 20 AWG 3C 75°C CMP (UL) C(UL)
H-TP18-CMP	18AWG,STR,1TP,CMP,BLUE JACKET	NORTHFLEX ® H-TP18-CMP "DI, DO, AI, AO" (Mfg E#) 18 AWG 2C 75°C CMP (UL) C(UL)
H-3C18-CMP	18AWG,STR,3COND,CMP,BLUE JACKET	NORTHFLEX ® H-3C18-CMP "TEC V/D" (Mfg E#) 18 AWG 3C 75°C CMP (UL) C(UL)
H-2C14-CL3P	14AWG,STR,2COND,CL3P,DARK BLUE JACKET	NORTHFLEX ® H-2C14-CL3P "LV POWER" (Mfg E#) 14 AWG 2C 75°C CL3P (UL) C(UL)
H-B-TSP24LC-CMP	BLN24AWG,STR,TSP,LOCAP,CMP,ORANGE JACKET	NORTHFLEX ® H-B-TSP24LC-CMP "BLN" (Mfg E#) 24 AWG TSP 75°C CMP (UL) C(UL)
H-F-TSP24LC-CMP	FLN24AWG,STR,TSP,LOCAP,CMP,ORANGE JACKET W/ BLUE STRIPE	NORTHFLEX ® H-F-TSP24LC-CMP "FLN" (Mfg E#) 24 AWG TSP 75°C CMP (UL) C(UL)
H-3P24-CMP	24AWG,SOL,3PAIR,CMP,BLUE JACKET	NORTHFLEX ® H-3P24-CMP "TEC STAT" (Mfg E#) 24 AWG 3P 75°C CMP (UL) C(UL)
LON-1P22-CMP	22AWG,STR,1PAIR,CMP,ORANGE JACKET W/ WHITE STRIPE	NORTHFLEX ® LON-1P22-CMP "LON FLN" (Mfg E#) 22AWG 1P 75O C CMP (UL) C(UL)
LON-2P22-CMP	22AWG,STR,2PAIR,CMP,ORANGE JACKET W/ WHITE STRIPE	NORTHFLEX ® LON-2P22-CMP "LON FLN" (Mfg E#) 22AWG 2P 75O C CMP (UL) C(UL)
LON-1PS22-CMP	22AWG,STR,1PAIR,OAS,CMP,ORANGE JACKET W/ WHITE STRIPE	NORTHFLEX ® LON-1PS22-CMP "LON FLN" (Mfg E#) 22AWG 1P 75O C CMP (UL) C(UL)
LON-2PS22-CMP	22AWG,STR,2PAIR,OAS,CMP,ORANGE JACKET W/ WHITE STRIPE	NORTHFLEX ® LON-2PS22-CMP "LON FLN" (Mfg E#) 22AWG 2P 75O C CMP (UL) C(UL)
E-4TP24CAT5-CMP	24AWG,SOL,4TP,CAT5,CMP	NORTHFLEX ® E-4TP24CAT5-CMP "ETHERNET" (Mfg E#) 24AWG 4P 75O C CMP (UL
H-A-1.5TSP24LC-CMP	ALN485, 24AWG, STR, TP+1C, OAS, LOCAP, CMP	NORTHFLEX ® H-A-1.5TSP24LC-CM "ALN485" 24 AWG 1P+1C 75°C CM (UL) C(UL) (Mfg E#)
H-F-1.5TSP24LC-CMP	FLN485, 24AWG, STR, TP+1C, OAS, LOCAP, CMP	NORTHFLEX ® H-A-1.5TSP24LC-CM "FLN485" 24 AWG 1P+1C 75°C CM (UL) C(UL) (Mfg E#)

Assemblies

SBT Part Number	Description	Print Legend
550-827	CABLE ASSEMBLY TEC TO SSB 3 POS 10 FT	N\A
550-828	CABLE ASSEMBLY TEC TO SSC 3 POS 10 FT	N\A

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Anixter Building Auto. Cables

440P-116804

ABAC

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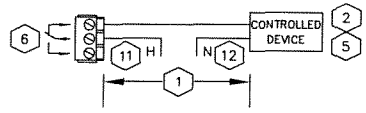
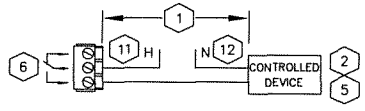
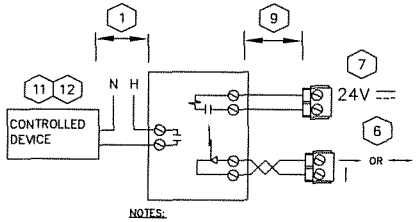


A 00 DIGITAL OUTPUT (DO) NC
PULSED OR LATCHED

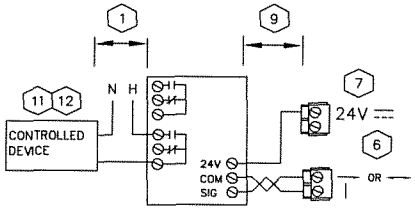


B 00 DIGITAL OUTPUT (DO) NO
PULSED OR LATCHED



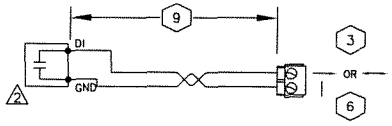
NOTES:
1. 0 VDC ON CABINET FAILURE

C 00 DIGITAL OUTPUT (AO,U,X) LATCHED
VOLTAGE TO SOLID STATE RELAY

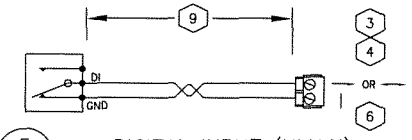


NOTES:
1. 0 VDC ON CABINET FAILURE
2. MAY BE MULTI-STAGE

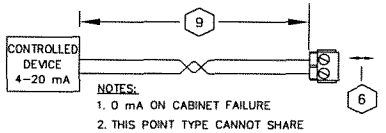
D 00 DIGITAL OUTPUT (AO,U,X) SEQUENCED
VOLTAGE TO SEQUENCING MODULE



E 00 DIGITAL INPUT (DI,UI,U,X)
DRY CONTACT

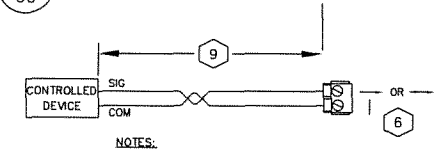


F 00 DIGITAL INPUT (UI,U,X)
PULSE ACCUMULATOR



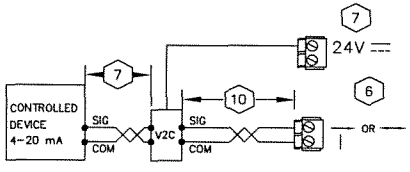
NOTES:
1. 0 mA ON CABINET FAILURE
2. THIS POINT TYPE CANNOT SHARE A MODULE WITH A SELF-POWERED TYPE INPUT POINT.

H 00 ANALOG OUTPUT (X) 4-20 mA

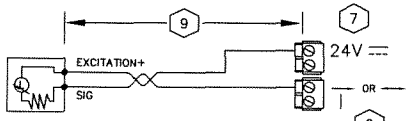


NOTES:
1. 0 VDC ON CABINET FAILURE

I 00 ANALOG OUTPUT (AO,U,X) 0-10VDC

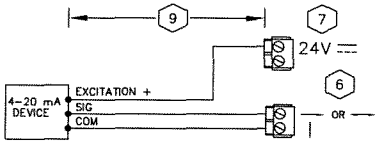


J 00 ANALOG OUTPUT (AO,U,X) 0-10VDC
VOLTAGE TO CURRENT CONVERTER

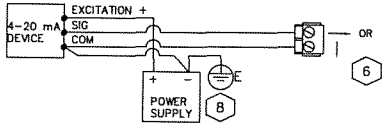


NOTES:
1. COMMON NOT CONNECTED

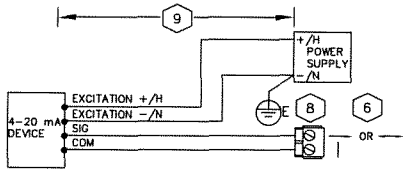
M 00 ANALOG INPUT (UI,U,X) 4-20 mA
2-WIRE INTERNAL POWERED



N 00 ANALOG INPUT (UI,U,X) 4-20mA
3-WIRE INTERNAL POWERED



O 00 ANALOG INPUT (UI,U,X) 4-20mA
3-WIRE EXTERNAL POWERED



Q 00 ANALOG INPUT (UI,U,X) 4-20mA
4-WIRE EXTERNAL POWERED

NOTES:

1. MAXIMUM WIRE RUN LENGTHS ARE BASED ON THE CURRENT DRAW AND WIRE GAGE. SEE DRAWING PWIR.
2. SEE CONTROL DRAWINGS FOR NORMAL DE-ENERGIZED CONTACT STATE
3. MAXIMUM CONTACT CLOSURE RATE IS 10 PER SECOND
   DI EXCITATION = 24VDC, 10mA
   UI, U EXCITATION = 24VDC, 6mA, 150ms, 1mA
4. DI CANNOT BE USED FOR PULSE ACCUMULATION.
   UI, U, X MAXIMUM PULSE RATE = 20HZ (25ms PER STATE, 50ms PRE PULSE.
5. PXCC DO CONTACT RATINGS
   AC OPERATION:
   4A @ 240VAC (RESISTIVE)
   3A @ 240VAC (INDUCTIVE)
   SIZE 4 MOTOR STARTER
   DC OPERATION:
   40W @ < 50VDC
   20W @ > 50VDC
6. REFER TO PXCC TERMINATION TABLES FOR ACTUAL POINT ADDRESSES. COMMON TERMINAL MAY BE SHARED BY 2 POINTS. AND ORDER MAY BE REVERSED ON ADJACENT POINTS.
7. REFER TO DRAWING P2 ON PWIR FOR MAXIMUM CURRENT PROVIDED BY THE PXCC 24VDC SENSOR SUPPLY.
8. EXTERNAL POWER SUPPLY CAN EITHER BE A 24VDC POWER SUPPLY OR A 24VAC TRANSFORMER DEPENDING ON THE SENSOR SELECTED. IF NOT AN ISOLATED NC CLASS 2 CIRCUIT THEN POWER SOURCE, NEUTRAL AND PXC COMPACT COMMON MUST BE BOTH CONNECTED TO THE SAME OR BONDED BUILDING APPROVED EARTH GROUND. FOR FURTHER DETAILS SEE EARTH GROUNDING RULES (125-3002) APOGEE WIRING GUIDELINES FOR FIELD PANELS AND EQUIPMENT CONTROLLERS.
9. 50mA OR LESS - 750ft/230m
   50mA TO 100mA - 375ft/115m
10. 100mA TO 150mA - 250ft/76m
    150mA TO 200mA - 187ft/57m
    200mA TO 250mA - 150ft/46m
11. WHERE H TERMINAL IS NOT A NEC CLASS 2 CIRCUIT, RELAY COMMON TERMINAL BRANCH CURRENT MUST BE EXTERNALLY LIMITED TO 10A MAXIMUM BY A NEC APPROVED MEANS. NOT A FUSE.
12. WHERE REQUIRED, NEUTRAL TERMINAL BRANCH CURRENT MUST BE EXTERNALLY LIMITED BA A NEC APPROVED MEANS.

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DMP	DMP	JS		09/11/12

PXCC Termination Specification

440P-116804

PTRM1

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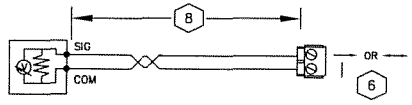
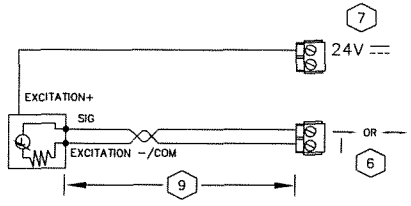
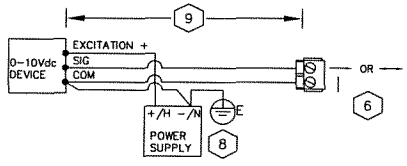


NOTES:
1. TRANSDUCER POWERED FROM INPUT
2. TRANSDUCER OUTPUT VOLTAGE

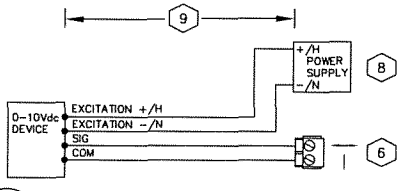
R 00 ANALOG INPUT (UI,U,X) 0–10 Vdc
SELF POWERED TRANSDUCER



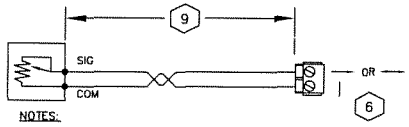
S 00 ANALOG INPUT (UI,U,X) 0–10VDC
3-WIRE INTERNAL POWERED



T 00 ANALOG INPUT (UI,U,X) 0–10VDC
3-WIRE EXTERNAL POWERED

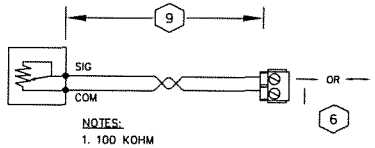


U 00 ANALOG INPUT (UI,U,X) 0–10VDC
4-WIRE EXTERNAL POWERED



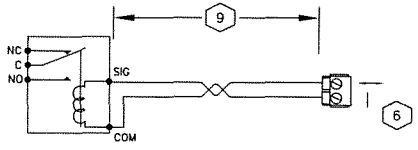
NOTES:
1. 1000 OHM PLATINUM (375)
2. 1000 OHM PLATINUM (385)
3. 1000 OHM NICKEL
4. CUSTOM

V 00 ANALOG INPUT (UI,U,X) RTD



NOTES:
1. 100 KOHM
2. 10 KOHM
3. CUSTOM

W 00 ANALOG INPUT (UI,U,X) THERMISTOR



AB 00 DIGITAL OUTPUT (X) 24 VDC
RELAY DRIVE 22 mA MAX.

Point Address Table for the PXC16.

Point Type	Point Type Number	Terminals Signal[2]	Terminals Common	PXC Point Address
Universal Input (UI) →	UI1	25	26	1
	UI2	27	26	2
	UI3	28	29	3
Universal Input/Output (U) ←→	U4	30	29	4
	U5	31	32	5
	U6	33	32	6
	U7	34	35	7
	U8	36	35	8
Analog Output (AO) ←	AO9	53	54	9
	AO10	55	56	10
	AO11	57	56	11
Digital Input (DI) →	DI12	58	59	12
	DI13	60	59	13
Digital Output (DO)	DO14	4, 5, 6		14
	DO15	7, 8, 9		15
	DO16	10, 11, 12		16

Point Address Table for the PXC24.

Point Type	Point Type Number	Terminals Signal[2]	Terminals Common	PXC Point Address
Universal Input (UI) →	UI1	25	26	1
	UI2	27	26	2
	UI3	28	29	3
Universal Input/Output (U) ←→	U4	30	29	4
	U5	31	32	5
	U6	33	32	6
	U7	34	35	7
	U8	36	35	8
	U9	41	42	9
	U10	43	42	10
	U11	44	45	11
	U12	46	45	12
Super Universal Input/Output (X)[1] ←→	X13 (U13)[1]	47	48	13
	X14 (U14)[1]	49	48	14
	X15 (U15)[1]	50	51	15
	X16 (U16)[1]	52	51	16
Analog Output (AO) ←	AO17	53	54	17
	AO18	55	56	18
	AO19	57	56	19
Digital Output (DO)	DO20	4, 5, 6		20
	DO21	7, 8, 9		21
	DO22	10, 11, 12		22
	DO23	13, 14, 15		23
	DO24	16, 17, 18		24

Point Address Table for the PXC36.

Point Type	Point Type Number	Terminals Signal[2]	Terminals Common	PXC Point Address
Super Universal Input/Output (X) ←→	X1	30	31	1
	X2	32	31	2
	X3	33	34	3
	X4	35	34	4
	X5	36	37	5
	X6	38	37	6
Universal Input/Output (U) ←→	U7	39	40	7
	U8	41	40	8
	U9	50	51	9
	U10	52	51	10
	U11	53	54	11
	U12	55	54	12
	U13	56	57	13
	U14	58	57	14
	U15	59	60	15
	U16	61	60	16
	U17	62	63	17
	U18	64	63	18
	U19	65	66	19
	U20	67	66	20
	U21	68	69	21
	U22	70	69	22
	U23	71	72	23
	U24	73	72	24
Digital Input (DI) →	DI25	74	75	25
	DI26	76	75	26
	DI27	77	78	27
	DI28	79	78	28
Digital Output (DO)	DO29	4,5,6		29
	DO30	7,8,9		30
	DO31	10,11,12		31
	DO32	13,14,15		32
	DO33	16,17,18		33
	DO34	19,20,21		34
	DO35	22,23,24		35
	DO36	25,26,27		36

Notes:
1. FOR PRE–PXC24.2 CONTROLLERS, POINTS 13–16 WERE UNIVERSAL I/O POINTS INSTEAD OF THE CURRENT SUPER UNIVERSAL I/O POINTS.

2. FOR THE APPROPRIATE TERMINAL SYMBOL, PLEASE REFER TO THE RESPECTIVE POINT TYPE COLUMN.

3. THE Common TERMNAL IS ALWAYS THE FOLLOWING SYMBOL: |

4. SEE BELOW FOR DIGITAL OUTPUT SYMBOL:

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PXCC Termination Spec. Sheet 2

440P-116804

PTRM2

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PXCC WIRING TYPE AND GAUGE REQUIREMENTS

TABLE 1

CIRCUIT TYPE	CLASS	WIRE TYPE	MAX. DISTANCE	CONDUIT SHARING [2]
AC LINE POWER [1]	POWER	#12-14 THHN	REFER TO NEC	CHECK LOCAL CODES
DIGITAL OUTPUT	1 & 2	TP not required, check job specs & local codes #18 to #24 AWG	SEE TABLE 3	CHECK LOCAL CODES
DIGITAL INPUT	2	TP not required, check job specs & local codes #18 to #24 AWG	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT [4] 100K/10K Thermistor	2	#18-#24 TP[3,6] or TSP[5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT [4] 1K Ni OR RTD	2	#18-#24 TP[3,6] or TSP[5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT 0-10 V	2	#18-#24 TP[3,6] or TSP[5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT 4-20 mA	2	#18-#24 TP[3,6] or TSP[5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG OUTPUT 0-10 V	2	#18-#24 TP[3,6] or TSP[5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG OUTPUT 4-20 mA	2	#18-#24 TP[3,6] or TSP[5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ETHERNET ALN	2	#24 (4) TP[6] CAT5 OR BETTER	295ft (90 m)	CHECK LOCAL CODES
ALN TRUNK	2	#24 TSP	SEE TABLE 4	CHECK LOCAL CODES

1. WHEN DAISY-CHAINING 24VAC POWER TO CONTROLLERS USE #14 WIRE.

2. CONDUIT SHARING RULES: ONLY WHERE LOCAL CODES PERMIT. BOTH CLASS1 AND CLASS 2 WIRING CAN BE RUN TO THE PXCC PROVIDED THE CLASS 2 WIRE IS UL LISTED 300V 75°C(167°F) OR HIGHER OR THE CLASS 2 WIRE IS NEC TYPE CM (FT4) (75°C OR HIGHER) OR CMP(FT6) (75°C OR HIGHER). NEC TYPE CL2 AND CL2P IS NOT ACCEPTABLE UNLESS ALSO UL LISTED AND MARKED 300V 75°C (167°F) OR HIGHER

3. TWISTED PAIR, NON-JACKETED UL LISTED 75°C(167°F) AND 300V, CABLE CAN BE USED IN PLACE OF CM(FT4) OR CMP(FT6)(BOTH MUST BE RATED 75°C OR HIGHER) CABLE WHEN CONTAINED IN CONDUIT PER LOCAL CODES. SEE THE FIELD PURCHASING GUIDE FOR WIRE.

4. WIRE LENGTH AFFECTS POINT INTERCEPT ENTRY. ADJUST INTERCEPT ACCORDINGLY FOR EACH WIRE GAUGE AND SENSOR TYPE.

5. SHIELDED TWISETED PAIR (TSP) IS NOT REQUIRED FOR ELECTRICAL NOISE LEVELS UPTO 10 V/M. AT HIGHER LEVELS TSP MAY BE NEEDED.TERMINATE SHIELD ON ENCLOSURE AND TAPE BACK ON POINT END.

6. FOR 24AWG INSTALL CATEGORY5 OR BETTER CABLE PER ANSI/TIA/EIA-568-B.1 OR HIGHER. USE SOLID COPPER BETWEEN JACK BOXES. USE STRANDED COPPER PATCH CABLES 13ft (4m) TO CONNECT PXCC AND 20ft (6m) TO CONNECT SWITCH OR HUB.

MAXIMUM DO WIRE RUN LENGHTS

TABLE 3

NOMINAL INRUSH	STARTER SIZE	WIRE SIZE		
		#18	#16	#14
200 VA	0 1	500ft (152m)	900ft (274m)	1400ft (427m)
550 VA	2	200ft (61m)	300ft (91m)	500ft (152m)
1150 VA	3	100ft (30m)	150ft (46m)	250ft (76m)
1500 VA	4	70ft (21m)	100ft (30m)	200ft (61m)

TABLE 3 NOTES:

1. DISTANCES SHOWN ASSURE LESS THAN 10% VOLTAGE DROP ACROSS THE WIRE FOR A TYPICAL STARTER.
2. PXCC DO CONTACT RATINGS
   4A @ 250VAC & 30VDC
   SIZE 4 MOTOR STARTER

MAXIMUM NUMBER HSTIE IN SERIES ON ALN TRUNK

TABLE 4

SPEED	1200 BAUD	4800 BAUD	9600 - 38.4K	57.6K - 115.2K BAUD
SERIES TIE'S	10	7	6	6
ALN TRUNK DISTANCE	4000ft (1.2km)	4000ft (1.2km)	4000ft (1.2km)	3280ft (1km)

- TIE MUST BE USED TO ISOLATE ALN BETWEEN PXCC CONNECTED TO DIFFERENT SERVICE GROUNDS OR ON BOTH SIDES OF THE ALN CABLE THAT EXITS BUILDING.
- THE MAX ALN DISTANCE APPLIES TO EACH SIDE OF THE TIE.

GENERAL NOTES:

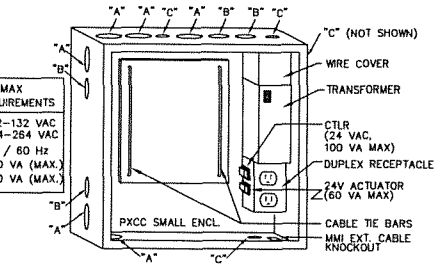
- COMPLY WITH LOCAL BUILDING CODES
- SIZE WIRE FOR LOAD, CURRENT, AND VOLTAGE.
- ALL WIRE TO BE APPROVED OR LISTED FOR THE INTENDED APPLICATION BY AGENCIES SUCH AS UL, NEC, CSA.
- ALWAYS REFER TO LOCAL CODES FOR CONDUIT SHARING.
- WIRING MUST HAVE INSULATION RATED FOR HIGHEST VOLTAGE CIRCUIT IN CONDUIT.
- THE ALN TRUNK MUST BE AN UNINTERRUPTED RUN BETWEEN CABINETS. NO SPLICES ALLOWED.
- CM/CMP/MM/MMP WIRE IS NOT USABLE FOR CLASS 1 CIRCUITS.
- FOR EXTENDED TEMPERATURE INSTALLATIONS USE ONLY COPPER WIRE LISTED FOR 90°C OR HIGHER

PXCC WIRE SPECIFICATIONS

TABLE 2

	LOW-VOLTAGE POINT APPLICATIONS	POINT USAGE	ALN TRUNK	EALN
CABLE CONFIGURATION	TWISTED PAIR OR TSP	TWISTED PAIR (UNJACKETED) OR TSP	TWISTED SHIELDED PAIR	(4) TWISTED PAIR
GAUGE	#18 TO #22 AWG (STRANDED)	#18 TO #22 AWG (STRANDED)	24 AWG (STRANDED)	24AWG(STRANDED)
CAPACITANCE	n.a.	n.a.	12.5 pf/ft OR LESS	13 pf/ft OR LESS
TWISTS PER FOOT	6 MINIMUM	6 MINIMUM	6 MINIMUM	CATEGORY 5 Min
SHIELDS	NOT REQUIRED (IN CASE OF TSP, 100% FOIL W/ DRAIN WIRE)	NOT REQUIRED (IN CASE OF TSP, 100% FOIL W/ DRAIN WIRE)	100% FOIL W/ DRAIN WIRE	NOT REQUIRED
NEC CLASS	CM, CMP (75°C OR HIGHER)	NOT SPECIFIED	CM, CMP (75°C OR HIGHER)	MM, MMP
CEC CLASS	FT4, FT6 (75°C OR HIGHER)	NOT SPECIFIED	FT4, FT6 (75°C OR HIGHER)	NOT SPECIFIED
UL VOLTAGE RATING	NOT SPECIFIED	300 VAC [2]	NOT SPECIFIED	NOT SPECIFIED
UL TEMP. RATING	NOT SPECIFIED	75°C (167°F)	NOT SPECIFIED	NOT SPECIFIED

1. UL RECOGNIZED WIRE (LABELED WITH A BACKWARDS 'RU') IS NOT FIELD INSTALLABLE. USE ONLY UL-LISTED WIRE.
2. 300 VAC WIRE CAN BE USED IN FIELD PANELS CONTAINING VOLTAGES BELOW 150 VAC.

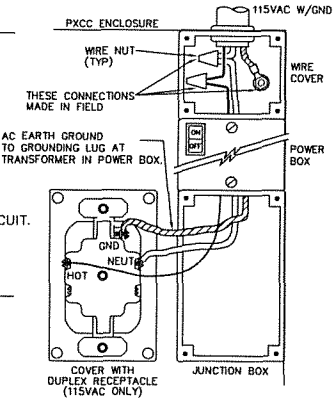


SERVICE BOX MAX POWER SOURCE REQUIREMENTS	
VOLTAGE:	102-132 VAC 204-264 VAC
LINE FREQUENCY:	50 / 60 Hz
XFMR POWER:	200 VA (MAX.)
115V OUTLETS:	200 VA (MAX.)

KNOCKOUT TYPES
A= 1" & 1-1/4"
B= 3/4" & 1"
C= 1/2" & 3/4"

P1 00 PXCC CONDUIT PENETRATIONS

PXCC FAMILY VA RATINGS & SENSOR SUPPLY		
PRODUCT	24VAC VA RATING	24VDC mA
PX COMPACT 16	18	100
PX COMPACT 24	20	100
PX COMPACT 36	35	200



NOTES:

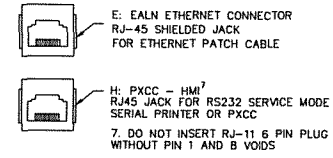
1. NO MORE THAN SEVEN (7) FULLY LOADED PXCC CABINETS ALLOWED ON A SINGLE 3-WIRE CIRCUIT.
2. RECEPTACLE IS PRE-WIRED AND MOUNTED IN FACTORY, FOR 115VAC SERVICE BOX ONLY.

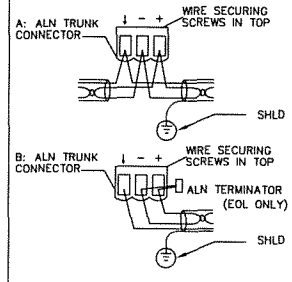
P2 00 PXCC POWER WIRING

NOTES:

1. COMMUNICATION CONNECTORS PLUG INTO PXCC.
2. ALN MUST BE DAISEY-CHAINED WHEN RUNNING 19.2 k BAUD OR FASTER AND TRUNK TERMINATORS USED AT BOTH ENDS OF LINE P3C.
3. TERMINATE SHIELD AT LEAVING END OF ALN TRUNK ONLY.
4. USE ALN SHIELD TERMINATION P3A WHEN 24VAC E TERMINAL IS EARTH GROUNDED.
5. USE ALN SHIELD TERMINATION P3B WHEN 24VAC E TERMINAL IS OPEN.

PXCC ON ETHERNET CONNECTOR





NOTE:
REFER TO "APOGEE WIRING GUIDELINES FOR FIELD PANELS AND EQUIPMENT CONTROLLERS (125-3002)" FOR FLN WIRING CONFIG'S.

G: USB DEVICE CONNECTOR

FOR LAPTOP

P3 00 PXCC COMMN TERMINATIONS

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PXCC Wiring Specification

440P-116804

PWIR

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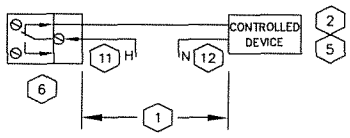
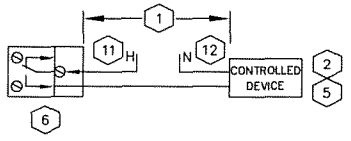
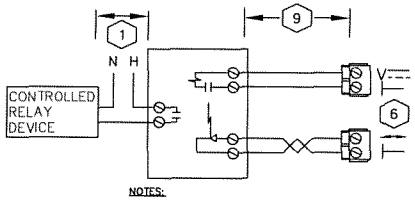


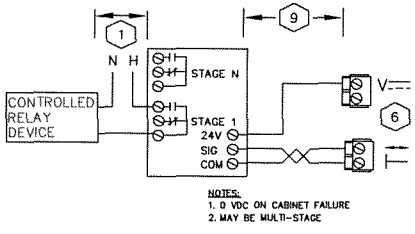
A 00 DIGITAL OUTPUT (6R) NC
PULSED OR LATCHED



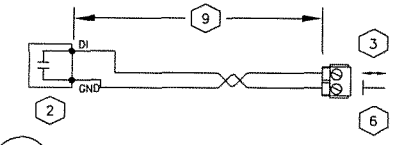
B 00 DIGITAL OUTPUT (6R) NO
PULSED OR LATCHED



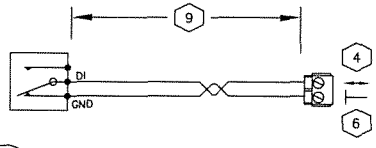
C 00 DIGITAL OUTPUT (8U,8X) Latched
VOLTAGE TO SOLID STATE RELAY



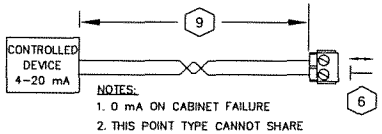
D 00 DIGITAL OUTPUT (8U,8X) Sequenced
VOLTAGE TO SEQUENCING MODULE



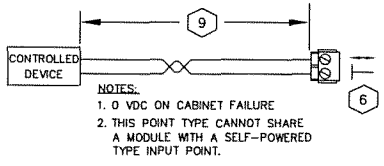
E 00 DIGITAL INPUT (8D,16D,8U,8x)
DRY CONTACT



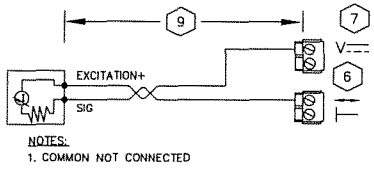
F 00 DIGITAL INPUT (8D,16D,8U,8X)
PULSE ACCUMULATOR



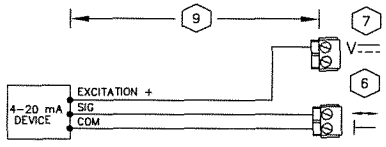
H 00 ANALOG OUTPUT (8X) 4-20 mA



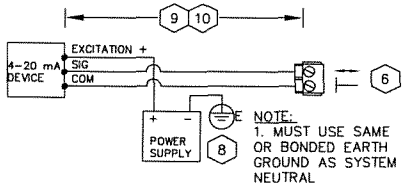
I 00 ANALOG OUTPUT (8U,8X) 0-10VDC



M 00 ANALOG INPUT (8X) 4-20 mA
2-WIRE INTERNAL POWERED



N 00 ANALOG INPUT (8X) 4-20mA
3-WIRE INTERNAL POWERED



O 00 ANALOG INPUT (8X) 4-20mA
3-WIRE EXTERNAL POWERED

NOTES:

1. MAXIMUM WIRE RUN LENGTHS ARE BASED ON THE CURRENT DRAW AND WIRE GAGE. SEE DRAWING TWIR.
2. SEE CONTROL DRAWINGS FOR NORMAL DE-ENERGIZED CONTACT STATE
3. MAXIMUM CONTACT CLOSURE RATE IS 10 PER SECOND
   8D, 16d EXCITATION = 24VDC, 8mA
   8U, 8X EXCITATION = 24VDC, 8mA, 20ms, 100mA
4. 8D, 16D MAXIMUM PULSE RATE = 10Hz (50ms PER STATE, 100ms PER PULSE)
   8U, 8X MAXIMUM PULSE RATE = 20Hz (25ms PER STATE, 50ms PER PULSE)
5. PXC MODULAR DO CONTACT RATINGS
   AC OPERATION:
   4A @ 240VAC (RESISTIVE)
   3A @ 240VAC (INDUCTIVE)
   SIZE 4 MOTOR STARTER
   DC OPERATION:
   40W @ < 50VDC
   20W @ > 50VDC
6. REFER TO PXC MODULAR PANEL FOR ACTUAL POINT ADDRESSES. REFER TO TXMI TERMINATION TABLES FOR ACTUAL TERMINALS FOR EACH PANEL ADDRESS. COMMON TERMINAL MAY BE SHARED BY 2 POINTS.
7. REFER TO DRAWING P1 ON TWIR FOR MAXIMUM CURRENT PROVIDED BY THE 24VDC SENSOR SUPPLY ON P1 BIM OR BUS POWER SUPPLY
8. EXTERNAL POWER SUPPLY CAN EITHER BE A 24VDC POWER SUPPLY OR A 24VAC TRANSFORMER DEPENDING ON THE SENSOR SELECTED. IF NOT AN ISOLATED NC CLASS 2 CIRCUIT THEN POWER SOURCE, NEUTRAL AND PXC MODULAR COMMON MUST BE BOTH CONNECTED TO THE SAME OR BONDED BUILDING APPROVED EARTH GROUND. FOR FURTHER DETAILS SEE EARTH GROUNDING RULES (125-3002) APOGEE WIRING GUIDELINES FOR FIELD PANELS AND EQUIPMENT CONTROLLERS.
9. 50mA OR LESS - 750ft/230m
   50mA TO 100mA - 375ft/115m
10. 100mA TO 150mA - 250ft/76m
    150mA TO 200mA - 187ft/57m
    200mA TO 250mA - 150ft/46m
11. WHERE H TERMINAL IS NOT A NEC CLASS 2 CIRCUIT, RELAY COMMON TERMINAL BRANCH CURRENT MUST BE EXTERNALLY LIMITED TO 10A MAXIMUM BY AN NEC APPROVED MEANS. NOT A FUSE.
12. WHERE REQUIRED, N TERMINAL BRANCH CURRENT MUST BE EXTERNALLY LIMITED BY AN NEC APPROVED MEANS.

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TX-I/O Termination Spec.

440P-116804

TTRM1

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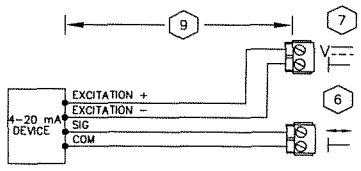
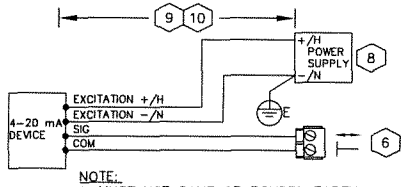
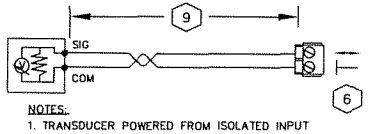


P 00 — ANALOG INPUT (8X) 4−20mA
4−WIRE INTERNAL POWERED



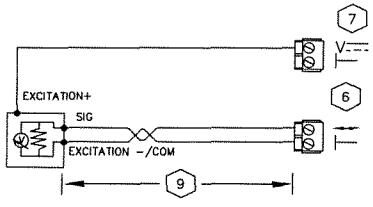
NOTE:
1. MUST USE SAME OR BONDED EARTH GROUND AS SYSTEM NEUTRAL

Q 00 — ANALOG INPUT (8X) 4−20mA
4−WIRE EXTERNAL POWERED

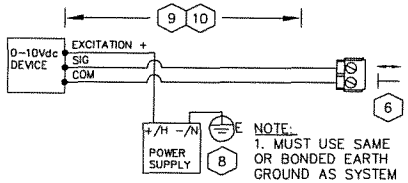


NOTES:
1. TRANSDUCER POWERED FROM ISOLATED INPUT
2. TRANSDUCER OUTPUT VOLTAGE

R 00 — ANALOG INPUT (8U,8X) 0−10 Vdc
SELF POWERED TRANSDUCER

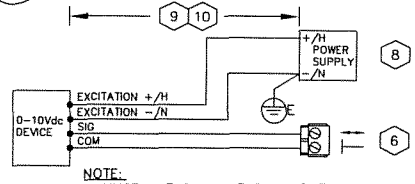


S 00 — ANALOG INPUT (8U,8X) 0−10VDC
3−WIRE INTERNAL POWERED



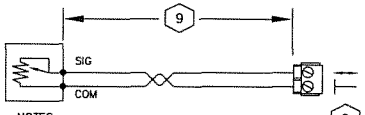
NOTE:
1. MUST USE SAME OR BONDED EARTH GROUND AS SYSTEM NEUTRAL

T 00 — ANALOG INPUT (8U,8X) 0−10VDC
3−WIRE EXTERNAL POWERED



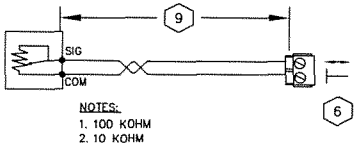
NOTE:
1. MUST USE SAME OR BONDED EARTH GROUND AS SYSTEM NEUTRAL

U 00 — ANALOG INPUT (8U,8X) 0−10VDC
4−WIRE EXTERNAL POWERED



NOTES:
1. 1000 OHM PLATINUM (375)
2. 1000 OHM PLATINUM (385)
3. 1000 OHM NICKEL
4. CUSTOM

V 00 — ANALOG INPUT (8X,8U) RTD



NOTES:
1. 100 KOHM
2. 10 KOHM
3. CUSTOM

W 00 — ANALOG INPUT (8X,8U) THERMISTOR

TXM1 TERMINATION TABLES

1. ALL TXM1 TERMINALS (MEASURING, NEUTRAL, RELAY, SUPPLY) ARE CONNECTED IN THE PLUG−IN I/O MODULE, NOT IN THE TERMINAL BUS.

	TXM1.8D, TXM1.16D							
I/O POINT	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SYSTEM NEUTRAL[1] ⊥ (−)	1	3	5	7	9	11	13	15
DIGITAL INPUT ⏐ (+)	2	4	6	8	10	12	14	16

1. NEUTRAL CAN BE CONNECTED TO ANY NEUTRAL TERMINAL ON SAME MODULE AND SEVERAL CAN SHARE SAME NEUTRAL TERMINAL.

	TXM1.16D							
I/O POINT	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
SYSTEM NEUTRAL ⊥ (−)	18	20	22	24	26	28	30	32
DIGITAL INPUT[1] ⏐ (+)	19	21	23	25	27	29	31	33

1. NO PULSE ACCUMULATOR

	TXM1.8U, TXM1.8U−ML							
I/O POINT	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SYSTEM NEUTRAL ⊥ (−)	2	6	10	14	19	23	27	31
UNIVERSAL I/O ⏐ (+)	4	8	12	16	21	25	29	33
24V AC/DC ACTUATOR SUPPLY[1] ≂		7		15		24		32

1. 24V DC ONLY AVAILABLE WITH BUS CONNECTOR MODULE (BCM) POWERED EXTERNALLY BY DC SUPPLY.

	TXM1.8X, TXM1.8X−ML							
I/O POINT	(1)	(2)	(3)	(4)	(5)[1]	(6)[1]	(7)[1]	(8)[1]
SYSTEM NEUTRAL ⊥ (−)	2	6	10	14	19	23	27	31
UNIVERSAL I/O ⏐ (+)	4	8	12	16	21	25	29	33
24V AC/DC ACTUATOR SUPPLY[2] ≂		7		15		24		32
24V DC SENSOR SUPPLY[3] ⎓	3		11		20		28	

1. 4−20 mA OUTPUT AVAILABLE ON POINTS 5−8 ONLY.

2. 24V DC ONLY AVAILABLE WITH BUS CONNECTOR MODULE (BCM) POWERED EXTERNALLY BY DC SUPPLY.

3. MAY POWER EXTERNAL SENSORS 0.6w (25mA) OR 1.2w (50mA) PER TERMINATION UP TO 2.4w (100mA) MAXIMUM FOR ALL TERMINATIONS.

	TXM1.6R, TXM1.6R−M					
I/O POINT	(1)	(2)	(3)	(4)	(5)	(6)
COMMON[1] ⏐ (C)	3	9	15	20	26	32
NORMALLY CLOSED (NC)	4	10	16	19	25	31
NORMALLY OPEN ⏐ (NO)	2	8	14	21	27	33

1. COMMONS ARE NOT INTERNALLY CONNECTED.

NOTE: REFER TO TERMINATION SHEET #1 FOR INSTALLATION DETAILS.

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TX-I/O Termination Spec. 2

440P-116804

TTRM2

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PXC MODULAR WIRING TYPE AND GAUGE REQUIREMENTS

TABLE 1

CIRCUIT TYPE	CLASS	WIRE TYPE	MAX. DISTANCE	CONDUIT SHARING [2]
AC LINE POWER [1]	POWER	#12–14 THHN	REFER TO NEC	CHECK LOCAL CODES
DIGITAL OUTPUT	1 & 2	TP not required, check job specs & local codes #18 to #24 AWG	SEE TABLE 3	CHECK LOCAL CODES
DIGITAL INPUT	2	TP not required, check job specs & local codes #18 to #24 AWG	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT [4] 100K/10K Thermistor	2	#18–#24 TP [3,6] or TSP [5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT [4] 1K Ni OR RTD	2	#18–#24 TP [3,6] or TSP [5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT 0–10 V	2	#18–#24 TP [3,6] or TSP [5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT 4–20 mA	2	#18–#24 TP [3,6] or TSP [5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG OUTPUT 0–10 V	2	#18–#24 TP [3,6] or TSP [5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG OUTPUT 4–20 mA	2	#18–#24 TP [3,6] or TSP [5] CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ETHERNET ALN	2	#24 (4) TP [6] CAT5 OR BETTER	295ft (90 m)	CHECK LOCAL CODES
ALN TRUNK	2	#24 TSP	SEE TABLE 4	CHECK LOCAL CODES

1. WHEN DAISY–CHAINING 24VAC POWER TO CONTROLLERS USE #14 WIRE.

2. CONDUIT SHARTING RULES: ONLY WHERE LOCAL CODES PERMIT. BOTH CLASS1 AND CLASS 2 WIRING CAN BE RUN TO THE PXCC PROVIDED THE CLASS 2 WIRE IS UL LISTED 300V 75°C(167°F) OR HIGHER OR THE CLASS 2 WIRE IS NEC TYPE CM (FT4) (75°C OR HIGHER) OR CMP(FT6) (75°C OR HIGHER). NEC TYPE CL2 AND CL2P IS NOT ACCEPTABLE UNLESS ALSO UL LISTED AND MARKED 300V 75°C (167°F) OR HIGHER

3. TWISTED PAIR, NON–JACKETED UL LISTED 75°C(167°F) AND 300V, CABLE CAN BE USED IN PLACE OF CM(FT4) OR CMP(FT6)(BOTH MUST BE RATED 75°C OR HIGHER) CABLE WHEN CONTAINED IN CONDUIT PER LOCAL CODES. SEE THE FIELD PURCHASING GUIDE FOR WIRE.

4. WIRE LENGTH AFFECTS POINT INTERCEPT ENTRY. ADJUST INTERCEPT ACCORDINGLY FOR EACH WIRE GAUGE AND SENSOR TYPE.

5. SHIELDED TWISETED PAIR (TSP) IS NOT REQUIRED FOR ELECTRICAL NOISE LEVELS UPTO 10 V/M. AT HIGHER LEVELS TSP MAY BE NEEDED. TERMINATE SHIELD ON ENCLOSURE AND TAPE BACK ON POINT END.

6. FOR 24AWG INSTALL CATEGORY5 OR BETTER CABLE PER ANSI/TIA/EIA–568–B.1 OR HIGHER. USE SOLID COPPER BETWEEN JACK BOXES. USE STRANDED COPPER PATCH CABLES 13ft (4m) TO CONNECT PXCC AND 20ft (6m) TO CONNECT SWITCH OR HUB.

MAXIMUM DO WIRE RUN LENGHTS

TABLE 3

NOMINAL INRUSH	STARTER SIZE	WIRE SIZE #18	WIRE SIZE #16	WIRE SIZE #14
200 VA	0 1	500ft (152m)	900ft (274m)	1400ft (427m)
550 VA	2	200ft (61m)	300ft (91m)	500ft (152m)
1150 VA	3	100ft (30m)	150ft (46m)	250ft (76m)
1500 VA	4	70ft (21m)	100ft (30m)	200ft (61m)

TABLE 3 NOTES:

1. DISTANCES SHOWN ASSURE LESS THAN 10% VOLTAGE DROP ACROSS THE WIRE FOR A TYPICAL STARTER.
2. PXCM DO CONTACT RATINGS
   4A @ 250VAC & 30VDC
   SIZE 4 MOTOR STARTER

MAXIMUM NUMBER HSTIE IN SERIES ON ALN TRUNK

TABLE 4

SPEED	1200 BAUD	4800 BAUD	9600 – 38.4K BAUD	57.6K – 115.2K BAUD
SERIES TIE'S	10	7	6	6
ALN TRUNK DISTANCE	4000ft (1.2km)	4000ft (1.2km)	4000ft (1.2km)	3280ft (1km)

- TIE MUST BE USED TO ISOLATE ALN BETWEEN PXCM CONNECTED TO DIFFERENT SERVICE GROUNDS OR ON BOTH SIDES OF THE ALN CABLE THAT EXITS BUILDING.
- THE MAX ALN DISTANCE APPLIES TO EACH SIDE OF THE TIE.

GENERAL NOTES:

- COMPLY WITH LOCAL BUILDING CODES
- SIZE WIRE FOR LOAD, CURRENT, AND VOLTAGE.
- ALL WIRE TO BE APPROVED OR LISTED FOR THE INTENDED APPLICATION BY AGENCIES SUCH AS UL, NEC, CSA.
- ALWAYS REFER TO LOCAL CODES FOR CONDUIT SHARING.
- WIRING MUST HAVE INSULATION RATED FOR HIGHEST VOLTAGE CIRCUIT IN CONDUIT.
- THE ALN TRUNK MUST BE AN UNINTERRUPTED RUN BETWEEN CABINETS. NO SPLICES ALLOWED.
- CM/CMP/MM/MMP WIRE IS NOT USABLE FOR CLASS 1 CIRCUITS.
- FOR EXTENDED TEMPERATURE INSTALLATIONS USE ONLY COPPER WIRE LISTED FOR 90°C OR HIGHER

PXCM WIRE SPECIFICATIONS

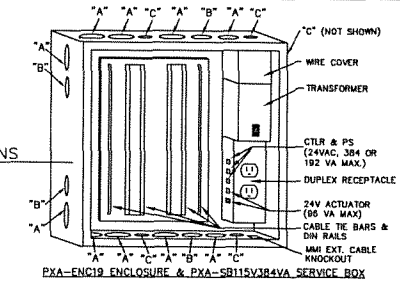
TABLE 2

	LOW-VOLTAGE POINT APPLICATIONS	POINT USAGE	ALN TRUNK	EALN
CABLE CONFIGURATION	TWISTED PAIR OR TSP	TWISTED PAIR (UNJACKETED) OR TSP	TWISTED SHIELDED PAIR	(4) TWISTED PAIR
GAUGE	#18 TO #22 AWG (STRANDED)	#18 TO #22 AWG (STRANDED)	24 AWG (STRANDED)	24AWG(STRANDED)
CAPACITANCE	n.a.	n.a.	12.5 pf/ft OR LESS	13 pf/ft OR LESS
TWISTS PER FOOT	6 MINIMUM	6 MINIMUM	6 MINIMUM	CATEGORY 5 Min
SHIELDS	NOT REQUIRED (IN CASE OF TSP, 100% FOIL W/ DRAIN WIRE)	NOT REQUIRED (IN CASE OF TSP, 100% FOIL W/ DRAIN WIRE)	100% FOIL W/ DRAIN WIRE	NOT REQUIRED
NEC CLASS	CM, CMP (75°C OR HIGHER)	NOT SPECIFIED	CM, CMP (75°C OR HIGHER)	MM, MMP
CEC CLASS	FT4, FT6 (75°C OR HIGHER)	NOT SPECIFIED	FT4, FT6 (75°C OR HIGHER)	NOT SPECIFIED
UL VOLTAGE RATING	NOT SPECIFIED	300 VAC [2]	NOT SPECIFIED	NOT SPECIFIED
UL TEMP. RATING	NOT SPECIFIED	75°C (167°F)	NOT SPECIFIED	NOT SPECIFIED

1. UL RECOGNIZED WIRE (LABELED WITH A BACKWARDS 'RU') IS NOT FIELD INSTALLABLE. USE ONLY UL–LISTED WIRE.
2. 300 VAC WIRE CAN BE USED IN FIELD PANELS CONTAINING VOLTAGES BELOW 150 VAC.

ENCLOSURE H x W x D (IN)
PXA–ENC–19 19 x 22 x 5 3\4
PXA–ENC–34 34 x 22 x 5 3\4
PXA–ENC–18 18 x 22 x 6

KNOCKOUT TYPES
A= 1" & 1–1/4"
B= 3/4" & 1"
C= 1/2" & 3/4"



PXA–ENC19 ENCLOSURE & PXA–SB115V384VA SERVICE BOX

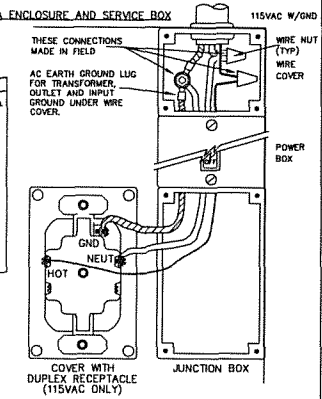
T1 00 PXCM CONDUIT PENETRATIONS

SERVICE BOX MAX POWER SOURCE REQUIREMENTS	
VOLTAGE:	102–132 VAC 204–264 VAC
LINE FREQUENCY:	50 / 60 Hz
115V OUTLETS:	200 VA (MAX.)
PXA–SB115V384VA [1]	440 VA (MAX.)
PXA–SB115V192VA [1]	220 VA (MAX.)
PXA–SB230V384VA	440 VA (MAX.)
PXA–SB230V192VA	220 VA (MAX.)

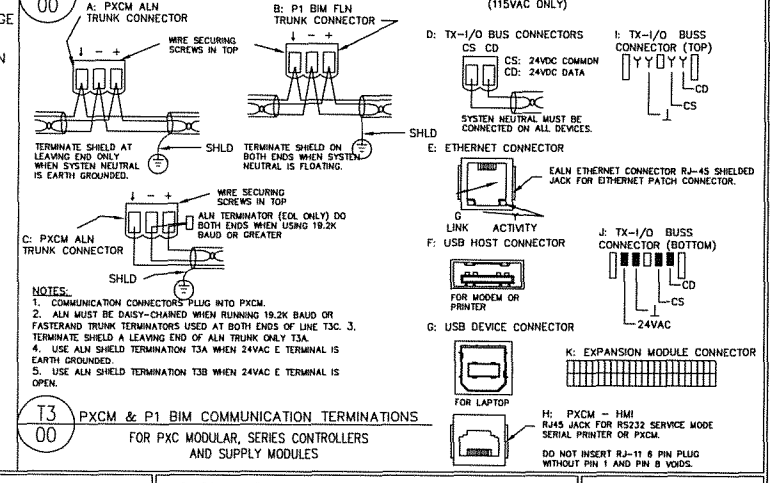
PXCM FAMILY VA RATINGS & SENSOR SUPPLY			
PRODUCT	24VDC (W)	24VAC INPUT VA	24VAC OUTPUT VA
PXC00–X	0	24	0
PXC100–X	0	24	0
TXB1.P1	14.4	125	96
TXS1.12F4	28.8	150	96
TXS1.EF4	0	96	96
TX–I/O MODULE	24VDC LOAD (W) MAX.		
TXM1.8D	1.1		
TXM1.16D	1.4		
TXM1.8U	1.5		
TXM1.8U–ML	1.8		
TXM1.8X	2.2		
TXM1.8X–ML	2.3		
TXM1.6R	1.7		
TXM1.6R–M	1.9		

NOTES:
1. NO MORE THAN THREE (3) 384VA OR FIVE (5) 192VA FULLY LOADED PXA CABINETS ALLOWED ON A SINGLE 3–WIRE 115V, 15A CIRCUIT.
2. RECEPTACLE IS PREWIRED AND MOUNTED IN FACTORY, FOR 115VAC SERVICE BOX ONLY.
3. DC INPUT/OUTPUT ONLY AVALABLE ON BUSS CONNECTION MODULES.

PXA ENCLOSURE AND SERVICE BOX



T2 00 PXCM POWER WIRING



NOTES:
1. COMMUNICATION CONNECTORS PLUG INTO PXCM.
2. ALN MUST BE DAISY–CHAINED WHEN RUNNING 19.2K BAUD OR FASTERAND TRUNK TERMINATORS USED AT BOTH ENDS OF LINE T3C. 3. TERMINATE SHIELD A LEAVING END OF ALN TRUNK ONLY T3A.
4. USE ALN SHIELD TERMINATION T3A WHEN 24VAC E TERMINAL IS EARTH GROUNDED.
5. USE ALN SHIELD TERMINATION T3B WHEN 24VAC E TERMINAL IS OPEN.

T3 00 PXCM & P1 BIM COMMUNICATION TERMINATIONS
FOR PXC MODULAR, SERIES CONTROLLERS AND SUPPLY MODULES

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TX-I/O Wiring Specification

440P-116804

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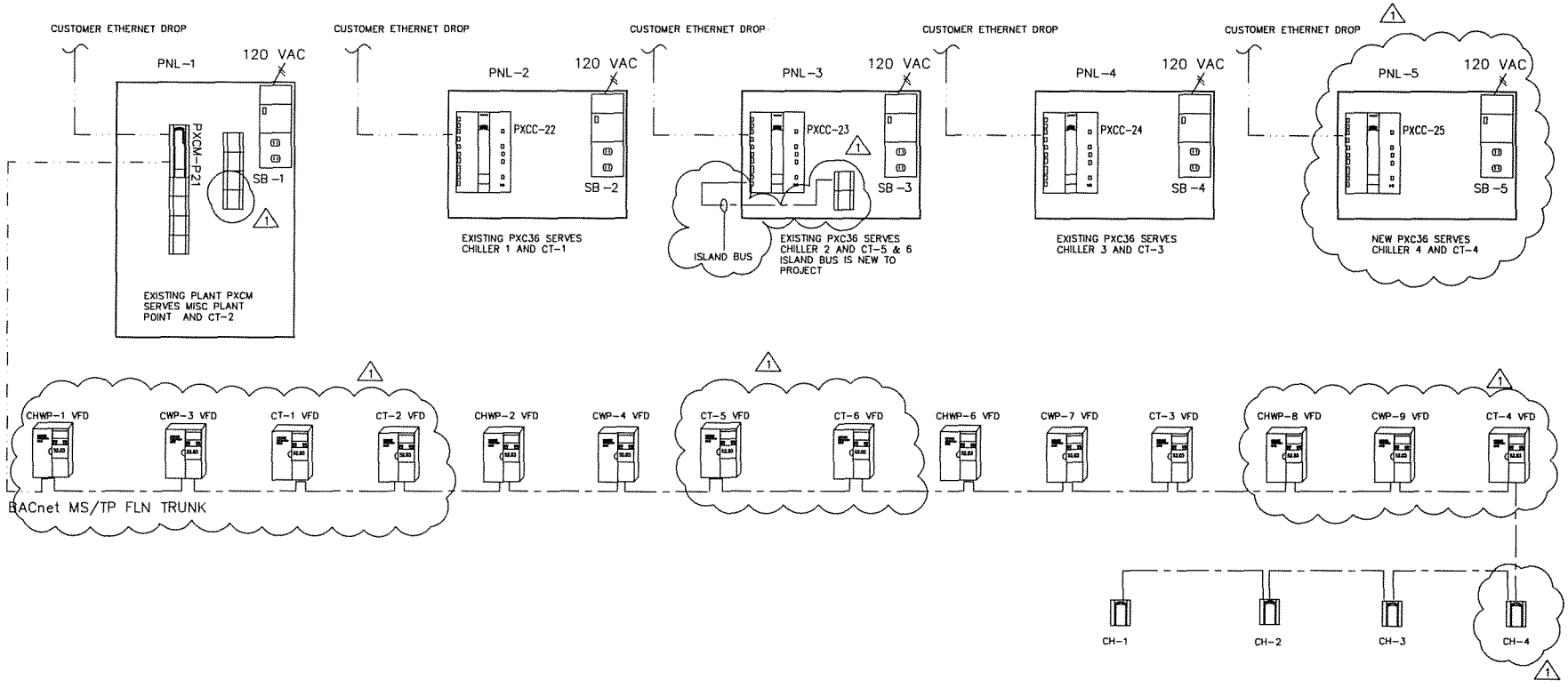
INSTALLATION NOTES:

1. CLOUDED ITEMS ARE NEW TO THIS PROJECT; ALL OTHERS ARE EXISTING.



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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
PNL 5	1	PXA-ENC19	SIEMENS	149475	ENCLOSURE ASSY 19"
PXCC 25	1	PXC36-EF.A	SIEMENS	149206	APOGEE 36PT, BACNET IP/MSTP,TXIO,RS485
SB 5				149 475	SERVICE BOX 115V, 24VAC, 192VA
Panel Mounted Devices					
TXIO 1	1	TXS1.12F10	SIEMENS	149476	24VDC SUPPLY 1200MA, 10 A FUSE
	3	TXM1.8X-ML	SIEMENS	149476	8 UNIV I/O W/ 4-20MA, OVD&LCD
	1	LSM-IB36.A	SIEMENS	N/A	ISLAND BUS LICENCE FOR PXC36

REVISION HISTORY

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VA Chiller Project
Alexandria, LA

ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
DMP	DMP	JS		09/11/12

Riser

440P-116804
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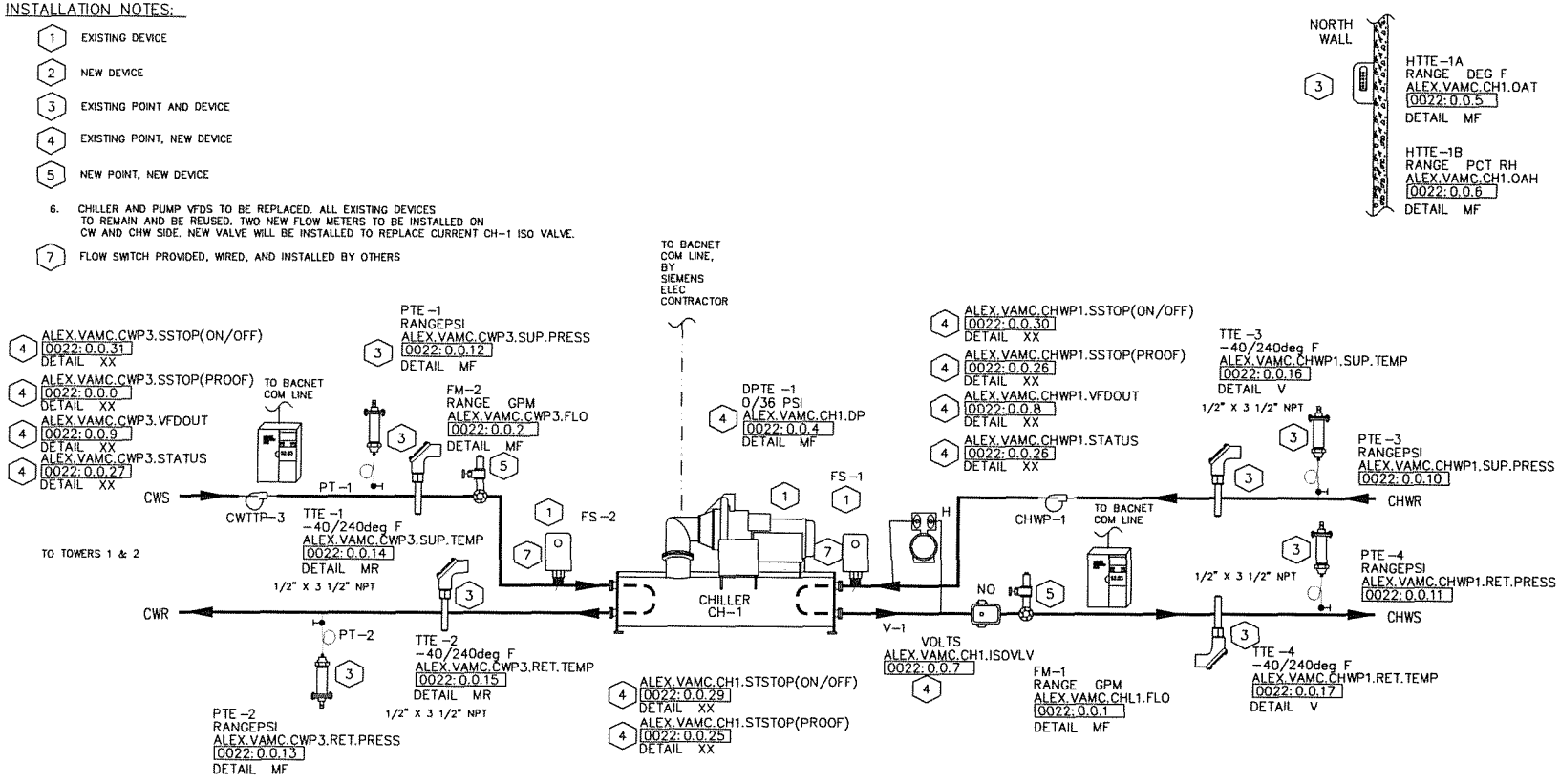
INSTALLATION NOTES:

1. EXISTING DEVICE
2. NEW DEVICE
3. EXISTING POINT AND DEVICE
4. EXISTING POINT, NEW DEVICE
5. NEW POINT, NEW DEVICE
6. CHILLER AND PUMP VFDS TO BE REPLACED. ALL EXISTING DEVICES TO REMAIN AND BE REUSED. TWO NEW FLOW METERS TO BE INSTALLED ON CW AND CHW SIDE. NEW VALVE WILL BE INSTALLED TO REPLACE CURRENT CH-1 ISO VALVE.
7. FLOW SWITCH PROVIDED, WIRED, AND INSTALLED BY OTHERS



REF#	FIELD PANEL NAME	FIELD PANEL NODE NAME
0022	BACDev_71471	Alexandria.VAMC.Chiller1

REVISION HISTORY

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Alexandria, LA

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DMP	DMP	JS	08/13/12	09/11/12

Replacement: Chiller 1

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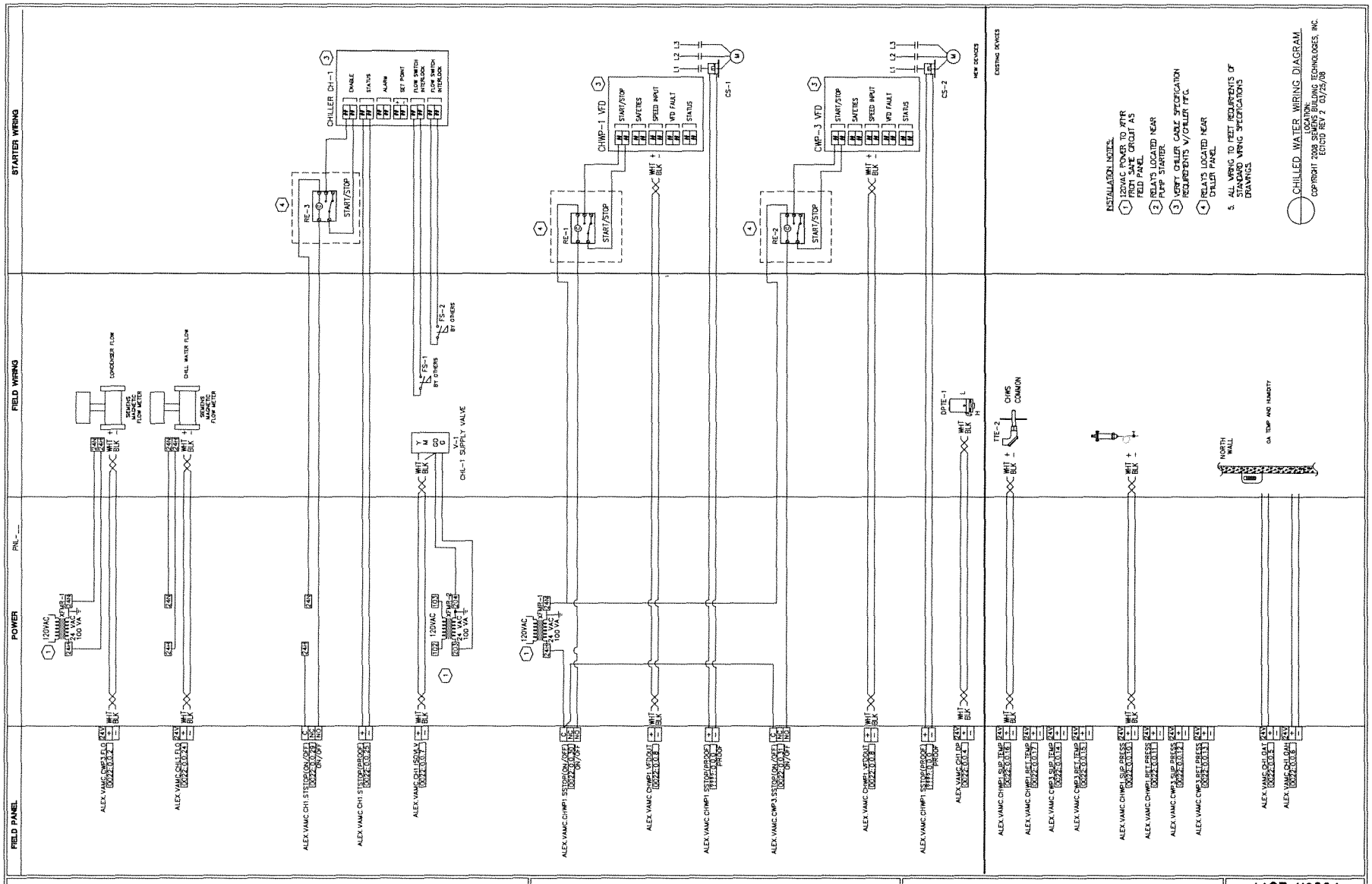

REVISION HISTORY

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ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
DMP	DMP	JS	08/13/12	09/11/12

Replacement: Chiller 1

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
CHWP 1	1	N/A	N/A	N/A	N/A
CWTT 4	1	N/A	N/A	N/A	N/A
DPTE 1	1	2024D3A12A2S1B4	N/A	N/A	N/A
FM 1-2	2	SIEMENS MAG MTR	N/A	N/A	N/A
V					SEE VALVE SUBMITTAL

CHILLER STAGING

1. The chillers shall be configured in a lead/lag/standby configuration.
2. Lead/lag/standby determination shall ensure that the most efficient operational arrangement is being employed for the current campus load.
3. A stage-on setpoint and a stage-off setpoint shall be determined based on the chiller(s) operating and the next chiller in line to maintain the chillers operating in their most efficient range to the extent possible. This should be based on campus load (tons), % run load amps of the chiller(s), and efficiency curves of the chillers in consideration.
4. After 15 minutes of any of the following conditions, the next chiller in sequence shall stage on: stage-on setpoint is exceeded (as per above description), or total loop flow exceeding the combined maximum allowable flow of the operating chiller(s), or the chilled water supply temperature exceeding its setpoint by two degrees or more.
5. A temporary demand limit may be needed on the operating chiller(s) upon a call for another chiller to stage on to reduce shock to the system.
6. Should multiple chillers operate at less than respective stage-off setpoint for more than 15 minutes, the lag chiller shall be staged off.
7. The chillers shall load and unload equally

CHILLER FLOW CONTROL

1. When a chiller is off, its isolation/flow regulating valve shall be fully closed.
2. Upon call for a chiller to run, its isolation/flow regulating valve shall open gradually in accordance with flow change rate capabilities of each operating chiller.
3. Upon a call for a chiller to stage off, its isolation/flow regulating valve shall close gradually in accordance with flow change rate capabilities of each operating chiller.
4. Flow rate through each chiller is measured with a flow meter.
5. If readings of water flow and pressure differential are available for each evaporator, cross-reference both readings and provide warning for calibration when necessary.
6. Only when minimum flow is detected through the chiller evaporator shall the chiller stage on.
7. The isolation/flow regulating valve for each chiller shall be capable of modulating to assist in regulating minimum and maximum flows through the chiller and to ensure equal loading among operating machines. Never at any time should all valves on operating chillers be less than 100% open, nor should any valve on an operating chiller ever fall below 50% open (adj.). Modulation of these valves shall be gradual to avoid quick changes in flow through any machine.
8. When flow through any operating chiller falls below its minimum allowable flow rate, the bypass valve will modulate in order to ensure minimum flow to all operating chillers.

CHILLED WATER TEMPERATURE CONTROL

1. The chillers shall operate to maintain the plant chilled water supply temperature at its set point. The plant chilled water supply temperature shall be from a sensor installed in the main header before it branches to the four loops.
2. During normal operation, the supply temperature set point shall be set based on outside air dry bulb temperature according to the linear reset schedule.

PRIMARY CHILLED WATER PUMP CONTROL

1. The primary chilled water pumps shall be configured in a lead/lag/standby configuration, corresponding to the lead/lag/standby configuration of the chillers, although staging of the pumps does not necessarily correlate with staging of the chillers. When Chiller #1 is lead, pump #1 is lead; when Chiller #2 is lead, pump #2 is lead; when Chiller #3 is lead, pump #6 is lead; when Chiller #4 is lead, pump #8 is lead.
2. The lead primary pump shall run continuously.
3. Loop differential pressures for each of the four primary loops shall be installed at the most remote building served by the loop, before the building pump(s). Differential pressures at the end of each loop will be compared to their setpoints on a continual basis. The differential pressure that is lowest relative to its setpoint shall be used as feedback to control the speed of the primary chilled water pump(s).
4. When the speed of the operating pump(s) exceeds 95% for 15 minutes, another pump shall stage on, and the pump speeds shall be the same for all operating pumps.
5. When the speed of two or more operating pumps falls below 30% for 15 minutes, the lag pump shall turn off.

REVISION HISTORY

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VA Chiller Project
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ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
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Replacement: Chiller 1

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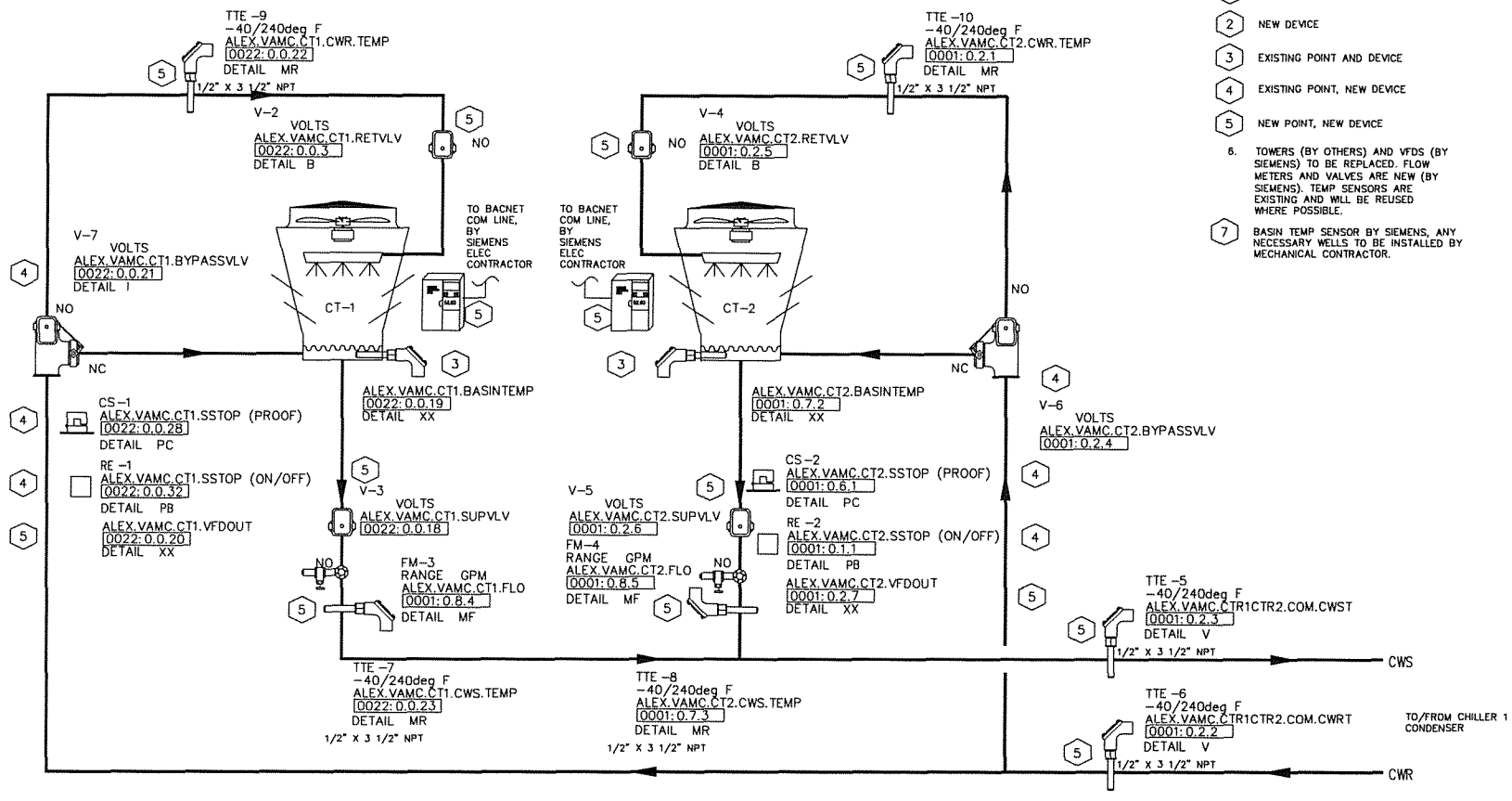

INSTALLATION NOTES:

1. EXISTING DEVICE
2. NEW DEVICE
3. EXISTING POINT AND DEVICE
4. EXISTING POINT, NEW DEVICE
5. NEW POINT, NEW DEVICE
6. TOWERS (BY OTHERS) AND VFDS (BY SIEMENS) TO BE REPLACED. FLOW METERS AND VALVES ARE NEW (BY SIEMENS). TEMP SENSORS ARE EXISTING AND WILL BE REUSED WHERE POSSIBLE.
7. BASIN TEMP SENSOR BY SIEMENS, ANY NECESSARY WELLS TO BE INSTALLED BY MECHANICAL CONTRACTOR.

REF#	FIELD PANEL NAME	FIELD PANEL NODE NAME
0001	Alex.VAMC.CHWSYS_71470	Alex.VAMC.CHWSYS
0022	BACDev_71471	Alexandria.VAMC.Chiller1

REVISION HISTORY

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VA Chiller Project
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ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
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Replacement: Tower 1 & 2

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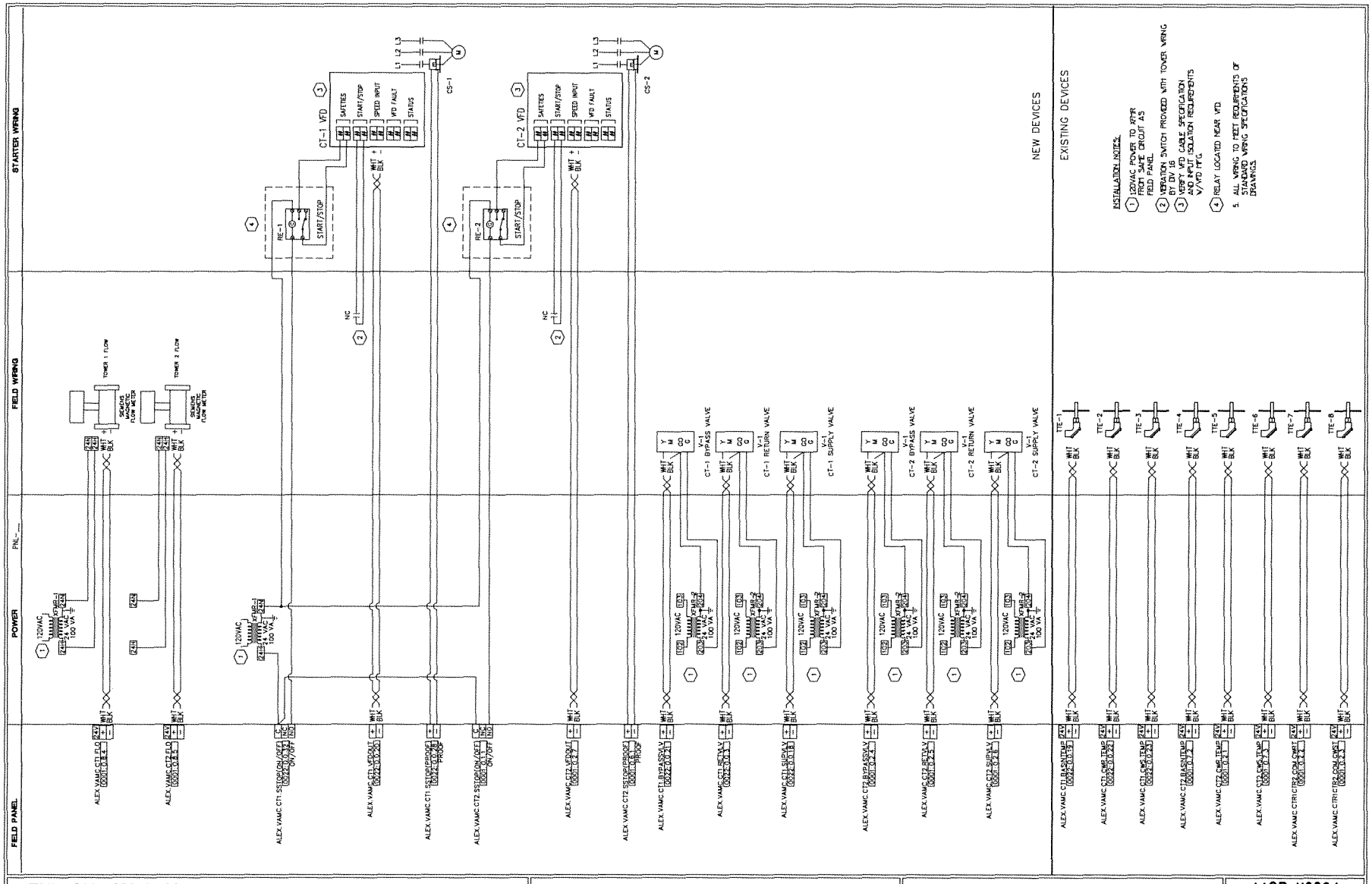

REVISION HISTORY	SIEMENS	VA Chiller Project Alexandria, LA	440P-116804
	Siemens Industry Inc Landis Division 104 Annonce St. Lafayette, La. 70507 USA Phone: (337) 233-7431 Fax: (337) 233-7518	ENGINEER: DMP · DRAFTER: DMP · CHECKED BY: JS · INITIAL RELEASE: 08/13/12 · LAST EDIT DATE: 09/11/12 Replacement: Tower 1 & 2	101A

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
CS 1-2	2	H908	VERIS	1006cut005	CURRENT SW SPLITCORE-ADJ W/LED
FM 3-4	2	SIEMENS MAG MTR	N/A	N/A	N/A
RE 1-2	2	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
TTE 5-10	6	544-577-25	SIEMENS	149261	IMMWELL SNSR, PT 1K OHM, (375),2.5" LGTH
V					SEE VALVE SUBMITTAL

CONDENSER WATER PUMP CONTROL

1. When a chiller is staged on, its corresponding condenser water pump shall be brought on.
2. The speed of each condenser water pump shall be controlled based on a combination of leaving condenser water temperature and existing load of the chiller to ensure optimum efficiency of the chiller.
3. The speed of each pump shall never fall below the value required to maintain minimum flow through the condenser of the chiller served as measured by a flow meter for each condenser.

COOLING TOWER STAGING

1. The cooling towers shall be configured in a lead/lag/standby configuration, and shall employ a common header system and be able to stage independent of the chiller systems based on total condenser load.
2. To the extent possible, lead/lag/standby determination shall ensure that the most efficient operational arrangement is being employed for the current load demand.
3. The lead cooling tower shall be enabled whenever a chiller is enabled.
4. The maximum number of cooling towers that can be enabled at any time will be determined based on the minimum flow requirements for each tower and the total condenser water flow as sensed by flow meters installed for each condenser.
5. When a tower is enabled, its isolation valves will open, and its bypass valve shall modulate to maintain condenser water temperature two degrees (adj.) below setpoint. If the bypass valve is fully open (flow to the tower) for five minutes (adj.) and condenser water temperature is above setpoint, the next tower in sequence will be enabled. This process is repeated as needed until the maximum number of cooling towers are enabled for the current condenser water flow rate.
6. When the maximum number of towers are enabled for a given condenser water flow rate, the bypass valves for all towers are fully open, and condenser water temperature exceeds its setpoint by two degrees (adj.), the lead tower fan shall turn on at minimum speed.
7. After the tower fan has been on at minimum speed for at least five minutes (adj.), if condenser water temperature exceeds its setpoint by two degrees (adj.), the next tower fan in sequence shall turn on at minimum speed. This process is repeated as needed until the fans of all enabled towers are on at minimum speed.
8. Once the fans of all enabled cooling towers are on at minimum speed, the VFD speeds shall begin to modulate in unison to maintain the condenser water at its setpoint.
9. With all operating fans at minimum speed, should condenser water temperature fall two degrees (adj.) below setpoint for five minutes (adj.), the lag fan shall turn off.
10. With all fans off on enabled towers, the bypass valve of the lag tower shall control to maintain condenser water temperature two degrees below setpoint. All other tower bypass valves shall remain fully open to tower flow.
11. When the lag tower bypass valve has fully closed for five minutes (adj.), the lag tower shall be disabled and its isolation valves closed. This process is repeated as needed until only one tower is in operation.

CONDENSER WATER TEMPERATURE CONTROL

1. During normal chiller operation, condenser water supply temperature setpoint shall be reset based on outside air wet bulb temperature and current chiller load.
2. The condenser water temperature shall preferably be measured downstream of the cooling towers, and shall be an average of multiples sensors installed in the main header before it branches to the four chillers. Any significant discrepancies in these multiple sensors shall send an alarm that calibration is needed.

REVISION HISTORY

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VA Chiller Project
Alexandria, LA

ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
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Replacement: Tower 1 & 2

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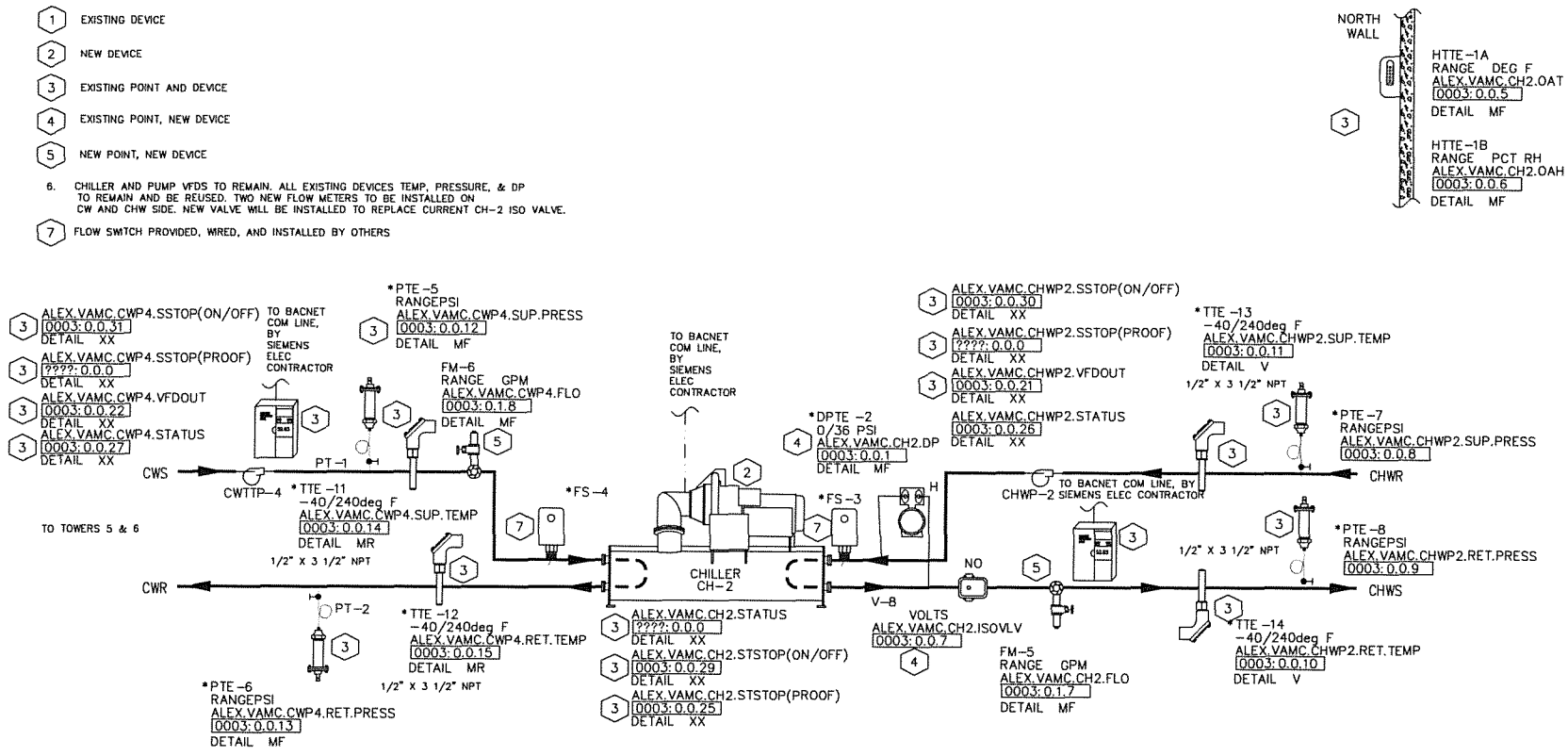
INSTALLATION NOTES:

1. EXISTING DEVICE
2. NEW DEVICE
3. EXISTING POINT AND DEVICE
4. EXISTING POINT, NEW DEVICE
5. NEW POINT, NEW DEVICE

6. CHILLER AND PUMP VFDS TO REMAIN. ALL EXISTING DEVICES TEMP, PRESSURE, & DP TO REMAIN AND BE REUSED. TWO NEW FLOW METERS TO BE INSTALLED ON CW AND CHW SIDE. NEW VALVE WILL BE INSTALLED TO REPLACE CURRENT CH-2 ISO VALVE.

7. FLOW SWITCH PROVIDED, WIRED, AND INSTALLED BY OTHERS



REF#	FIELD PANEL NAME	FIELD PANEL NODE NAME
0003	BACDev_71472	Alex.VAMC.Chiller2

REVISION HISTORY

SIEMENS

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VA Chiller Project
Alexandria, LA

ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
DMP	DMP	JS	08/13/12	09/11/12

Existing: Chiller 2

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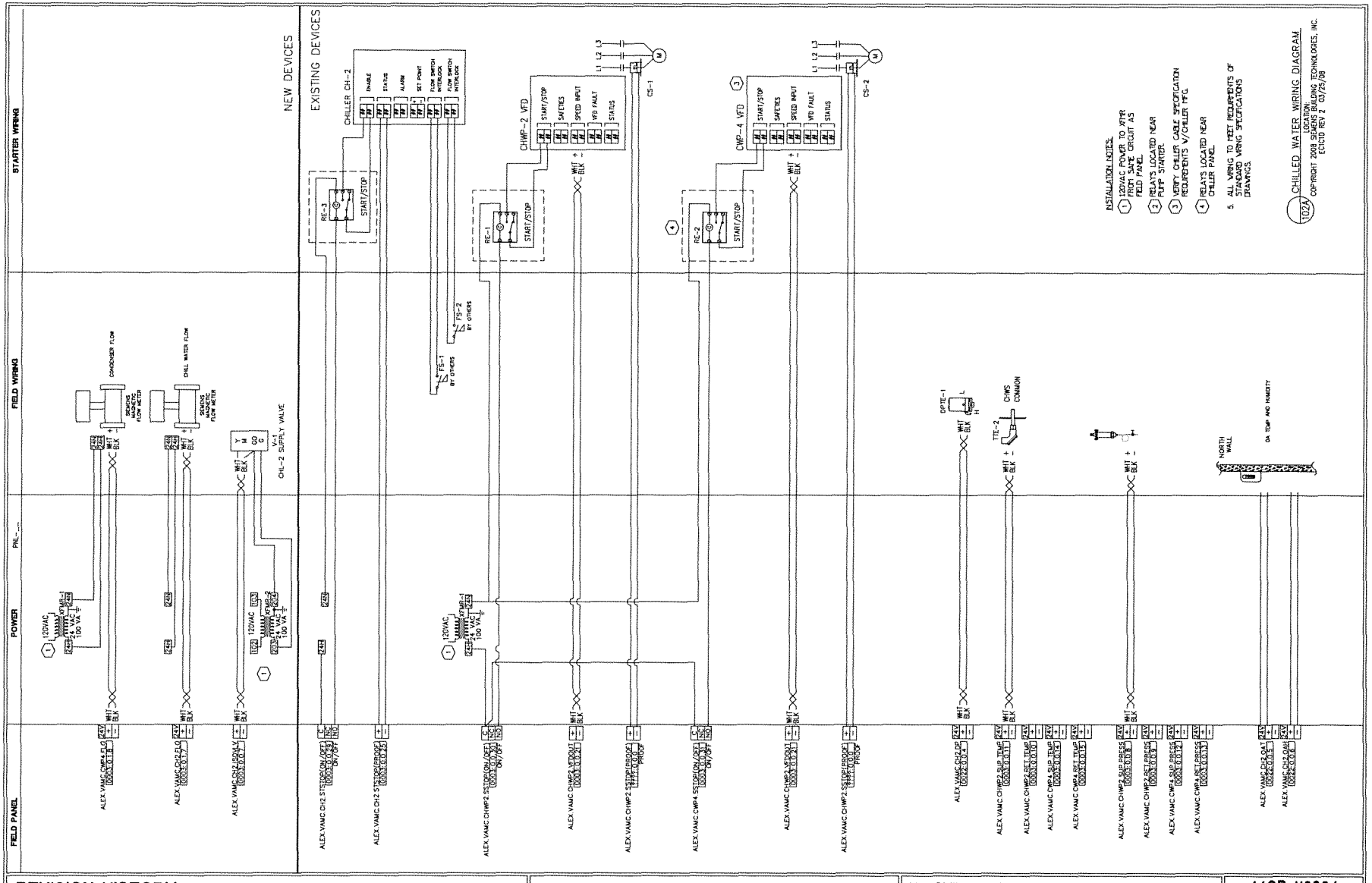

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VA Chiller Project
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DMP	DMP	JS	08/13/12	09/11/12

Existing: Chiller 2

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
CHWP 2	1	N/A	N/A	N/A	N/A
CWTT 4	1	N/A	N/A	N/A	N/A
FM 5-6	2	SIEMENS MAG MTR	N/A	N/A	N/A
V					SEE VALVE SUBMITTAL

CHILLER STAGING

1. The chillers shall be configured in a lead/lag/standby configuration.
2. Lead/lag/standby determination shall ensure that the most efficient operational arrangement is being employed for the current campus load.
3. A stage-on setpoint and a stage-off setpoint shall be determined based on the chiller(s) operating and the next chiller in line to maintain the chillers operating in their most efficient range to the extent possible. This should be based on campus load (tons), % run load amps of the chiller(s), and efficiency curves of the chillers in consideration.
4. After 15 minutes of any of the following conditions, the next chiller in sequence shall stage on: stage-on setpoint is exceeded (as per above description), or total loop flow exceeding the combined maximum allowable flow of the operating chiller(s), or the chilled water supply temperature exceeding its setpoint by two degrees or more.
5. A temporary demand limit may be needed on the operating chiller(s) upon a call for another chiller to stage on to reduce shock to the system.
6. Should multiple chillers operate at less than respective stage-off setpoint for more than 15 minutes, the lag chiller shall be staged off.
7. The chillers shall load and unload equally

CHILLER FLOW CONTROL

1. When a chiller is off, its isolation/flow regulating valve shall be fully closed.
2. Upon call for a chiller to run, its isolation/flow regulating valve shall open gradually in accordance with flow change rate capabilities of each operating chiller.
3. Upon a call for a chiller to stage off, its isolation/flow regulating valve shall close gradually in accordance with flow change rate capabilities of each operating chiller.
4. Flow rate through each chiller is measured with a flow meter.
5. If readings of water flow and pressure differential are available for each evaporator, cross-reference both readings and provide warning for calibration when necessary.
6. Only when minimum flow is detected through the chiller evaporator shall the chiller stage on.
7. The isolation/flow regulating valve for each chiller shall be capable of modulating to assist in regulating minimum and maximum flows through the chiller and to ensure equal loading among operating machines. Never at any time should all valves on operating chillers be less than 100% open, nor should any valve on an operating chiller ever fall below 50% open (adj.). Modulation of these valves shall be gradual to avoid quick changes in flow through any machine.
8. When flow through any operating chiller falls below its minimum allowable flow rate, the bypass valve will modulate in order to ensure minimum flow to all operating chillers.

CHILLED WATER TEMPERATURE CONTROL

1. The chillers shall operate to maintain the plant chilled water supply temperature at its set point. The plant chilled water supply temperature shall be from a sensor installed in the main header before it branches to the four loops.
2. During normal operation, the supply temperature set point shall be set based on outside air dry bulb temperature according to the linear reset schedule.

PRIMARY CHILLED WATER PUMP CONTROL

1. The primary chilled water pumps shall be configured in a lead/lag/standby configuration, corresponding to the lead/lag/standby configuration of the chillers, although staging of the pumps does not necessarily correlate with staging of the chillers. When Chiller #1 is lead, pump #1 is lead; when Chiller #2 is lead, pump #2 is lead; when Chiller #3 is lead, pump #6 is lead; when Chiller #4 is lead, pump #8 is lead.
2. The lead primary pump shall run continuously.
3. Loop differential pressures for each of the four primary loops shall be installed at the most remote building served by the loop, before the building pump(s). Differential pressures at the end of each loop will be compared to their setpoints on a continual basis. The differential pressure that is lowest relative to its setpoint shall be used as feedback to control the speed of the primary chilled water pump(s).
4. When the speed of the operating pump(s) exceeds 95% for 15 minutes, another pump shall stage on, and the pump speeds shall be the same for all operating pumps.
5. When the speed of two or more operating pumps falls below 30% for 15 minutes, the lag pump shall turn off.

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ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
DMP	DMP	JS		09/10/12

Existing: Chiller 2

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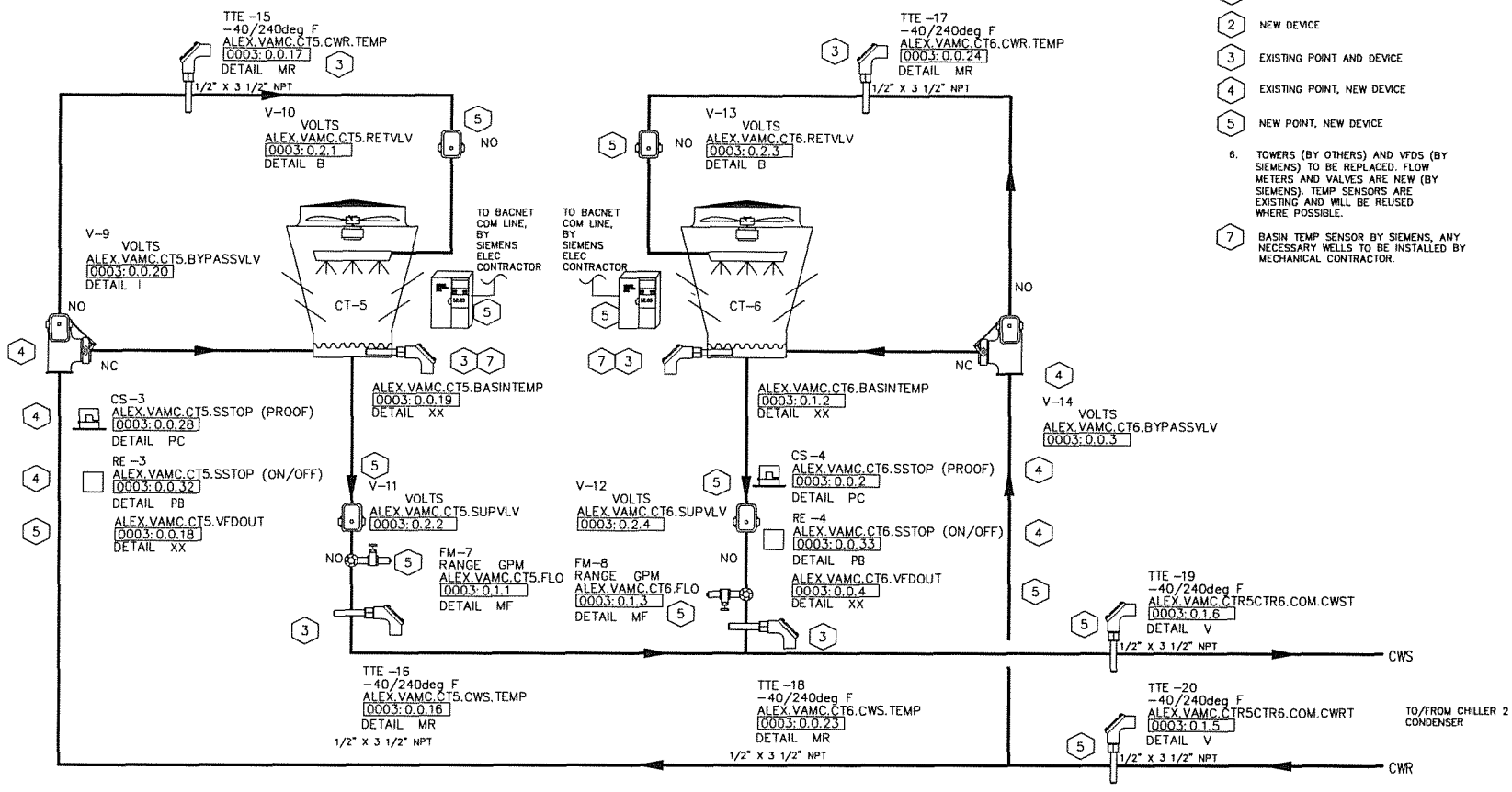

INSTALLATION NOTES:

1. EXISTING DEVICE
2. NEW DEVICE
3. EXISTING POINT AND DEVICE
4. EXISTING POINT, NEW DEVICE
5. NEW POINT, NEW DEVICE
6. TOWERS (BY OTHERS) AND VFDS (BY SIEMENS) TO BE REPLACED. FLOW METERS AND VALVES ARE NEW (BY SIEMENS). TEMP SENSORS ARE EXISTING AND WILL BE REUSED WHERE POSSIBLE.
7. BASIN TEMP SENSOR BY SIEMENS, ANY NECESSARY WELLS TO BE INSTALLED BY MECHANICAL CONTRACTOR.

REF#	FIELD PANEL NAME	FIELD PANEL NODE NAME
0003	BACDev_71472	Alex.VAMC.Chiller2

REVISION HISTORY

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VA Chiller Project
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DMP	DMP	JS	08/13/12	09/11/12

Replacement: Tower 5 & 6

440P-116804

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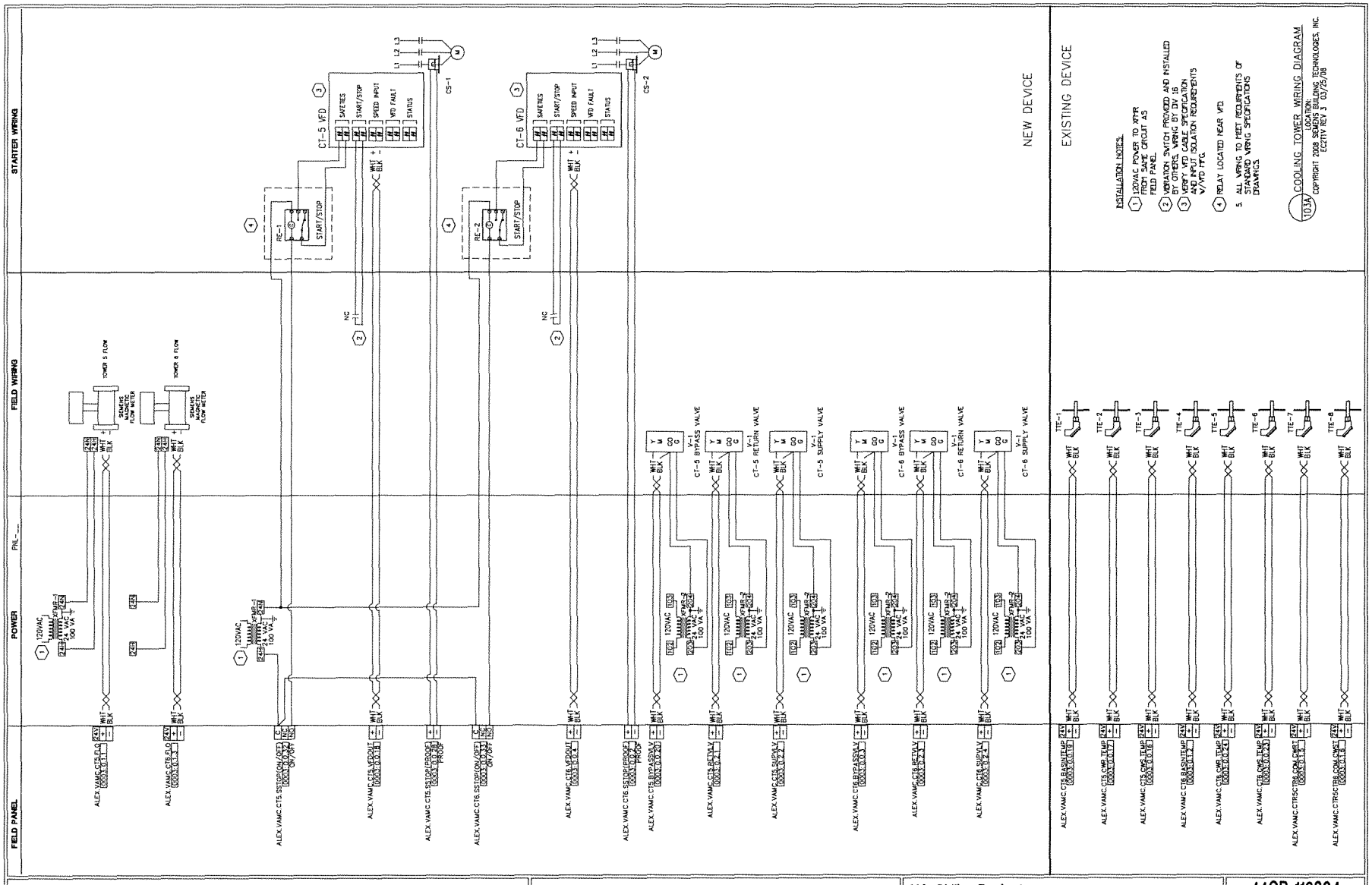

REVISION HISTORY

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ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
DMP	DMP	JS	08/13/12	09/11/12

Replacement: Tower 5 & 6

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
CS 3-4	2	H908	VERIS	1006cut005	CURRENT SW SPLITCORE-ADJ W/LED
FM 7-8	2	SIEMENS MAG MTR	N/A	N/A	N/A
RE 3-4	2	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
TTE 15-20	6	544-577-25	SIEMENS	149261	IMMWELL SNSR, PT 1K OHM, (375),2.5" LGTH
V					SEE VALVE SUBMITTAL

CONDENSER WATER PUMP CONTROL

1. When a chiller is staged on, its corresponding condenser water pump shall be brought on.
2. The speed of each condenser water pump shall be controlled based on a combination of leaving condenser water temperature and existing load of the chiller to ensure optimum efficiency of the chiller.
3. The speed of each pump shall never fall below the value required to maintain minimum flow through the condenser of the chiller served as measured by a flow meter for each condenser.

COOLING TOWER STAGING

1. The cooling towers shall be configured in a lead/lag/standby configuration, and shall employ a common header system and be able to stage independent of the chiller systems based on total condenser load.
2. To the extent possible, lead/lag/standby determination shall ensure that the most efficient operational arrangement is being employed for the current load demand.
3. The lead cooling tower shall be enabled whenever a chiller is enabled.
4. The maximum number of cooling towers that can be enabled at any time will be determined based on the minimum flow requirements for each tower and the total condenser water flow as sensed by flow meters installed for each condenser.
5. When a tower is enabled, its isolation valves will open, and its bypass valve shall modulate to maintain condenser water temperature two degrees (adj.) below setpoint. If the bypass valve is fully open (flow to the tower) for five minutes (adj.) and condenser water temperature is above setpoint, the next tower in sequence will be enabled. This process is repeated as needed until the maximum number of cooling towers are enabled for the current condenser water flow rate.
6. When the maximum number of towers are enabled for a given condenser water flow rate, the bypass valves for all towers are fully open, and condenser water temperature exceeds its setpoint by two degrees (adj.), the lead tower fan shall turn on at minimum speed.
7. After the tower fan has been on at minimum speed for at least five minutes (adj.), if condenser water temperature exceeds its setpoint by two degrees (adj.), the next tower fan in sequence shall turn on at minimum speed. This process is repeated as needed until the fans of all enabled towers are on at minimum speed.
8. Once the fans of all enabled cooling towers are on at minimum speed, the VFD speeds shall begin to modulate in unison to maintain the condenser water at its setpoint.
9. With all operating fans at minimum speed, should condenser water temperature fall two degrees (adj.) below setpoint for five minutes (adj.), the lag fan shall turn off.
10. With all fans off on enabled towers, the bypass valve of the lag tower shall control to maintain condenser water temperature two degrees below setpoint. All other tower bypass valves shall remain fully open to tower flow.
11. When the lag tower bypass valve has fully closed for five minutes (adj.), the lag tower shall be disabled and its isolation valves closed. This process is repeated as needed until only one tower is in operation.

CONDENSER WATER TEMPERATURE CONTROL

1. During normal chiller operation, condenser water supply temperature setpoint shall be reset based on outside air wet bulb temperature and current chiller load.
2. The condenser water temperature shall preferably be measured downstream of the cooling towers, and shall be an average of multiples sensors installed in the main header before it branches to the four chillers. Any significant discrepancies in these multiple sensors shall send an alarm that calibration is needed.

REVISION HISTORY

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Alexandria, LA

ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
DMP	DMP	JS		09/10/12

Replacement: Tower 5 & 6

440P-116804
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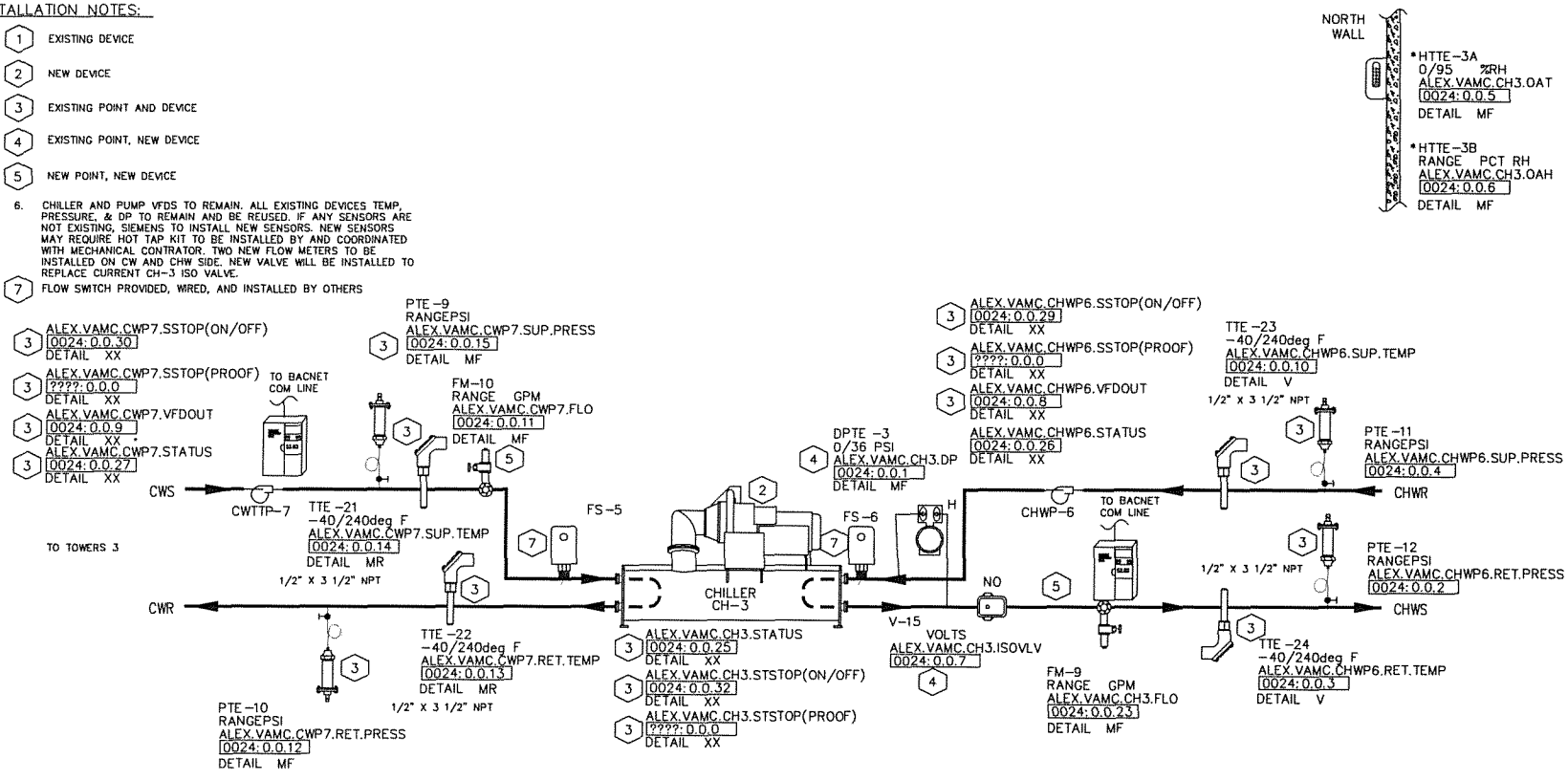
INSTALLATION NOTES:

1. EXISTING DEVICE
2. NEW DEVICE
3. EXISTING POINT AND DEVICE
4. EXISTING POINT, NEW DEVICE
5. NEW POINT, NEW DEVICE

6. CHILLER AND PUMP VFDS TO REMAIN. ALL EXISTING DEVICES TEMP, PRESSURE, & DP TO REMAIN AND BE REUSED. IF ANY SENSORS ARE NOT EXISTING, SIEMENS TO INSTALL NEW SENSORS. NEW SENSORS MAY REQUIRE HOT TAP KIT TO BE INSTALLED BY AND COORDINATED WITH MECHANICAL CONTRATOR. TWO NEW FLOW METERS TO BE INSTALLED ON CW AND CHW SIDE. NEW VALVE WILL BE INSTALLED TO REPLACE CURRENT CH-3 ISO VALVE.

7. FLOW SWITCH PROVIDED, WIRED, AND INSTALLED BY OTHERS



REF #	FIELD PANEL NAME	FIELD PANEL NODE NAME
0024	BACDev_71473	Alex.VAMC.Chiller3

REVISION HISTORY

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ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
DMP	DMP	JS	08/13/12	09/11/12

Existing: Chiller 3

440P-116804
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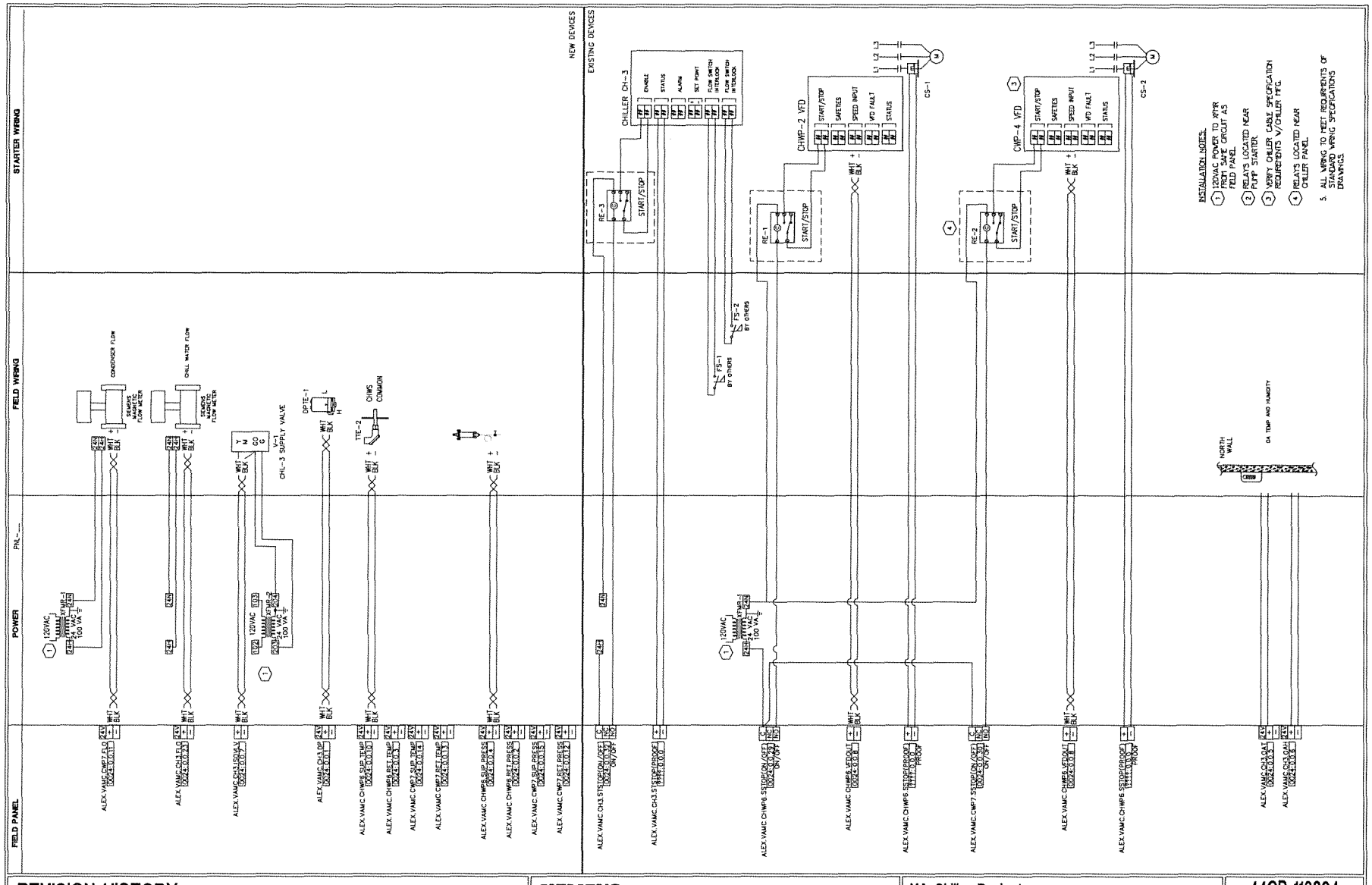

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DMP	DMP	JS	08/13/12	09/11/12

Existing: Chiller 3

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
CHWP 6	1	N/A	N/A	N/A	N/A
CWTT 7	1	N/A	N/A	N/A	N/A
DPTE 3	1	2024D3A12A2S1B4	N/A	N/A	N/A
FM 9-10	2	SIEMENS MAG MTR	N/A	N/A	N/A
FS 6	1	BY OTHERS	N/A	N/A	N/A
FS 9	1	BY OTHERS	N/A	N/A	N/A
PTE 9-12	4	2091025PG2M1102	SETRA	0608cut004	PRES TRANS,25PSI,4-20MA,2'CBL
TTE 21-24	4	544-577-25	SIEMENS	149261	IMMWELL SNSR, PT 1K OHM, (375),2.5" LGTH
V					SEE VALVE SUBMITTAL

CHILLER STAGING

1. The chillers shall be configured in a lead/lag/standby configuration.
2. Lead/lag/standby determination shall ensure that the most efficient operational arrangement is being employed for the current campus load.
3. A stage-on setpoint and a stage-off setpoint shall be determined based on the chiller(s) operating and the next chiller in line to maintain the chillers operating in their most efficient range to the extent possible. This should be based on campus load (tons), % run load amps of the chiller(s), and efficiency curves of the chillers in consideration.
4. After 15 minutes of any of the following conditions, the next chiller in sequence shall stage on: stage-on setpoint is exceeded (as per above description), or total loop flow exceeding the combined maximum allowable flow of the operating chiller(s), or the chilled water supply temperature exceeding its setpoint by two degrees or more.
5. A temporary demand limit may be needed on the operating chiller(s) upon a call for another chiller to stage on to reduce shock to the system.
6. Should multiple chillers operate at less than respective stage-off setpoint for more than 15 minutes, the lag chiller shall be staged off.
7. The chillers shall load and unload equally

CHILLER FLOW CONTROL

1. When a chiller is off, its isolation/flow regulating valve shall be fully closed.
2. Upon call for a chiller to run, its isolation/flow regulating valve shall open gradually in accordance with flow change rate capabilities of each operating chiller.
3. Upon a call for a chiller to stage off, its isolation/flow regulating valve shall close gradually in accordance with flow change rate capabilities of each operating chiller.
4. Flow rate through each chiller is measured with a flow meter.
5. If readings of water flow and pressure differential are available for each evaporator, cross-reference both readings and provide warning for calibration when necessary.
6. Only when minimum flow is detected through the chiller evaporator shall the chiller stage on.
7. The isolation/flow regulating valve for each chiller shall be capable of modulating to assist in regulating minimum and maximum flows through the chiller and to ensure equal loading among operating machines. Never at any time should all valves on operating chillers be less than 100% open, nor should any valve on an operating chiller ever fall below 50% open (adj.). Modulation of these valves shall be gradual to avoid quick changes in flow through any machine.
8. When flow through any operating chiller falls below its minimum allowable flow rate, the bypass valve will modulate in order to ensure minimum flow to all operating chillers.

CHILLED WATER TEMPERATURE CONTROL

1. The chillers shall operate to maintain the plant chilled water supply temperature at its set point. The plant chilled water supply temperature shall be from a sensor installed in the main header before it branches to the four loops.
2. During normal operation, the supply temperature set point shall be set based on outside air dry bulb temperature according to the linear reset schedule.

PRIMARY CHILLED WATER PUMP CONTROL

1. The primary chilled water pumps shall be configured in a lead/lag/standby configuration, corresponding to the lead/lag/standby configuration of the chillers, although staging of the pumps does not necessarily correlate with staging of the chillers. When Chiller #1 is lead, pump #1 is lead; when Chiller #2 is lead, pump #2 is lead; when Chiller #3 is lead, pump #6 is lead; when Chiller #4 is lead, pump #8 is lead.
2. The lead primary pump shall run continuously.
3. Loop differential pressures for each of the four primary loops shall be installed at the most remote building served by the loop, before the building pump(s). Differential pressures at the end of each loop will be compared to their setpoints on a continual basis. The differential pressure that is lowest relative to its setpoint shall be used as feedback to control the speed of the primary chilled water pump(s).
4. When the speed of the operating pump(s) exceeds 95% for 15 minutes, another pump shall stage on, and the pump speeds shall be the same for all operating pumps.
5. When the speed of two or more operating pumps falls below 30% for 15 minutes, the lag pump shall turn off.

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VA Chiller Project
Alexandria, LA

ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
DMP	DMP	JS		09/10/12

Existing: Chiller 3

440P-116804
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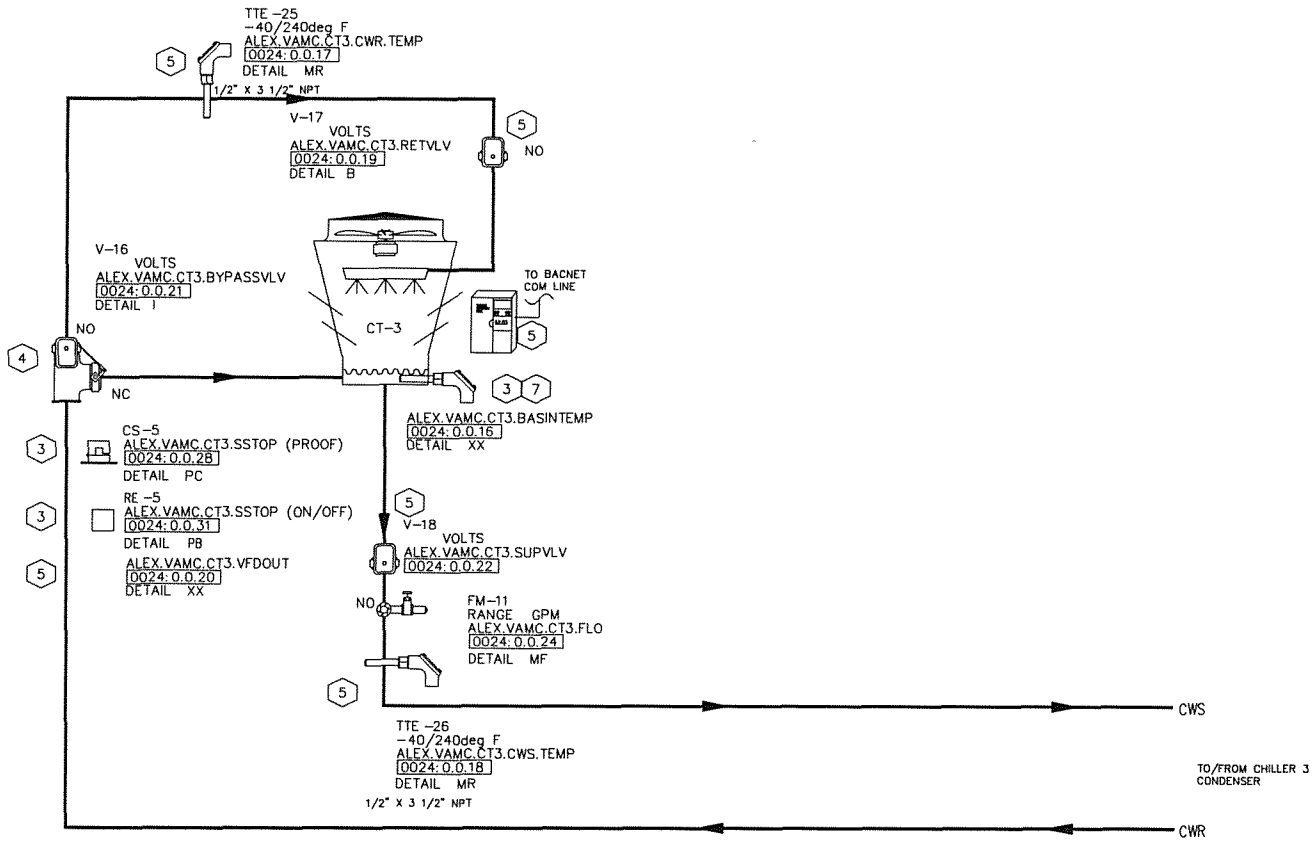

INSTALLATION NOTES:

1. EXISTING DEVICE
2. NEW DEVICE
3. EXISTING POINT AND DEVICE
4. EXISTING POINT, NEW DEVICE
5. NEW POINT, NEW DEVICE

6. TOWER AND VFD IS EXISTING. FLOW METER AND SUPPLY AND RETURN VALVES ARE NEW (BY SIEMENS). BYPASS VALVE IS EXISTING. TEMP SENSORS THAT ARE EXISTING WILL BE REUSED WHERE POSSIBLE. NEW TEMP SENSORS MAY REQUIRE HOT TAP TO INSTALL SINCE TOWER IS EXISTING. WILL COORDINATE WITH MECH CONTRACTOR.

7. FLOW SWITCH PROVIDED, WIRED, AND INSTALLED BY OTHERS

REF#	FIELD PANEL NAME	FIELD PANEL NODE NAME
0024	BACDev_71473	Alex.VAMC.Chiller3

REVISION HISTORY

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VA Chiller Project
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ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
DMP	DMP	JS	08/13/12	09/11/12

Existing: Tower 3

44OP-116804
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105

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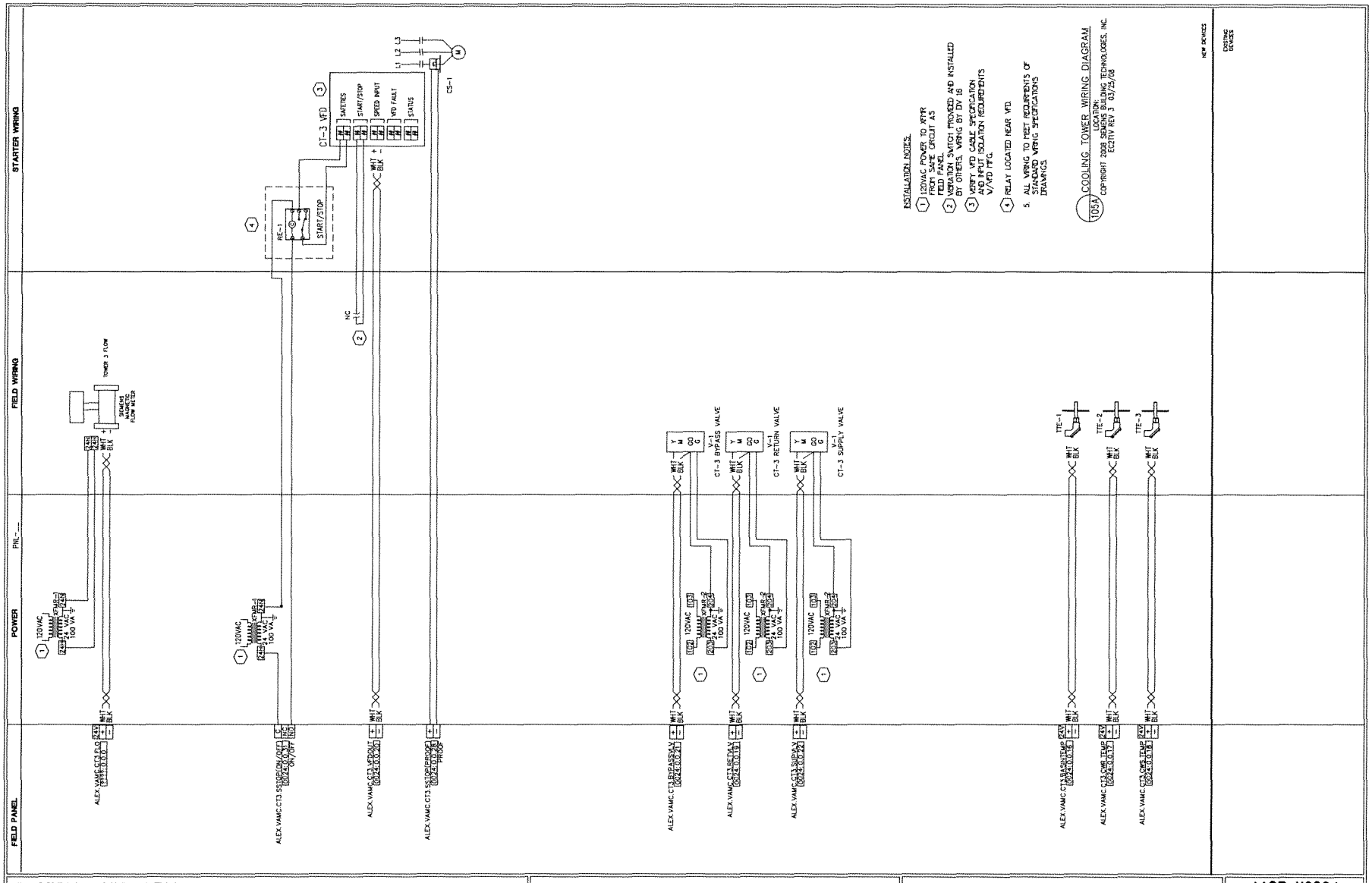

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ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
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Existing: Tower 3

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
CS 5	1	H908	VERIS	1006cut005	CURRENT SW SPLITCORE-ADJ W/LED
FM 11	1	SIEMENS MAG MTR	N/A	N/A	N/A
RE 5	1	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
TTE 25-26	2	544-577-25	SIEMENS	149261	IMMWELL SNSR, PT 1K OHM, (375),2.5" LGTH
V					SEE VALVE SUBMITTAL

CONDENSER WATER PUMP CONTROL

1. When a chiller is staged on, its corresponding condenser water pump shall be brought on.
2. The speed of each condenser water pump shall be controlled based on a combination of leaving condenser water temperature and existing load of the chiller to ensure optimum efficiency of the chiller.
3. The speed of each pump shall never fall below the value required to maintain minimum flow through the condenser of the chiller served as measured by a flow meter for each condenser.

COOLING TOWER STAGING

1. The cooling towers shall be configured in a lead/lag/standby configuration, and shall employ a common header system and be able to stage independent of the chiller systems based on total condenser load.
2. To the extent possible, lead/lag/standby determination shall ensure that the most efficient operational arrangement is being employed for the current load demand.
3. The lead cooling tower shall be enabled whenever a chiller is enabled.
4. The maximum number of cooling towers that can be enabled at any time will be determined based on the minimum flow requirements for each tower and the total condenser water flow as sensed by flow meters installed for each condenser.
5. When a tower is enabled, its isolation valves will open, and its bypass valve shall modulate to maintain condenser water temperature two degrees (adj.) below setpoint. If the bypass valve is fully open (flow to the tower) for five minutes (adj.) and condenser water temperature is above setpoint, the next tower in sequence will be enabled. This process is repeated as needed until the maximum number of cooling towers are enabled for the current condenser water flow rate.
6. When the maximum number of towers are enabled for a given condenser water flow rate, the bypass valves for all towers are fully open, and condenser water temperature exceeds its setpoint by two degrees (adj.), the lead tower fan shall turn on at minimum speed.
7. After the tower fan has been on at minimum speed for at least five minutes (adj.), if condenser water temperature exceeds its setpoint by two degrees (adj.), the next tower fan in sequence shall turn on at minimum speed. This process is repeated as needed until the fans of all enabled towers are on at minimum speed.
8. Once the fans of all enabled cooling towers are on at minimum speed, the VFD speeds shall begin to modulate in unison to maintain the condenser water at its setpoint.
9. With all operating fans at minimum speed, should condenser water temperature fall two degrees (adj.) below setpoint for five minutes (adj.), the lag fan shall turn off.
10. With all fans off on enabled towers, the bypass valve of the lag tower shall control to maintain condenser water temperature two degrees below setpoint. All other tower bypass valves shall remain fully open to tower flow.
11. When the lag tower bypass valve has fully closed for five minutes (adj.), the lag tower shall be disabled and its isolation valves closed. This process is repeated as needed until only one tower is in operation.

CONDENSER WATER TEMPERATURE CONTROL

1. During normal chiller operation, condenser water supply temperature setpoint shall be reset based on outside air wet bulb temperature and current chiller load.
2. The condenser water temperature shall preferably be measured downstream of the cooling towers, and shall be an average of multiples sensors installed in the main header before it branches to the four chillers. Any significant discrepancies in these multiple sensors shall send an alarm that calibration is needed.

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ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
DMP	DMP	JS		09/10/12

Existing: Tower 3

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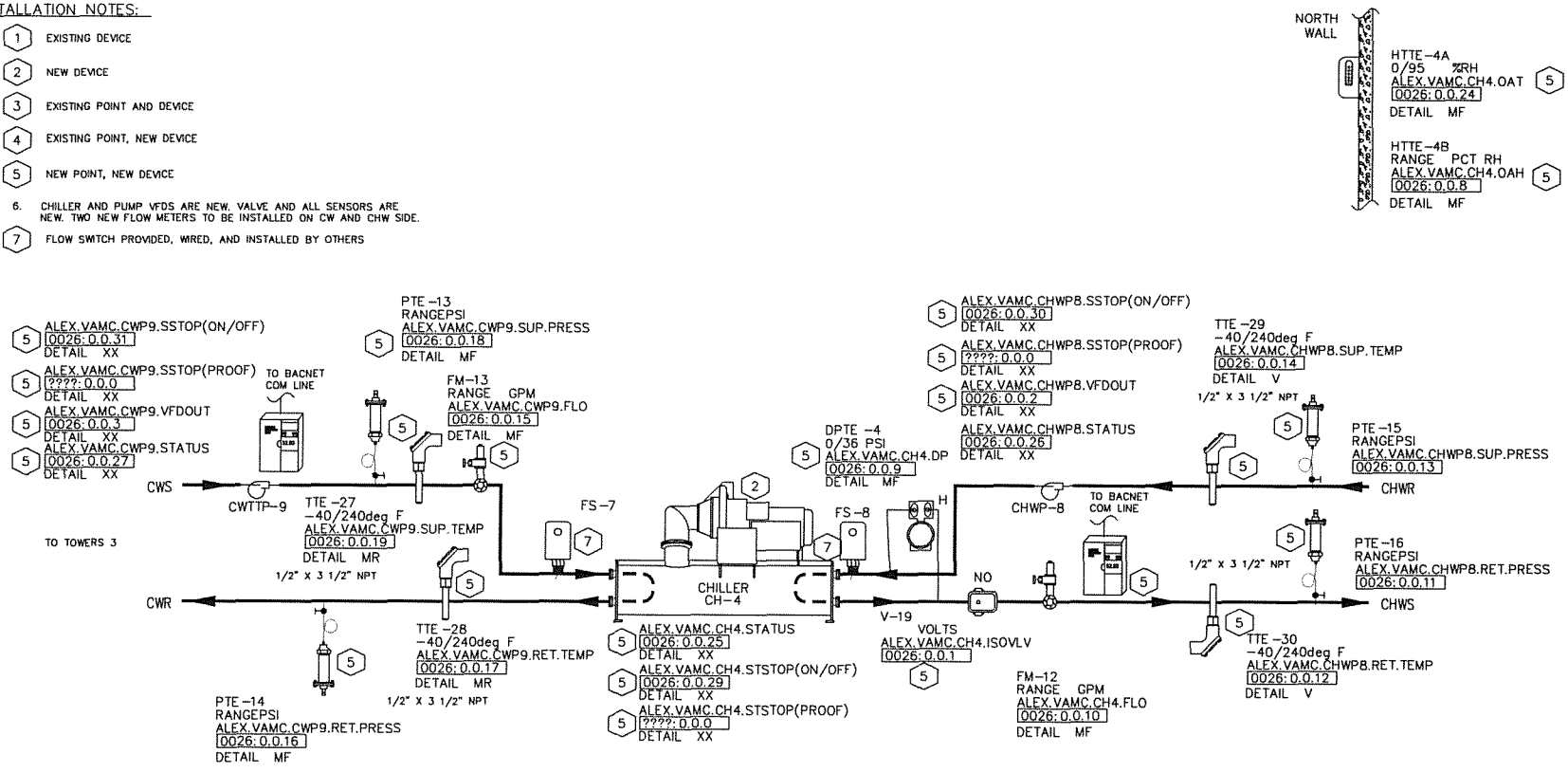
INSTALLATION NOTES:

1. EXISTING DEVICE
2. NEW DEVICE
3. EXISTING POINT AND DEVICE
4. EXISTING POINT, NEW DEVICE
5. NEW POINT, NEW DEVICE

6. CHILLER AND PUMP VFDS ARE NEW. VALVE AND ALL SENSORS ARE NEW. TWO NEW FLOW METERS TO BE INSTALLED ON CW AND CHW SIDE.

7. FLOW SWITCH PROVIDED, WIRED, AND INSTALLED BY OTHERS



106 CHILLED WATER PIPING SYSTEM

LOCATION:
SERVES:

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EC1C1D REV 10 10/21/2009

REF#	FIELD PANEL NAME	FIELD PANEL NODE NAME
0026	BACDev_71475	Alexandria.VAMC.Chiller4.CT4

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New: Chiller 4

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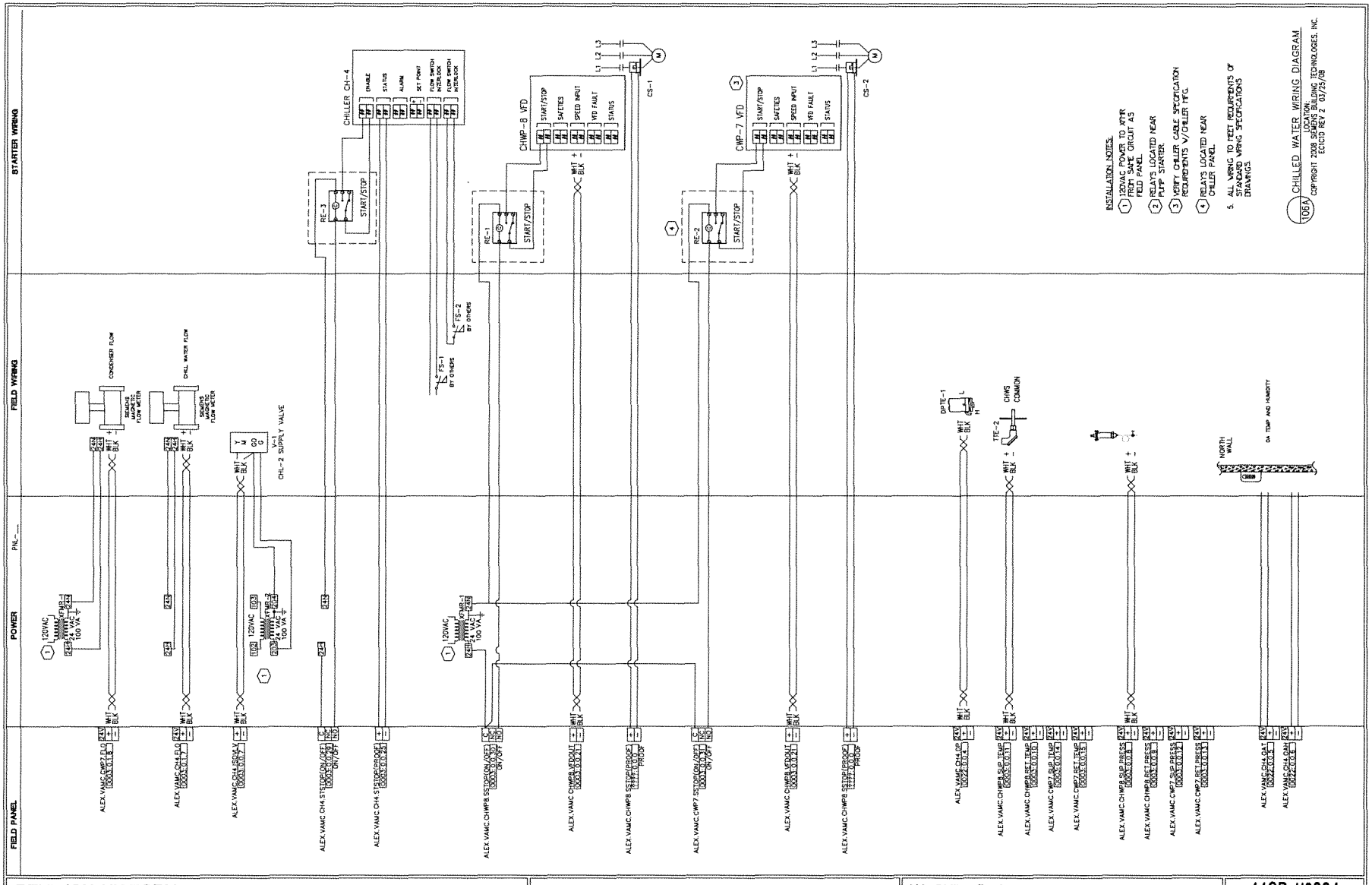

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DMP	DMP	JS	08/13/12	09/10/12

New: Chiller 4

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
CHWP 8	1	N/A	N/A	N/A	N/A
CWTT 9	1	N/A	N/A	N/A	N/A
DPTE 4	1	2301050PD2F11B	SETRA	0608cut002	DP TRANS,WET,0-50PSID,4-20MA
FM 12-13	2	SIEMENS MAG MTR	N/A	N/A	N/A
FS 7-8	2	BY OTHERS	N/A	N/A	N/A
HTTE 4A	1	QFA3160	SIEMENS	149992	RH: 0-10VDC / T: 0-10VDC
HTTE 4B	1	SAME AS HTTE-4A	N/A	N/A	N/A
PTE 13-16	4	2091025PG2M1102	SETRA	0608cut004	PRES TRANS,25PSI,4-20MA,2'CBL
TTE 27-30	4	544-577-25	SIEMENS	149261	IMMWELL SNSR, PT 1K OHM, (375),2.5" LGTH
V					SEE VALVE SUBMITTAL

CHILLER STAGING

1. The chillers shall be configured in a lead/lag/standby configuration.
2. Lead/lag/standby determination shall ensure that the most efficient operational arrangement is being employed for the current campus load.
3. A stage-on setpoint and a stage-off setpoint shall be determined based on the chiller(s) operating and the next chiller in line to maintain the chillers operating in their most efficient range to the extent possible. This should be based on campus load (tons), % run load amps of the chiller(s), and efficiency curves of the chillers in consideration.
4. After 15 minutes of any of the following conditions, the next chiller in sequence shall stage on: stage-on setpoint is exceeded (as per above description), or total loop flow exceeding the combined maximum allowable flow of the operating chiller(s), or the chilled water supply temperature exceeding its setpoint by two degrees or more.
5. A temporary demand limit may be needed on the operating chiller(s) upon a call for another chiller to stage on to reduce shock to the system.
6. Should multiple chillers operate at less than respective stage-off setpoint for more than 15 minutes, the lag chiller shall be staged off.
7. The chillers shall load and unload equally

CHILLER FLOW CONTROL

1. When a chiller is off, its isolation/flow regulating valve shall be fully closed.
2. Upon call for a chiller to run, its isolation/flow regulating valve shall open gradually in accordance with flow change rate capabilities of each operating chiller.
3. Upon a call for a chiller to stage off, its isolation/flow regulating valve shall close gradually in accordance with flow change rate capabilities of each operating chiller.
4. Flow rate through each chiller is measured with a flow meter.
5. If readings of water flow and pressure differential are available for each evaporator, cross-reference both readings and provide warning for calibration when necessary.
6. Only when minimum flow is detected through the chiller evaporator shall the chiller stage on.
7. The isolation/flow regulating valve for each chiller shall be capable of modulating to assist in regulating minimum and maximum flows through the chiller and to ensure equal loading among operating machines. Never at any time should all valves on operating chillers be less than 100% open, nor should any valve on an operating chiller ever fall below 50% open (adj.). Modulation of these valves shall be gradual to avoid quick changes in flow through any machine.
8. When flow through any operating chiller falls below its minimum allowable flow rate, the bypass valve will modulate in order to ensure minimum flow to all operating chillers.

CHILLED WATER TEMPERATURE CONTROL

1. The chillers shall operate to maintain the plant chilled water supply temperature at its set point. The plant chilled water supply temperature shall be from a sensor installed in the main header before it branches to the four loops.
2. During normal operation, the supply temperature set point shall be set based on outside air dry bulb temperature according to the linear reset schedule.

PRIMARY CHILLED WATER PUMP CONTROL

1. The primary chilled water pumps shall be configured in a lead/lag/standby configuration, corresponding to the lead/lag/standby configuration of the chillers, although staging of the pumps does not necessarily correlate with staging of the chillers. When Chiller #1 is lead, pump #1 is lead; when Chiller #2 is lead, pump #2 is lead; when Chiller #3 is lead, pump #6 is lead; when Chiller #4 is lead, pump #8 is lead.
2. The lead primary pump shall run continuously.
3. Loop differential pressures for each of the four primary loops shall be installed at the most remote building served by the loop, before the building pump(s). Differential pressures at the end of each loop will be compared to their setpoints on a continual basis. The differential pressure that is lowest relative to its setpoint shall be used as feedback to control the speed of the primary chilled water pump(s).
4. When the speed of the operating pump(s) exceeds 95% for 15 minutes, another pump shall stage on, and the pump speeds shall be the same for all operating pumps.
5. When the speed of two or more operating pumps falls below 30% for 15 minutes, the lag pump shall turn off.

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VA Chiller Project
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DMP	DMP	JS		09/11/12

New: Chiller 4

440P-116804

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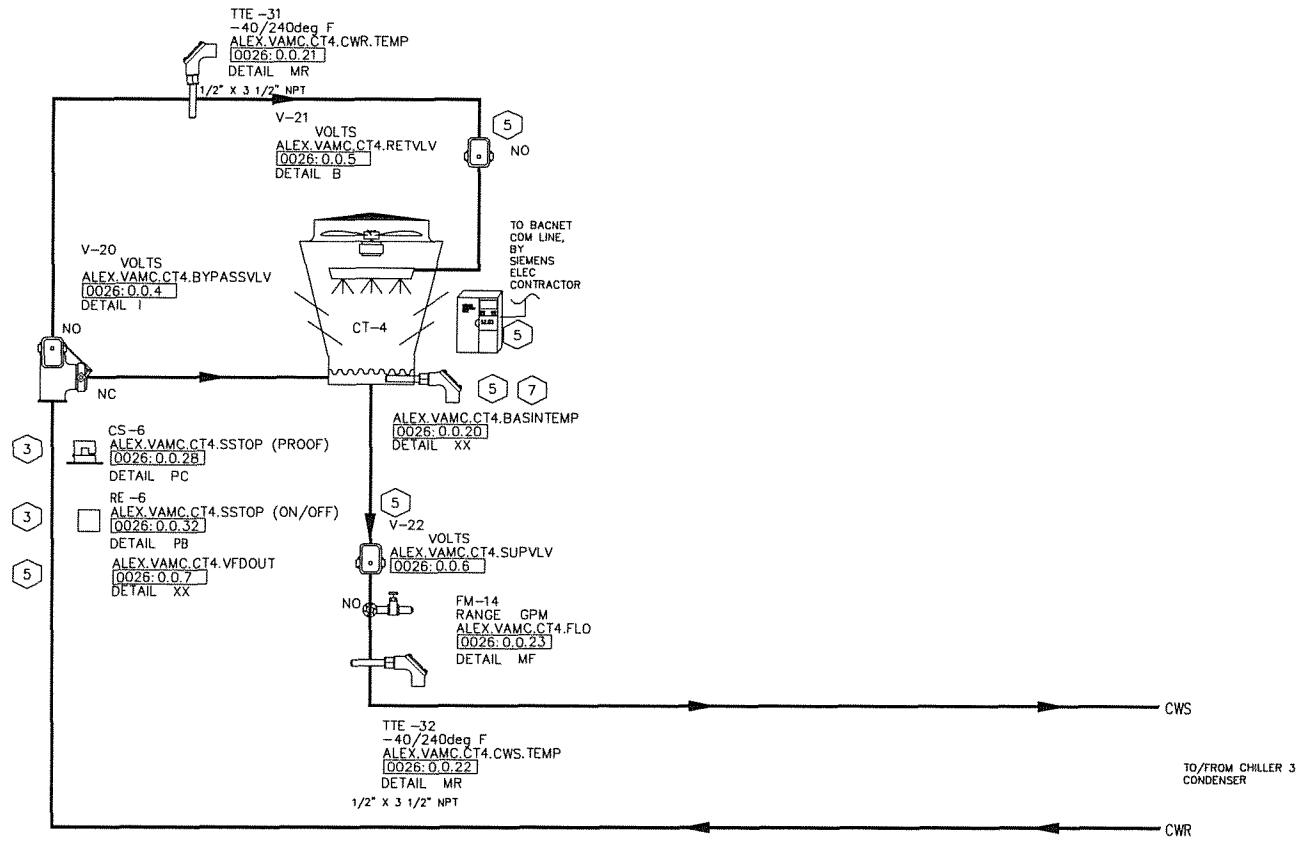

INSTALLATION NOTES:

1. EXISTING DEVICE
2. NEW DEVICE
3. EXISTING POINT AND DEVICE
4. EXISTING POINT, NEW DEVICE
5. NEW POINT, NEW DEVICE

6. TOWER IS NEW (BY OTHERS). ALL VFDS, VALVES, FLOW METERS AND SENSORS SHOWN ARE NEW AND PROVIDED BY SIEMENS.

7. BASIN TEMP SENSOR BY SIEMENS, ANY NECESSARY WELLS TO BE INSTALLED BY MECHANICAL CONTRACTOR.

REF#	FIELD PANEL NAME	FIELD PANEL NODE NAME
0026	BACDev_71475	Alexandria.VAMC.Chiller4.CT4

REVISION HISTORY

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New: Tower 4

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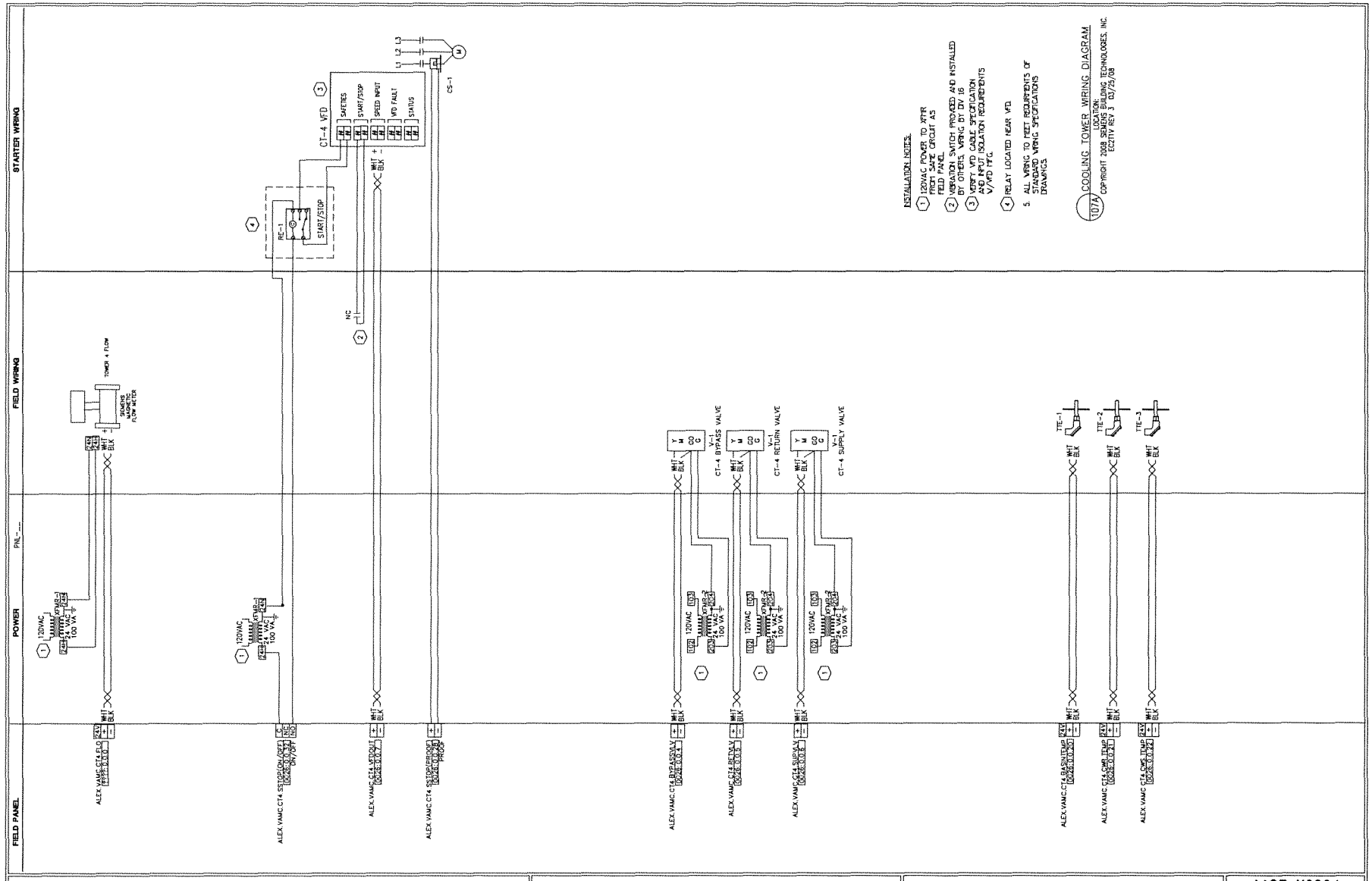
C:\JOBS\JOBS\JERRYJOBS\VAMCALEXANDRIA-REDUNDANTCHILLERPROJECT_MAY2012\440P-116804\MDT\NEW TOWER 4.DWG



INSTALLATION NOTES:

1. 120VAC POWER TO XFMR FROM SAFE CIRCUIT AS FIELD PANEL
2. VIBRATION SWITCH PROVIDED AND INSTALLED BY OTHERS, WIRING BY EW 16
3. VFD# AND CABLE SPECIFICATION AND PART ISOLATION REQUIREMENTS W/VFD MFG.
4. RELAY LOCATED NEAR VFD
5. ALL WIRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS

107A COOLING TOWER WIRING DIAGRAM

LOCATION:

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EC2TV REV 3 03/25/08

REVISION HISTORY

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VA Chiller Project
Alexandria, LA

ENGINEER	DRAFTER	CHECKED BY	INITIAL RELEASE	LAST EDIT DATE
DMP	DMP	JS	08/13/12	09/11/12

New: Tower 4

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
CS 6	1	H908	VERIS	1006cut005	CURRENT SW SPLITCORE-ADJ W/LED
FM 14	1	SIEMENS MAG MTR	N/A	N/A	N/A
RE 6	1	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
TTE 31-32	2	544-577-25	SIEMENS	149261	IMMWELL SNSR, PT 1K OHM, (375),2.5" LGTH
V					SEE VALVE SUBMITTAL

CONDENSER WATER PUMP CONTROL

1. When a chiller is staged on, its corresponding condenser water pump shall be brought on.
2. The speed of each condenser water pump shall be controlled based on a combination of leaving condenser water temperature and existing load of the chiller to ensure optimum efficiency of the chiller.
3. The speed of each pump shall never fall below the value required to maintain minimum flow through the condenser of the chiller served as measured by a flow meter for each condenser.

COOLING TOWER STAGING

1. The cooling towers shall be configured in a lead/lag/standby configuration, and shall employ a common header system and be able to stage independent of the chiller systems based on total condenser load.
2. To the extent possible, lead/lag/standby determination shall ensure that the most efficient operational arrangement is being employed for the current load demand.
3. The lead cooling tower shall be enabled whenever a chiller is enabled.
4. The maximum number of cooling towers that can be enabled at any time will be determined based on the minimum flow requirements for each tower and the total condenser water flow as sensed by flow meters installed for each condenser.
5. When a tower is enabled, its isolation valves will open, and its bypass valve shall modulate to maintain condenser water temperature two degrees (adj.) below setpoint. If the bypass valve is fully open (flow to the tower) for five minutes (adj.) and condenser water temperature is above setpoint, the next tower in sequence will be enabled. This process is repeated as needed until the maximum number of cooling towers are enabled for the current condenser water flow rate.
6. When the maximum number of towers are enabled for a given condenser water flow rate, the bypass valves for all towers are fully open, and condenser water temperature exceeds its setpoint by two degrees (adj.), the lead tower fan shall turn on at minimum speed.
7. After the tower fan has been on at minimum speed for at least five minutes (adj.), if condenser water temperature exceeds its setpoint by two degrees (adj.), the next tower fan in sequence shall turn on at minimum speed. This process is repeated as needed until the fans of all enabled towers are on at minimum speed.
8. Once the fans of all enabled cooling towers are on at minimum speed, the VFD speeds shall begin to modulate in unison to maintain the condenser water at its setpoint.
9. With all operating fans at minimum speed, should condenser water temperature fall two degrees (adj.) below setpoint for five minutes (adj.), the lag fan shall turn off.
10. With all fans off on enabled towers, the bypass valve of the lag tower shall control to maintain condenser water temperature two degrees below setpoint. All other tower bypass valves shall remain fully open to tower flow.
11. When the lag tower bypass valve has fully closed for five minutes (adj.), the lag tower shall be disabled and its isolation valves closed. This process is repeated as needed until only one tower is in operation.

CONDENSER WATER TEMPERATURE CONTROL

1. During normal chiller operation, condenser water supply temperature setpoint shall be reset based on outside air wet bulb temperature and current chiller load.
2. The condenser water temperature shall preferably be measured downstream of the cooling towers, and shall be an average of multiples sensors installed in the main header before it branches to the four chillers. Any significant discrepancies in these multiple sensors shall send an alarm that calibration is needed.

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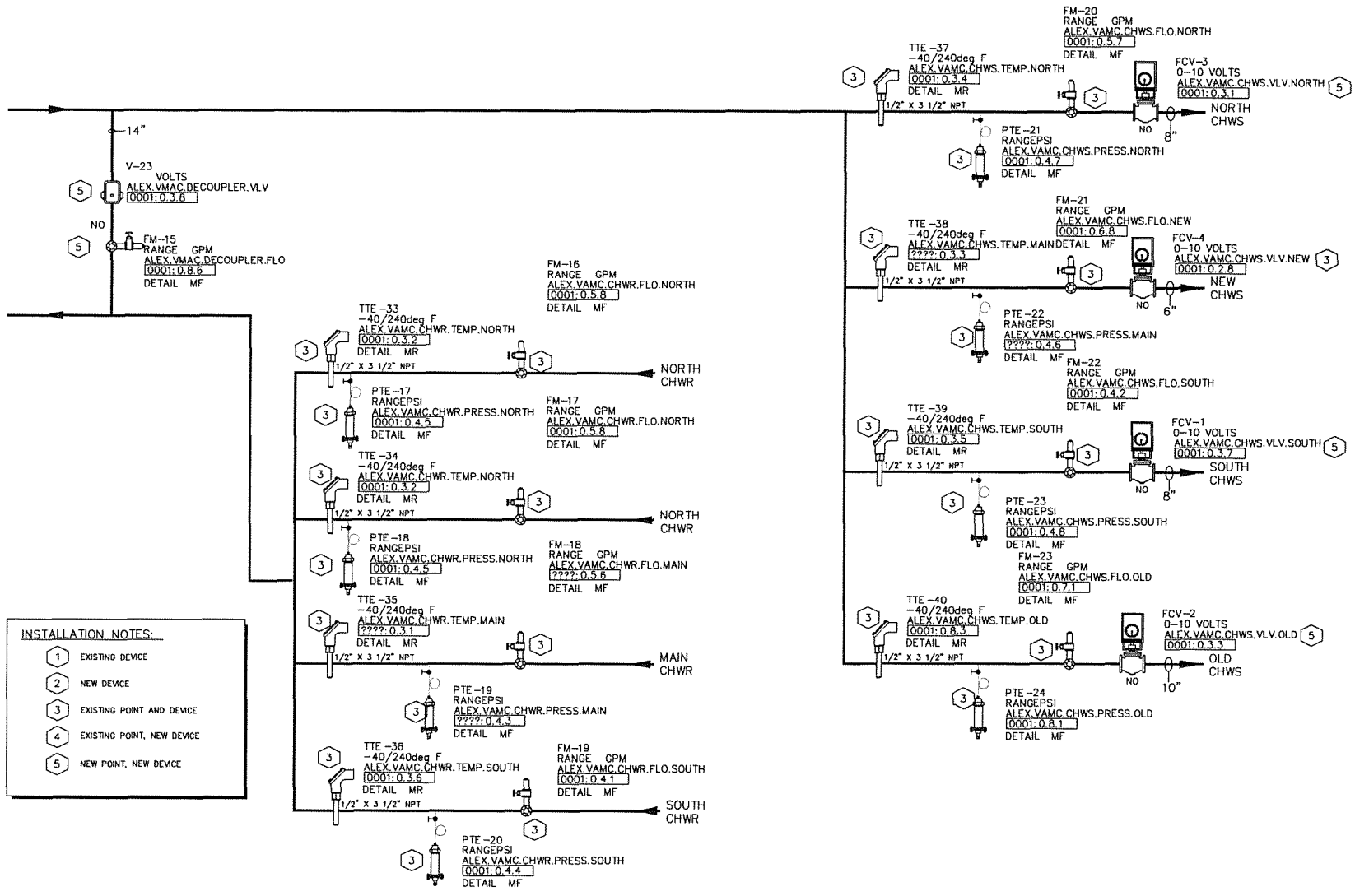

REF#	FIELD PANEL NAME	FIELD PANEL NODE NAME
0001	Alex.VAMC.CHWSYS_71470	Alex.VAMC.CHWSYS

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Decoupler and Flow Control Valves

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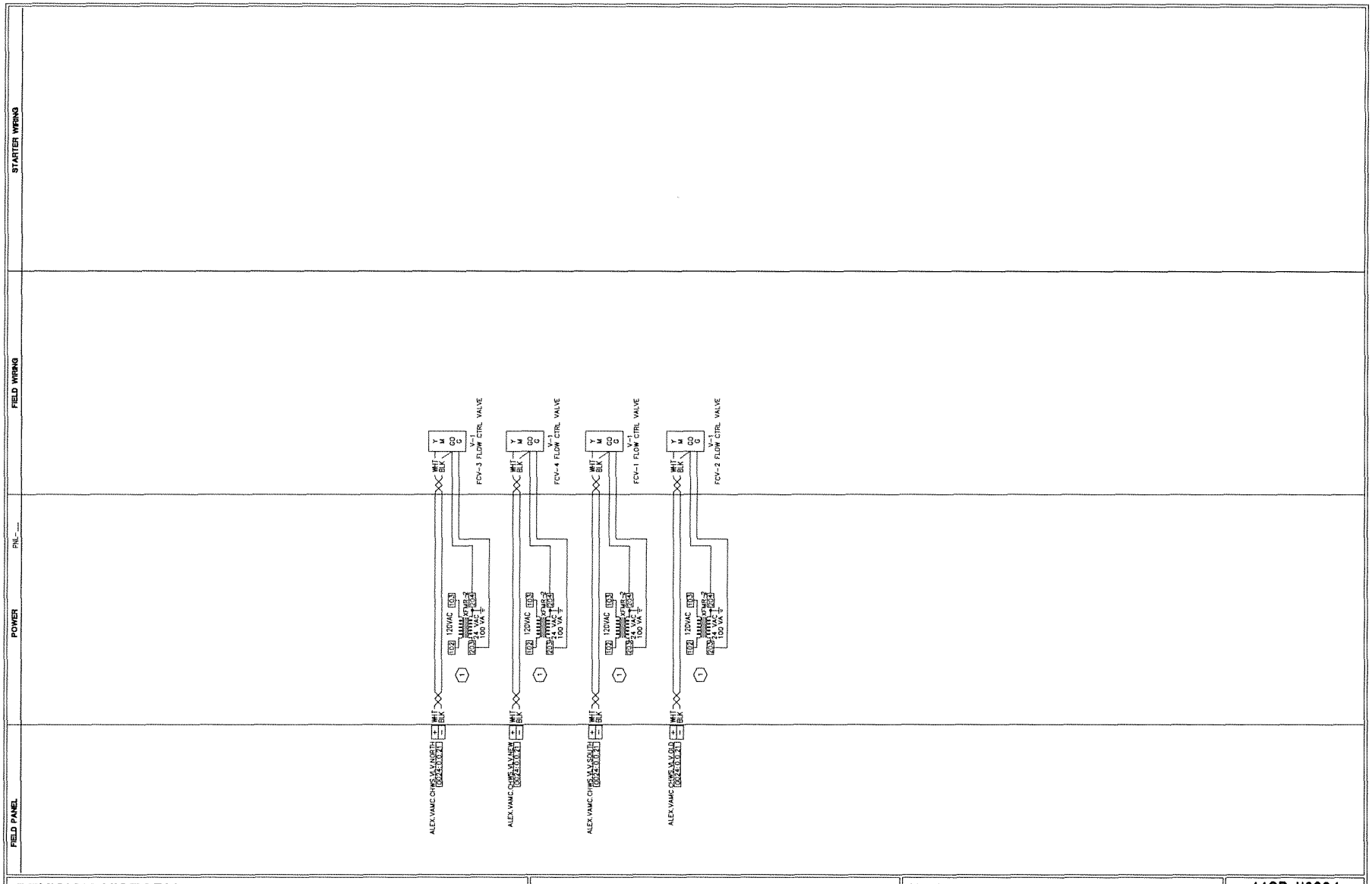

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Decoupler and Flow Control Valves

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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted Devices					
FCV 1-4	4	ZZZ	N/A	N/A	N/A
FM 15	1	SIEMENS MAG MTR	N/A	N/A	N/A
FM 16-23	8	EXISTING METER	N/A	N/A	N/A
PTE 17-24	8	ZZZ	N/A	N/A	N/A
TTE 33-40	8	544-577-25	SIEMENS	149261	IMMWELL SNSR, PT 1K OHM, (375),2.5" LGTH
V					SEE VALVE SUBMITTAL

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Decoupler and Flow Control Valves

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EXISTING POINTS TO REMAIN

ALEX.VAMC.B147.EXFAN1.SSTOP(ON/OFF)
0001:0.1.2

ALEX.VAMC.B147.EXFAN1.SSTOP(PROOF)
0001:0.6.2

ALEX.VAMC.B147.EXFAN2.SSTOP(ON/OFF)
0001:0.1.3

ALEX.VAMC.B147.EXFAN2.SSTOP(PROOF)
0001:0.6.3

ALEX.VAMC.B147.SFAN.SSTOP(ON/OFF)
0001:0.1.4

ALEX.VAMC.B147.SFAN.SSTOP(PROOF)
0001:0.6.4

ALEX.VAMC.PMP5.SSTOP(ON/OFF)
0001:0.1.5

ALEX.VAMC.PMP5.SSTOP(PROOF)
0001:0.6.5

ALEX.VAMC.PMP5.RET.PRESS
0001:0.5.2

ALEX.VAMC.PMP5.SUP.PRESS
0001:0.5.3

ALEX.VAMC.PUMP5.RTEMP
0001:0.7.4

ALEX.VAMC.PUMP5.STEMP
0001:0.7.5

ALEX.VAMC.B147.CTRLAIR
0021:0.1.2

ALEX.VAMC.B147.REFMON.PPM
0021:0.6.2

ALEX.VAMC.B147.REFMON.STATUS
0001:0.7.8

REF#	FIELD PANEL NAME	FIELD PANEL NODE NAME
0001	Alex.VAMC.CHWSYS_71470	Alex.VAMC.CHWSYS

REVISION HISTORY

1	4/30/2012	DMP	AS BUILT DRAWING

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Existing Plant Points

440P-116804

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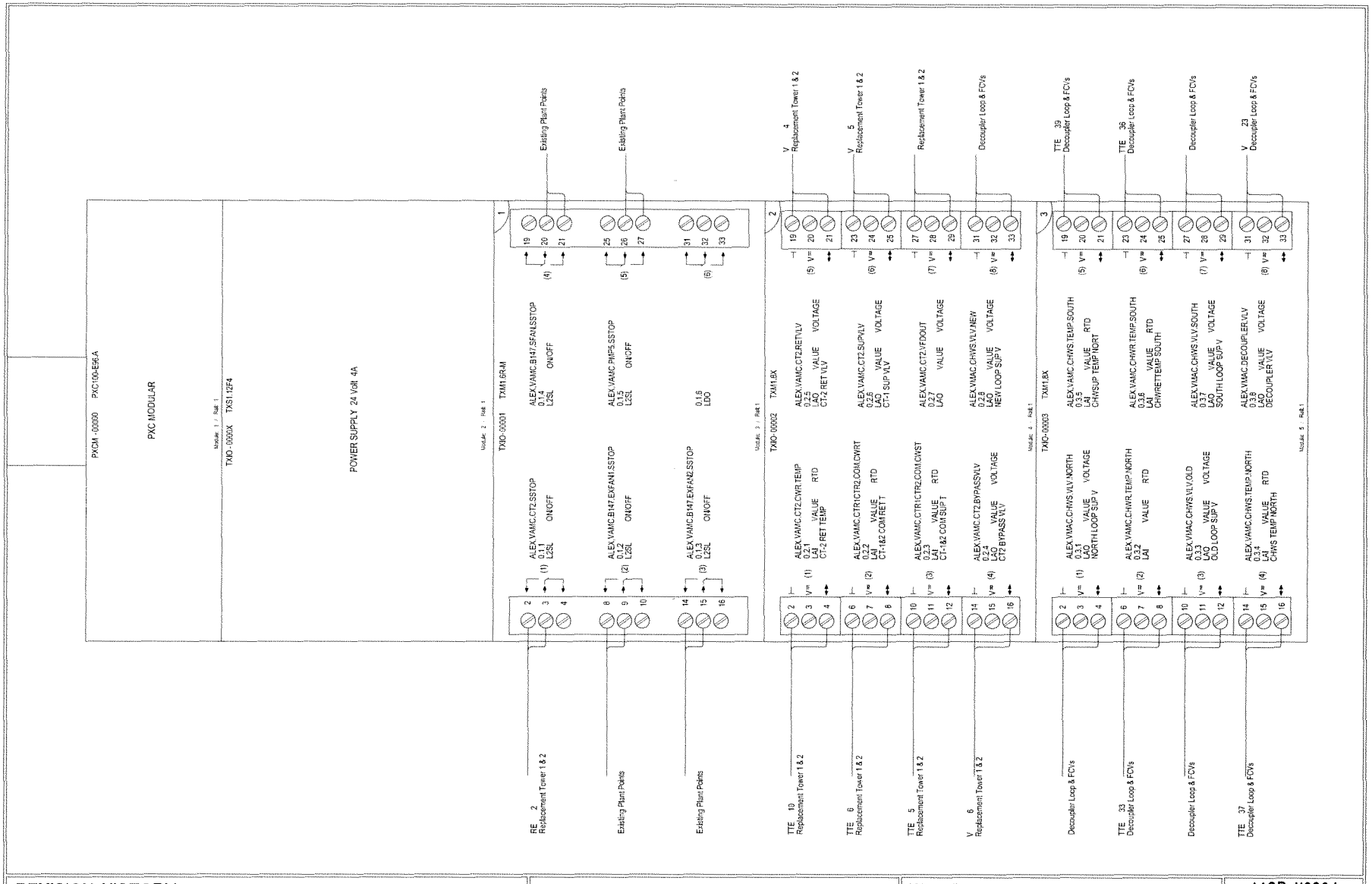

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	Siemens Industry Inc Landis Division 104 Annonce St. Lafayette, La. 70507 USA Phone: (337) 233-7431 Fax: (337) 233-7518	ENGINEER: DMP · DRAFTER: DMP · CHECKED BY: JS · INITIAL RELEASE: 08/13/12 · LAST EDIT DATE: 09/10/12 Plant CHW System	900

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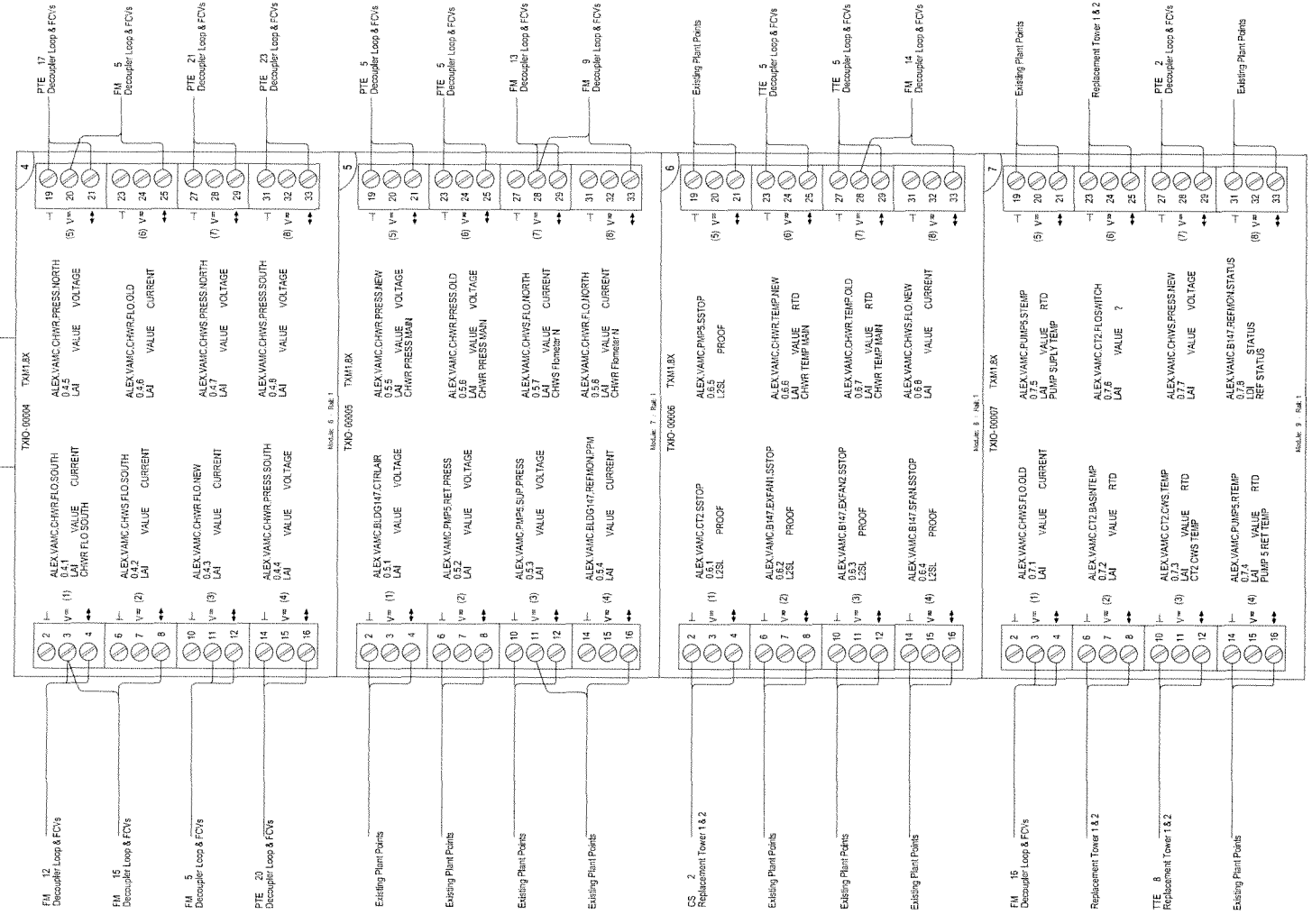

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Alex.VAMC.CHWSYS_71470p002

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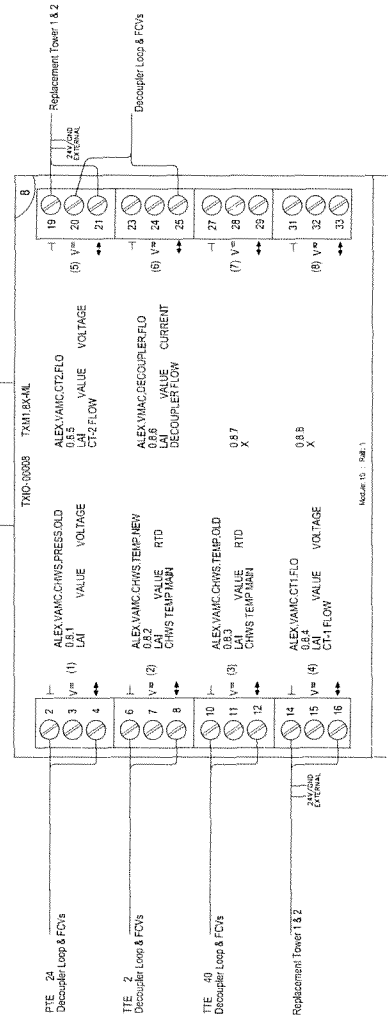

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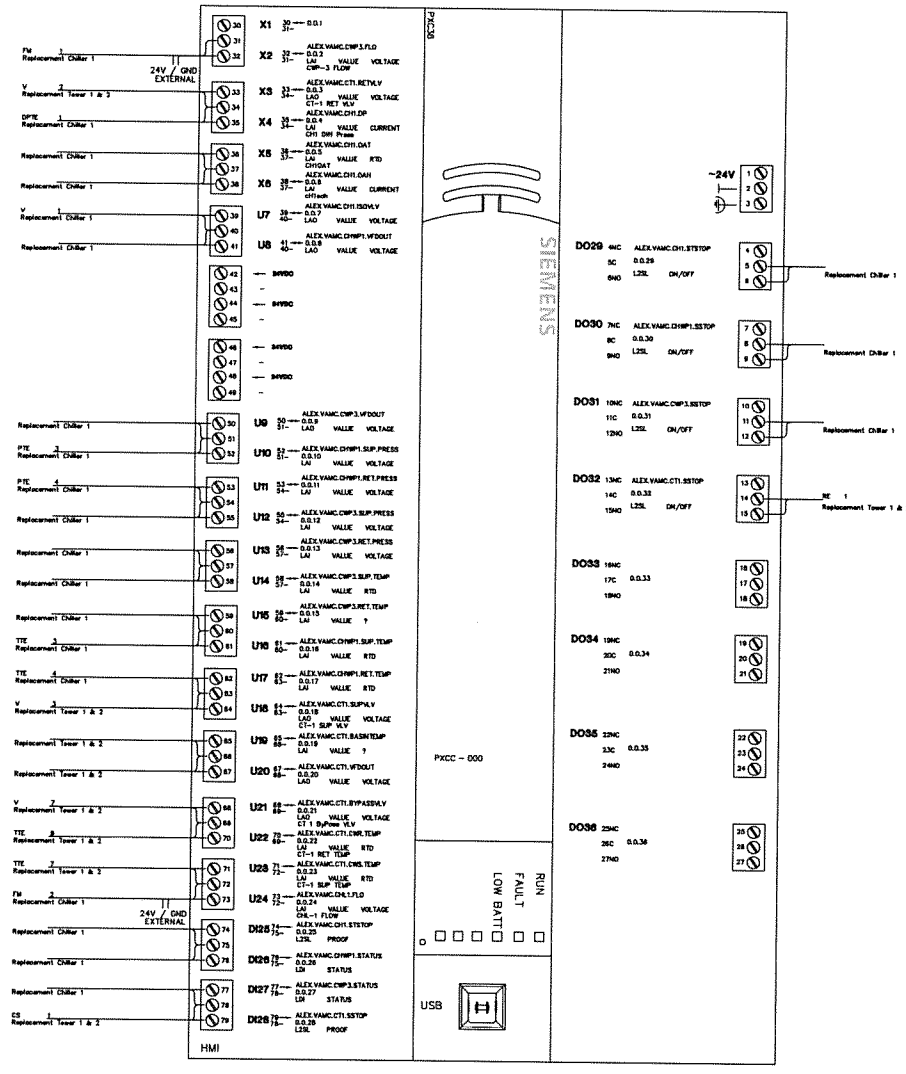

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Chiller1 (B147)

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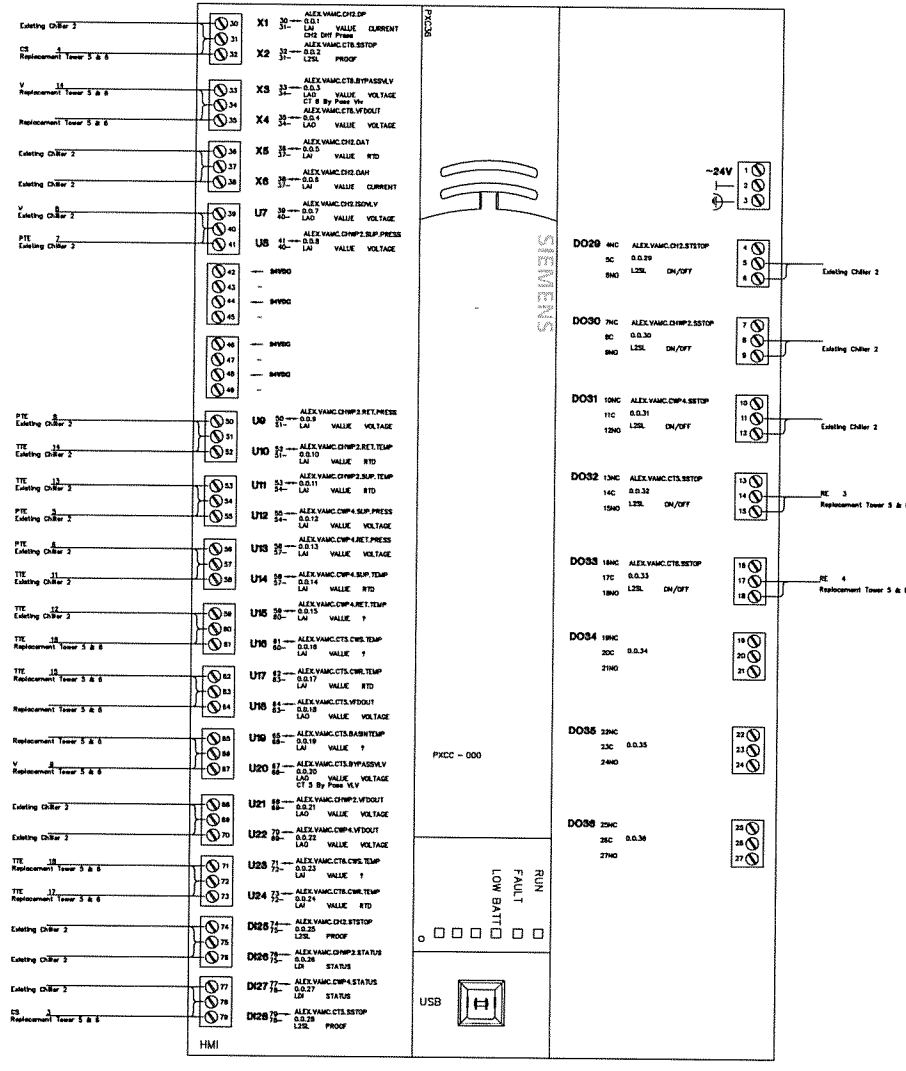

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Chiller 2

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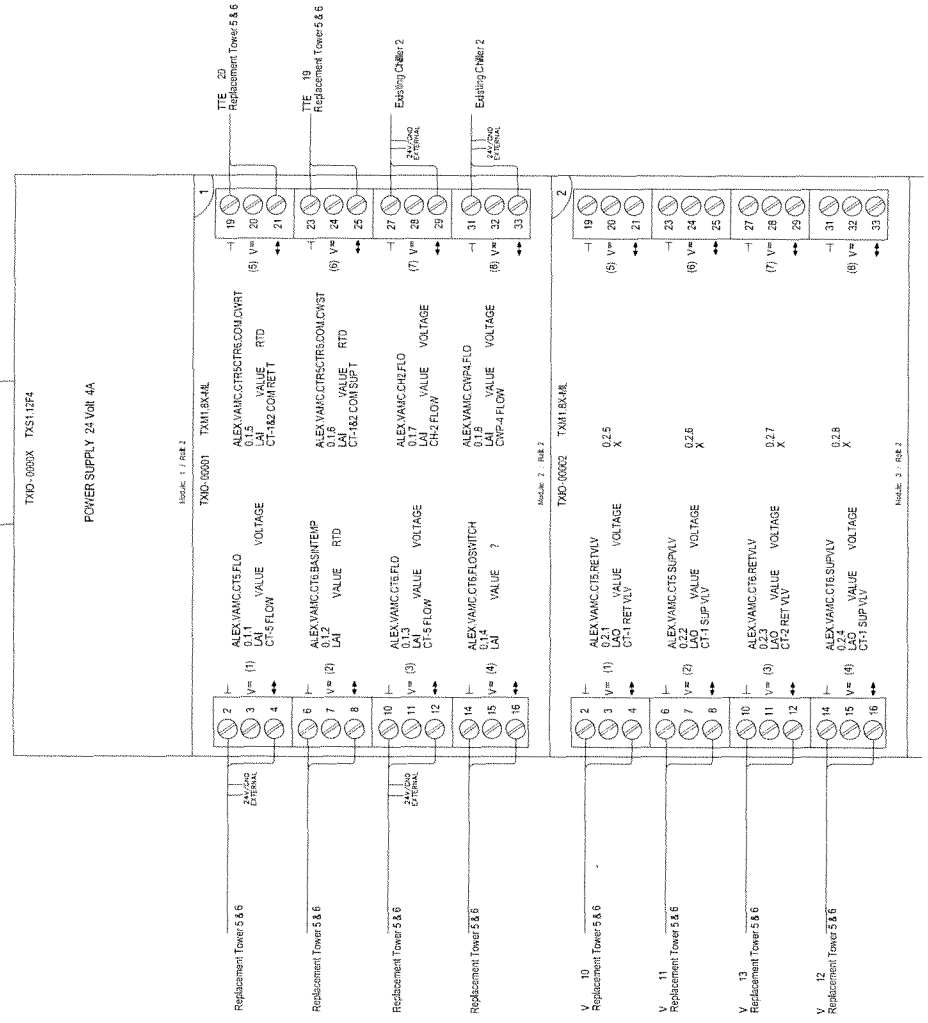

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Chiller 2 Island Bus

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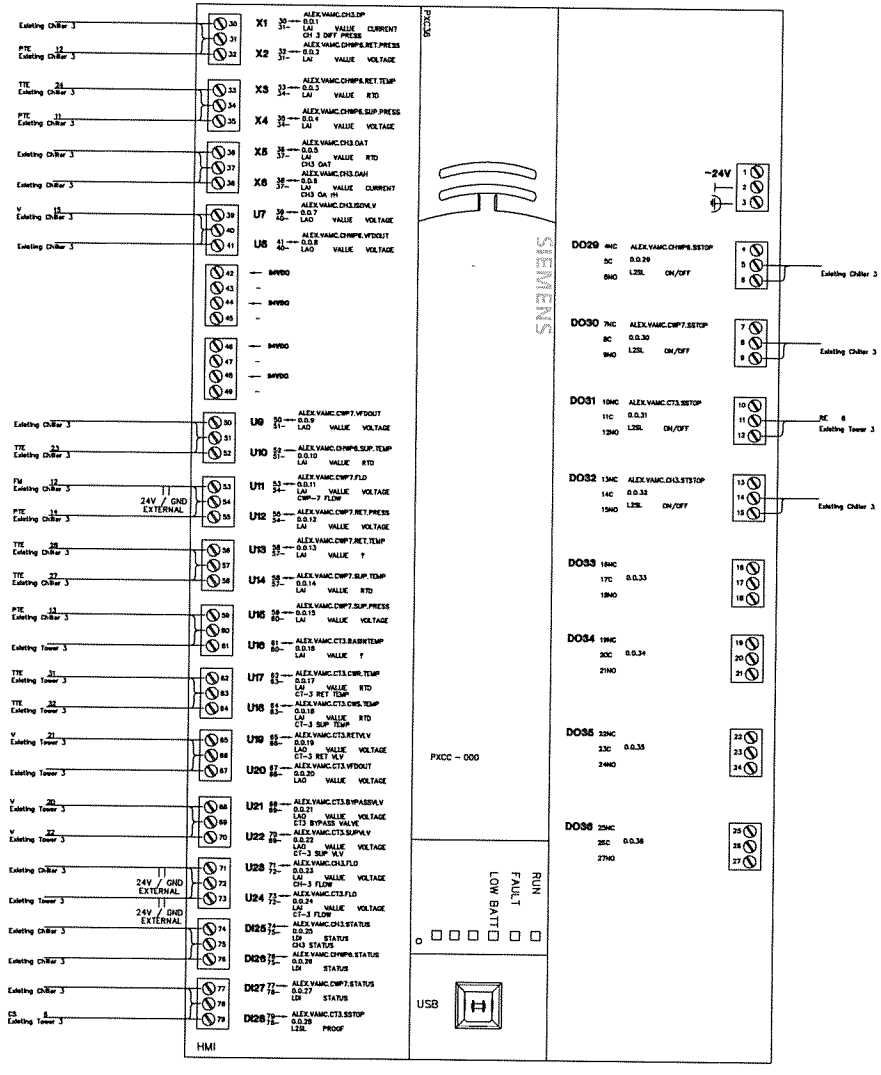

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Chiller 3 (B147)

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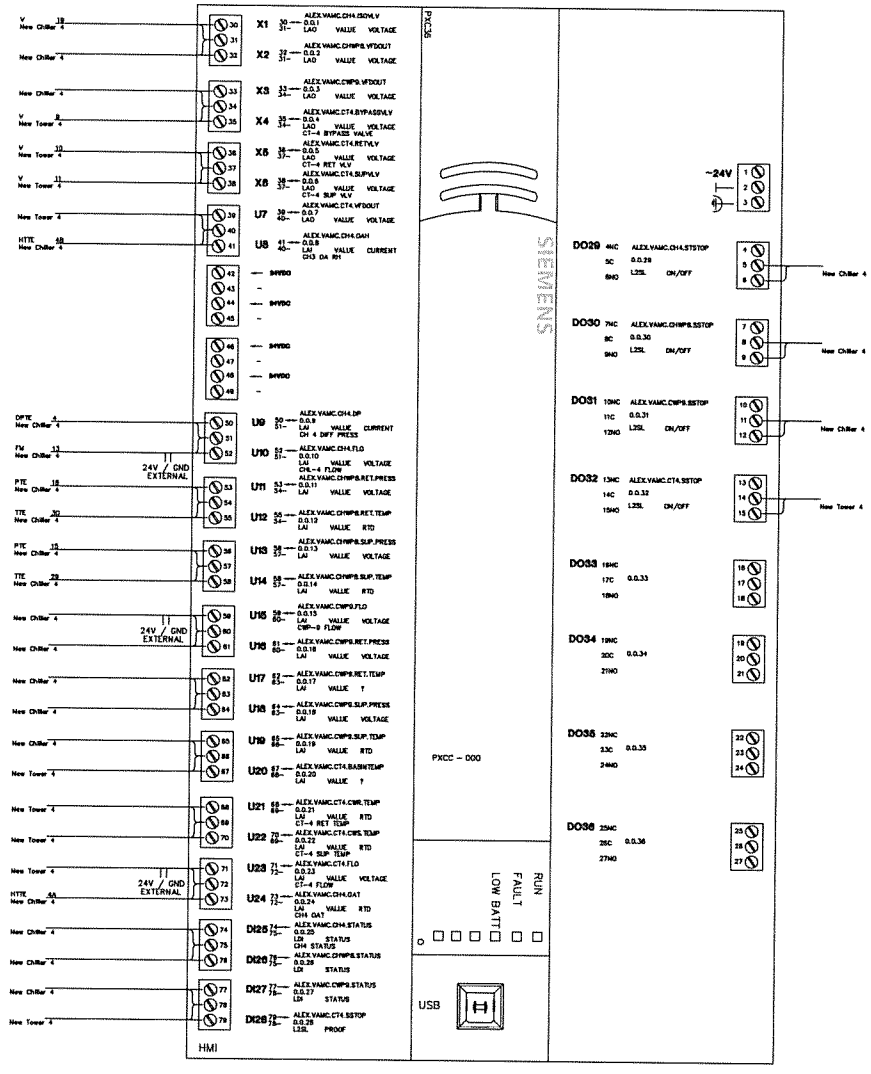

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Chiller 4 and Tower 4

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