

	POWER LEGEND
Ф	DUPLEX RECEPTACLE, INSTALL AT 18" AFF UNO +48 = INSTALL AT 48" AFF +60 = INSTALL AT 60" AFF TV = INSTALL AT 72" AFF, UNO * = INSTALL 6" ABOVE COUNTER OR DESK REF = DEDICATED FOR REFRIGERATOR M/W = DEDICATED FOR MICROWAVE COFF = DEDICATED FOR COFFEE POT
P	DUPLEX RECEPTACLE, GFI WP = WEATHERPROOF
Φ	CEILING DUPLEX RECEPTACLE
₽	DOUBLE DUPLEX RECEPTACLES
Ŧ	DOUBLE DUPLEX GFI RECEPTACLES
₽	CEILING DOUBLE DUPLEX RECEPTACLES
φ	SINGLE RECEPTACLE
Ŷ	SPECIAL RECEPTACLE AS NOTED
\odot	POWER FLOOR OUTLET
₽▽	POWER/TELECOM FLOOR BOX
JJ	JUNCTION BOX
	DISCONNECT SWITCH
R	STARTER/DISCONNECT SWITCH
	STARTER OR CONTACTOR
전	VARIABLE FREQUENCY/SPEED DRIVE
\$ м	MANUAL MOTOR STARTER WITH THERMAL OVERLOAD PROTECTION
	PANELBOARD
\sim	ELECTRIC MOTOR
æ	UTILITY METER
	HOMERUN
۲ ۲ (CIRCUIT CONTINUATION
	CONDUIT CONCEALED IN WALL OR CEILING
	CONDUIT UNDERGROUND OR IN FLOOR
	DRIVEN GROUND ROD
۲	GROUND INSPECTION WELL
<u> </u>	
	FUSE
(#)	
•	
B	
~** * >-	
۲	

l	LIGHTING LEGEND		ABBREVIATIONS]			RS
a · A	2'X4' LIGHT FIXTURE UPPERCASE LETTER = FIXTURE TYPE LOWERCASE LETTER = SWITCH CIRCUIT	A AC AFC AFF AFG	AMPERE ABOVE COUNTER AVAILABLE FAULT CURRENT ABOVE FINISHED FLOOR ABOVE FINISHED GRADE			INC.	ENGINEE
	2 AZ LIGHT FIATURE	AH AHJ	AIR HANDLER AUTHORITY HAVING JURISDICTION			S	<u>U</u>
⊢ݤ┥	WALL-MOUNTED LINEAR FIXTURE	AHU AWG	AIR HANDLING UNIT AMERICAN WIRE GAUGE			Ш	
⊢⊶	SURFACE-MOUNTED STRIP FIXTURE	BFG BJ	BELOW FINISHED GRADE BONDING JUMPER			F	
	TRACK LIGHTING	BKR BLDG C	BREAKER BUILDING CONDUIT			A N	ISN
<u>н н</u>	STRIP OR TAP LIGHTING	СКТ CLG	CIRCUIT CEILING				00
00	RECESSED CAN LIGHT	CONC COORD CPT	CONCRETE COORDINATE CONTROL POWER TRANSFORMER			Š Š	CAL
\odot	HANGING PENDANT FIXTURE	CRI CTRL	COLOR RENDITION INDEX CONTROL			() ⊲	-RIC
0	SURFACE-MOUNTED CIRCULAR FIXTURE	Cu CU DEF	COPPER CONDENSING UNIT DIESEL EXHAUST EUEL				ECT
Q	WALL-MOUNTED SCONCE OR WALL-PACK	DISC	DISCONNECT DISPENSER			Ż	ШЦ
\mathbf{P}	EMERGENCY LIGHT, WALL-MOUNTED	DGR EA EB I				4	•
	EMERGENCY LIGHT, CEILING-MOUNTED	EF EGC	EXHAUST FAN EQUIPMENT GROUNDING CONDUCTOR			Z	NIC/
$\overline{\bigotimes} \otimes$	EXIT SIGN, WALL/CEILING-MOUNTED, CHEVRON DIRECTION INDICATED BY ARROWS	EJ EM ENCL	EXPANSION JOINT EMERGENCY ENCLOSURE, ENCLOSED			ЦО	HAN
4 <u>8</u> ° 48°	EXIT SIGN AND EMERGENCY LIGHT, WALL/CEILING-MOUNTED	ETR EWC EWH	EXISTING TO REMAIN ELECTRIC WATER COOLER ELECTRIC WATER HEATER			OBI	MEO
	OCCUPANCY SENSOR, WALL/CEILING- MOUNTED, DUAL TECHNOLOGY TYPE, UNO	EX EXIST FA FACP	EXISTING EXISTING FIRE ALARM FIRE ALARM CONTROL PANEL			Ŭ	-
Р	PHOTOCELL	FMP G, GND	FUEL MONITORING PANEL GROUND				
		GEC GFI	GROUNDING ELECTRODE CONDUCTOR GROUND FAULT INTERRUPT				uuu
¢ ¢	3 = 3-WAY	GWB HD	GYPSUM WALL BOARD HEAVY DUTY		1111	HADJ	. FRA
ዋ₃ ዋ₄ .\$_		HOA LS	HAND-OFF-AUTO INTRINSICALLY SAFE			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	ENSE
$\mathbf{\Psi}_{D}$	D = 0.100 DIMIMER, UNO	JB	JUNCTION BOX		Ē*!	No	73811
\$	COMBINATION WALL-SWITCH/OCCUPANCY SENSOR	KVA KW	KILO-VOLT AMPERE KILO-WATT		PF	OTA	*
പ്പം		LED LFMC	LIGHT EMITTING DIODE LIQUIDTIGHT FLEXIBLE METAL CONDUIT		I O T	STA	IE O
	CHANDELIER	LTG	LIGHTING		111	SSIO	RIV.
\rightarrow	CEILING FAN	MBJ				****	iiiiii
U		MIN	MAIN CIRCUIT BREAKER				
		MLO	MAIN LUGS ONLY				
		N	NEUTRAL				
		NEC	NATIONAL ELECTRICAL CODE				
		NF	NGHT LIGHT		E ⊂		
		NS	NOT SWITCHED		л С		
		NTS OAE	NOT TO SCALE OR APPROVED EQUAL		A)22	
		OE	OR EQUAL			20	
		OEM OH	ORIGINAL EQUIPMENT MANUFACTURER		N I	1	
	SYSTEMS LEGEND	OL	OVERLOAD		DR/ K		
		P PB	POLE PULL BOX				
ד 🗸	ELECOM OUTLET, INSTALL AT 18", UNO	PC PP	PHOTOCELL PUSH PLATE		NO.	ISSUE	SN
т	ELECOM FLOOR OUTLET	PH, Ø PNL	PHASE PANEL		3.A JOE 220	TE OF	NISIO
ت (ک	V OUTLET, INSTALL AT 72" AFF, UNO	PRI REC	PRIMARY RECEPTACLE		0	DA	RE
ନ ୨	SPEAKER						
		RGS	RIGID GALVANIZED STEEL				
(C) (I RTH		1	4		

G	 	
\sim		

AH.I	
AHU	
BFG	BELOW FINISHED GRADE
BJ BKR	BONDING JUMPER BREAKER
BLDG C	BUILDING CONDUIT
CKT	
CONC	CONCRETE
COORD	COORDINATE CONTROL POWER TRANSFORMER
CRI CTRI	COLOR RENDITION INDEX
Cu	COPPER
DEF	DIESEL EXHAUST FUEL
DISC DISP	DISCONNECT DISPENSER
DGR FA	DRIVEN GROUND ROD
EBJ	EQUIPMENT BONDING JUMPER
EGC	EQUIPMENT GROUNDING CONDUCTO
EJ EM	EXPANSION JOINT EMERGENCY
ENCL FTR	ENCLOSURE, ENCLOSED
EWC	
EVVH EX	EXISTING
EXIST FA	EXISTING FIRE ALARM
FACP FMP	FIRE ALARM CONTROL PANEL
G, GND	
GEC GFI	GROUND FAULT INTERRUPT
GWB HD	GYPSUM WALL BOARD HEAVY DUTY
HOA	HAND-OFF-AUTO
JB	JUNCTION BOX
K KVA	KELVIN KILO-VOLT AMPERE
KW LED	KILO-WATT LIGHT EMITTING DIODE
	LIQUIDTIGHT FLEXIBLE METAL COND
LTG	LIGHTING
MBJ MCB	MAIN BONDING JUMPER MAIN CIRCUIT BREAKER
MIN	MINIMUM
MLO MTD	MAIN LUGS ONLY MOUNTED
N	NEUTRAL
NEC NE	NATIONAL ELECTRICAL CODE
NL	NIGHT LIGHT
NS	NOT SWITCHED
OAE	OR APPROVED EQUAL
OE	
OEM	OVERHEAD
OL	OVERLOAD
Р PB	POLE PULL BOX
PC	PHOTOCELL
PP PH.Ø	PUSH PLATE PHASE
PNL	PANEL
PRI	PRIMARY RECEPTACLE
RECEPT	RECEPTACLE
REF	
RTU	ROOFTOP UNIT
SBJ	SYSTEM BONDING JUMPER
SEC SPD	SECUNDARY SURGE PROTECTIVE DEVICE
STP	SUBMERSIBLE TURBINE PUMP
SW TC	SWITCH TIMECLOCK
THD	TOTAL HARMONIC DISTORTION
TYP	
UNO	UNLESS NOTED OTHERWISE
V	
VA VAC	VOLTS ALTERNATING CURRENT
W	WIRE OR WATT
W/ WAP	WITH WIRELESS ACCESS POINT
WP	WEATHERPROOF
WW XFMR	WIREWAY TRANSFORMER
XP	EXPLOSION PROOF
~	
∆ §	SECTION
	GREATER THAN
>	
2 <	GREATER THAN OR EQUAL TO LESS THAN

NOTE: NOT ALL SYMBOLS AND ABBREVIATIONS ARE USED

GENERAL NOTES

DIESEL CANOPY AND ASSOCIATED TANKS, DISPENSERS, AND LIGHTING WERE DESIGNED BY OTHERS (INFINITY). REFER TO DIESEL DRAWINGS FOR DETAILS. CONDUIT SEAL-OFF REQUIREMENTS ARE NOTED IN DIESEL DRAWINGS.

. EXISTING ELECTRICAL SYSTEM IS FED FROM HIGH LEG OPEN DELTA SERVICE. CONTRACTOR SHALL ENSURE HIGH PHASE LEG IS DISTINCTLY AND PROPERLY IDENTIFIED THROUGHOUT SYSTEM - INCLUDING EXISTING AND NEW EQUIPMENT.

ELECTRICAL SHEET INDEX

E100 ELECTRICAL SITE PLAN, LEGEND, AND ABBREVIATIONS E200 ELECTRICAL DEMO & NEW PLANS E300 ELECTRICAL RISER DIAGRAMS E400 ELECTRICAL PANEL SCHEDULES E500 ELECTRICAL SPECIFICATIONS









PROVIDE SIGNS ON NOTED EQUIPMENT. SIG	GNS			FEE	DEF	R SCI	HEDI	JLE		
SHALL BE LAMINATED BLACK PHENOLIC RE WITH SOLID WHITE CORE WITH ENGRAVED	SIN	NAME	PHASE (AWG)	N (AWG)	G (AWG)	EBJ (AWG)	CONDUIT (3PH 4W)	CONDUIT (1PH OR 3PH 3W)	CONDUIT (1PH 2W)	AMPA CITY
LETTERING MINIMUM OF % INCH HEIGHT.		20	12	12	12	-	3/4"	3/4"	3/4"	20
SIGNS ON INTERIOR ITEMS MAY BE ATTACH USING ADHESIVE. SIGNS ON EXTERIOR ITEM	IED MS	30	10	10	10	-	3/4"	3/4"	3/4"	30
SHALL BE ATTACHED USING WEATHERPROOF/UV RESISTANT ADHESIVE		50	8	8	10	8	3/4"	3/4"	3/4"	50
		60	6	6	10	8	1"	3/4"	3/4"	65
EAAWI LEG ARE DEI IOTED BELOW.		60*	4	4	10	8	-	1-1/4"	-	85
		70	4	4	8	8	1-1/4"	1"	1"	85
MAIN DISCONNECT		80	4	4	8	8	1-1/4"	1"	1"	85
FOR SUNSTOP	PROVIDE ON ATS, FRONT COVER	90	3	3	8	8	1-1/4"	1-1/4"	1"	100
(ALSO FED FROM STANDBY		100	3	3	8	8	1-1/4"	1-1/4"	1"	100
GENERATOR WEST OF BUILDING)		115	2	2	6	8	1-1/4"	1-1/4"	1"	115
		125	1	1	6	6	1-1/2"	1-1/2"	-	130
		150	1/0	1/0	6	6	2"	1-1/2"	-	150
MAIN DISCONNECT	PROVIDE ON OUTSIDE OF	175	2/0	2/0	6	4	2"	2"	-	175
FOR SUNSTOP	GENERATOR ENCLOSURE, ON ENCLOSURE DOOR IN FRONT	200	3/0	3/0	6	4	2"	2"	-	200
	OF GENERATOR BREAKER	225	4/0	4/0	4	2	2-1/2"	2"	-	230
GENERATOR		250	250	250	4	2	3"	2-1/2"	-	255
		300	350	350	4	1/0	3"	3"	-	310
VOLTAGE 240/120 3PH		380	500	500	3	1/0	3-1/2"	3"	-	380
PHASE A BLACK		400	(2) 3/0	(2) 3/0	(2) 3	(2) 1/0	(2) 2"	(2) 2"	-	400
PHASE C BLUE	PROVIDE ON INSIDE FRONT COVER OF	400*	600	600	3	1/0	4"	3-1/2"	-	420
NEUTRAL WHITE	240/120V 3PH PANEL(S) NEW AND EXISTING)	500	(2) 250	(2) 250	(2) 2	(2) 1/0	(2) 3"	(2) 2-1/2	-	510
OTHER UNIDENTIFIED SYSTEMS	AND IN ATS	600	(2) 350	(2) 350	(2) 1	(2) 2/0	(2) 3"	(2) 3"	-	620
VOLTAGE 120/240 1PH PHASE A BLACK PHASE C BLUE NEUTRAL WHITE GROUND GREEN OTHER UNIDENTIFIED SYSTEMS EXIST ON PREMISES	PROVIDE ON INSIDE FRONT COVER OF 20/240V (SINGLE PHASE) PANEL(S), NEW AND EXISTING	ASSUM - AMF - CON - AMF - CON EXAMF 60/G 3PH 3V PHASE GROUI 100/N/E	MPTIONS PACITY BA NDUIT SIZ PACITY BA NTRACTO PLES: W FEEDE E CONDU NDING CO EBJ	FOR ITEI ASED ON ZES BASE ASED ON DR IS AWA R WITH E CTORS, N ONDUCTO	MS ABOV CU THHI D ON PV TERMIN ARE OF C QUIPMEI IO NEUTI DR IN A 3	YE: N/THWN- C SCHEE ATIONS & IRCUIT/F NT GROU RAL, ANE 1/4"" CONI	2 CONDU 40, EMT EQUIP F EEDER V INDING C 1-#10AV DUIT	OTORS , IMC, OR RATED 75 OLTAGE ONDUCT VG EQUIF	RMC DEGREE OR: 3-#6/ MENT	E C AWG
PANEL A 240/120 VOLTS, 3-PHASE, 4-WIRE SERVED FROM PANEL MDP, CKTS 2,4,6 ELEC ROOM	OF EACH PANEL (NEW AND EXISTING), WITH APPLICABLE INFORMATION ON LABEL INCLUDING PANEL NAME, VOLTAGE, PHASE, WIRE, AND FEEDER SOURCE.	3-#3AV 3-#3AV 1-#8AV 20/G (1 1PH 2V 2-#12A 120V C 3/4" CC	VG PEEDE VG PHAS VG EQUIF IPH) V FEEDE WG PHA VR 277V), DNDUIT.	R WITH E PMENT BO R WITH E SE COND AND 1-#1	QUIPMEN DNDING QUIPMEN UCTORS 2AWG E	NT GROU QUIPMEN	NEUTRA IN A 1-1/4 NDING C E PHASE IT GROUI	AL CONDI "" CONDI ONDUCT AND ON NDING C	JCTOR, A JIT" OR: E NEUTR, ONDUCTO	ND AL IF DR IN
STANDBY GENERATOR SHUT OFF	DFF	20/G (1 1PH 3V 2-#12A 1-#12A	1PH 3W) (V FEEDE WG PHA WG EQU	OR 20/N/G R WITH E SE COND IPMENT (G (1PH) QUIPMEN UCTORS GROUNDI	NT GROU 5, 1-#12AV ING CONI	NDING C VG NEUT DUCTOR	ONDUCT RAL CON IN 3/4" C	or: Iductor Onduit.	S, AND
EXAMPLE NAMEPL	ATE DETAILS									



EXISTING LOADS			
12-MNTH KW PEAK	58.0		M
ASSUMED PF	0.8		
KVA	72.5		4 C
VA * 125%		90,625	
		0	
NONE		0	
LOADS ADDED (VA)		58,452	
DEF STP (1.5HP)	2,400		
DIESEL PUMP (2HP)	2,880		
DISPENSERS	1,600		
AIR COMPR (5HP)	6,318		
DIESEL LTG	1,554		
DIESEL SIGNS	4,800		
MISC CTRLS	1,000		
GEN HEATER	2,000		
FTR HVAC (NET)	6,000		
FTR BEER CAVE	3,500		
65% FTR KITCHEN (NET)	23,400		
MISC FUTURE (FTR)	3,000		
NEW LOAD SUMMATION (VA)		149.077	
AMPS AT 240V/3PH (BALA		359	
APPROX AMPS 120/240 L	OADS	485	
NEW SERVICE SIZE		600	





MLO (A)	200	_		POLES	3	0		REM	ARKS				
VOLTAGE 2	40/120 🔺	_	MC	UNTING	SUR	FACE			CAT.	NO. CH7E	E COVER		
PHASE WIRE	3PH 4W	_	BRAI	ND/TYPE	CUTLER	HAMMER			СН Т	YPE LOAD	CENTER, TAN BREAKE		
INTERRUPT	10kAIC	_	LC	CATION	ELEC	CRM							
ENCL TYPE	1	_	FE	D FROM	MAIN	MDP			CAU	FION: 3PH	HIGH LEG PANEL		
									1				
DESCRIPTION	BKR	СКТ				^		В	СКТ	BKR	DESCRIPTION		
	A/P	NO.		-		-	(HIGF	LEG)	NO.	A/P			
EX. FRYER	40/3	1			\ge	\ge	\ge	\gg	2	50/3	EX. FRYER		
		3	\ge	\ge			\ge	\ge	4				
		5	\ge	\leq	\ge	\leq			6				
EX. ICE	20/2	7			\ge	\lesssim	\ge	\leq	8	60/3	PANEL K SPARE		
		9	\ge	\ge			\gtrsim	\gtrsim	10				
SPACE (HIGH LEG)		11	\ge	\gtrsim	\ge	\leq			12				
EXISTING LOAD	20/1	13			>	>	\geq	\geq	14	30/2	EX. OVEN		
EXISTING LOAD	20/1				\geq	$>\!$	\geq	$>\!\!\!<$	*				
EX. COOLER FANS	20/1	15	\geq	\geq			\ge	\geq	16				
EX. COOLER LTG	20/1	17		\Leftrightarrow	~ ~		\sim	\frown	10				
SPARE	20/2	1/	\otimes	>	\otimes	\leq			18		SPACE (HIGH LEG)		
		19			\ge	\leq	\times	\leq	20	30/2 (OFF)	EX. DELI HOT CASE		
EX. WARMER	20/2	21	\ge	\ge			\ge	\leq	22				
		23	\ge	\leq	\ge	\leq			24	20/2	EX. WARMER		
EX. COMPUTER	20/1	25			\geq	\leq	\geq	\geq	26				
EXISTING LOAD	20/1				\geq	\geq	\geq	\geq					
EX. FLOOD LT EAST	20/1 20/1	27		\leq			\ge	\leq	28	30/2	EX. GRILL		
SPACE (HIGH LEG)		29	$\left \right\rangle$	\gtrsim	\ge	\leq			30				
					$\left \right\rangle$	\lesssim	\ge		-				
			\ge	\ge			$\overset{\frown}{\sim}$	\gtrsim					
			$\left \right\rangle$	\approx	\geq	\geq	\sim	\frown					
			\sim	\geq	\ge	\gg	\geq	\leq					
					\geq	\geq	\geq	\geq					
			\leq	\leq			\leq	\leq					
			$\left \right\rangle$	\leq	\bowtie	\triangleleft							

MLO (A)	20	00	_		POLES		12	_
VOLTAGE	120,	/240	_	MC	DUNTING	SUR	FACE	_
PHASE WIRE	1PH	3W	_	BRA	ND/TYPE	CUTLER	HAMME	R
INTERRUPT	10	AIC	_	LC	OCATION	ELE	C RM	_
ENCL TYPE		1	_	FE	D FROM	MAIN	MDP	_
DESCRIPTION		BKR	СКТ			PHA	SE VA	Т
	TYPE	A/P	NO.	,	4			
EX. SIGN/AIR PUMP		30/1	1			\geq	\geq	t
					Ļ	\geq	\geq	
EXISTING LOAD		20/1	3	>>	>>	\geq	>>	>
EXISTING LOAD		20/1		\geq	\geq	\gg	\geq	ł
EX. FLOOR BOX		20/1	5			<	~>	+
EXISTING LOAD		20/1	_			>	>	+
EXISTING LOAD		20/1	/	<>	<>	$\langle \rangle$	<>	>
		20/1	0	\sim	\frown	\bigcirc	>	ł
		20/1	9			\bigcirc	\sim	✻
		20/1	11	\sim		>	>	t
		20/1	11	$\leq>$	<>	<>	<>	>
		30/1	13		\frown			╋
		50/1	10			\leq	~~	>
EX. SMOOTHIE		20/1	15	\geq	\geq	\sim	\leq	Ť
EXISTING LOAD		20/1		\geq	$>\!\!\!<$	$>\!\!\!>$	\sim	>
EX. ICEE FOUNTAIN		20/1	17			\geq	\geq	1
EXISTING LOAD		20/1				\geq	\geq	1
EXISTING LOAD		20/1	19	\ge	$>\!$	\times	$>\!$	J
EXISTING LOAD		20/1		\geq	$\geq \leq$	\geq	\geq	
EX. FRYER		40/2	21			>>	\geq	_
					Ļ	\geq	\geq	-
			23	>	<>	<	~>	>
		4-	25	\geq	\sim			ł
EX. MONITOR		20/1	25			\langle	\sim	>
		20/1	27	\sim		\bigcirc	>	Ŧ
EXISTING LUAD		20/1	21	\bigcirc	<>	\bigcirc	\sim	>
		20/1	29	\leq	\frown			╀
		20/1	25			$\leq>$	<>	×
EXISTING LOAD		20/1	31	\sim	\leq			Ť
100		., -		5~	>>	\sim	~~	1
EXISTING LOAD		20/1	33			\bowtie	\geq	t
EXISTING LOAD		20/1				\geq	$>\!\!\!>\!\!\!>$	1
EXISTING LOAD		20/1	35	\geq	$>\!\!\!\!>\!\!\!\!>$	\geq	> <	T
				\geq	\geq	\geq	\geq	1
EX. WALK LIGHT		20/1	37			\geq	\geq	ľ
					L	\mid	\geq	\downarrow
EXISTING LOAD		20/1	39	\geq	$<\!\!\!>$	\geq	~>	
EXISTING LOAD		20/1	_ · ·	\geq	\sim	\mid	>	ł
EX. SPRINKLER SYSTEM		20/1	41			\geq	\sim	\downarrow

NEW 1-PHASE	PA	NE	L SC	CHED	ULE						F	$\langle 6 \rangle$	NEW 1-PHA	\SE	ΡΑ	NE	L S	CHE	DULE					GEN
MCB (A) 6 VOLTAGE 120, PHASE WIRE 1PH	60 /240 3W	-	N	POLES NOUNTING B.O.D	5 30 5 SURFACE . SQ D NQ	_	RE	MARKS DIES BRE	S SEL LOA	ADS PANEL YPES:		-	MLO (A) VOLTAGE PHASE WIRE	120	50 0/240 H 3W	_	N	POLE 10UNTIN B.O.I	ES <u>12</u> G <u>SURFACE</u> D. SQ D QO	-	R	EMAR <u>LC</u>	KS AD CENTER AT	GENERATOR
INTERRUPT 10k ENCL TYPE 3	(AIC IR	- - -	l	LOCATION FED FROM	EAST EXT WALL	-		L : S\	= LOCKA VN = SV	ABLE IN O	FF POSITION NEUTRAL	-	INTERRUPT ENCL TYPE	10	KAIC 1	_		LOCATIO FED FROI	M GEN ENCL M MDP	- -				
					PHASE VA														PHASE VA					
DESCRIPTION LOAD TYPE	BKR A/P	CKT NO.	800	A			c		BKR A/P	LOAD TYPE		-	DESCRIPTION	LOAD TYPE	BKR A/P	CKT NO.	220	A			В	CI N	T BKR LOAD	
DISP #1 OF 2	L/SWN	1	800	1,440		\searrow	\leq	\geq	25/2 L		DIESEL STP (2HP)		REC & LI	V	20/1	. 1	230	500		\sim	\geq	2 '		BATTERY CHARGER
(CKT SWN)		3	\geq	\geq		0	1,440) 4		M		(1)	COOLANT HEATER	G	20/2	3	\ge	\ge		1,00	0 0	4	20/1	SPARE
MISC-DIESEL/DEF M DISP #1 OF 2	20/1 L/SWN	5	800	1,200		\ge	\ge	6	20/2 L	M	DEF STP (1.5HP)			G		5	1,000	0			\gtrsim	S	;	SPACE
(CKT SWN)		7	\geq	\sim	\gtrsim	0	1,200	8 0		M			SPACE			7	\geq	\gtrsim	\sim	0	0	8	3	SPACE
SPARE	20/1 L/SWN	9	0	100		\geq	${\sim}$	10	20/1	G	OVERFILL ALARM		SPACE			9	0	0			\geq	1	0	SPACE
(CKT SWN)		11	\ge			0	0	12	20/1		SPARE		SPACE			11	\geq	${\sim}$		0	0	1	2	SPACE
SPACE		13	0	0				14			SPACE							Ť			$\stackrel{+}{>}$	3		
SPACE		15	\ge			0	0	16			SPACE						\geq	\leq			Ť			
SPACE		17	0	0		\geq	\sim	18			SPACE							Ť			$\overline{\langle}$	5		
SPACE		19	\geq			0	0	20			SPACE						\geq	${\sim}$			Ť			
SPACE		21	0	0			\sim	22			SPACE							T			$\overline{\langle}$			
SPACE		23	\geq			0	0	24			SPACE						\ge	${\sim}$			Ť			
SPACE		25	0	0			\sim	26			SPACE							Ť		\geq		\leq		
SPACE		27	\ge	\sim		0	0	28			SPACE						\geq			>	Ť			
SPACE		29	0	0				30		:	SPACE							Ť			$\overline{\boldsymbol{\triangleleft}}$			
			\ge	\geq		>	Ť										\ge	\geq		>	Ť			
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SEE LOAD SUMMARY ON RISER SHEET.

LOAD TYPE L = LIGHTING R = RECEPTACLE M = MOTOR G = GENERAL S = SPECIAL V = VARIED * = NON CONCURRENT

SHEET NOTES

A. NOT USED THIS SHEET.

\bigcirc SHEET KEYNOTES

- COORDINATE BREAKER SIZE AND POLES WITH HEATER NAMEPLATE REQUIREMENTS.
- 2. CONTRACTOR SHALL VERIFY EXISTING FEEDER AND EXISTING ROOF PANEL BUS SIZE; ADJUST BREAKER SIZE TO MATCH.
- 3. NOT USED. 4. PROVIDE NEW BREAKER IN EXISTING
- PANEL. 5. PROVIDE NEW FILLER PLATE FOR TO COVER SPACE OPENING.
- 6. REFER TO DIESEL DRAWINGS FOR ALL BRANCH CIRCUITS NOTED IN THIS PANEL.



The PROFILE	COBURN AND ASSOCIATES, IN COBURN AND ASSOCIATES, IN		P.O. BOX 577 HIGH SPRINGS, FLOF	Truce R * The PH 386-454-3748 CELL 352-538-0163	THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY CHAD J. FRALICK, PE ON THE INDICATED DATE USING A	DIGITAL SIGNATURE. FRANTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERHED ON ANY ELECTRONC DOCUMENTS. IF THERE IS ANY DOUBT STO THE AUTHENTICITY OF THIS DOCUMENT.
2205 KLL CJF	DATE OF ISSUE 7/1/2022	REVISIONS				
		0070107 010KE # 303	1166 E DUVAL ST	LAKE CITY, FL 32055		PANEL SCHEDULES

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ELECTRICAL SPECIFICATIONS GENERAL

- A. All work shall be performed or installed in strict accordance with the following (each contractor and subcontractor shall be responsible for compliance):
- 1. NFPA 70 National Electrical Code (2017 Edition) 2. Florida Building Code (2020, 7th Edition)
- 3. NFPA 72 National Fire Alarm and Signaling Code (2016 Edition)
- 4. NFPA 101 Life Safety Code (2018) 5. NFPA 110 Emergency and Standby Power Systems (2016)
- 6. NFPA 780 Lightning Protection (2017) 7. OSHA Regulations
- 8. All other applicable rules, regulations, and codes of local, state, and federal governments having lawful jurisdiction. B. Furnish all labor, materials, fixtures, equipment, tools and service necessary for installation, testing, and adjusting of all electrical system. Electrical systems shall be furnished and installed in compliance with the Drawings, Specifications, and any Addenda thereto
- C. All equipment and materials provided shall meet or exceed specification requirements, be new and unused (unless furnished by the owner), listed under an UL category, and shall be a product of a manufacturer regularly engaged in producing such equipment and materials for at least five years.
- D. Drawings and Specification shall be understood to cover, according to their intent and meaning, complete electrical systems. Work shown on the drawings vet not specified, and work specified vet not shown on the drawings shall be performed as though mentioned in both.
- Minor items and accessories reasonably inferred as necessary for the complete and proper operation of any system shall be provided by contractor or subcontractor for such system whether or not they are specifically called for
- F. The Electrical Contractor shall include in his bid the cost of furnishing, installing, maintaining, and removing all material and equipment required to provide temporary lights and power to perform the work of all trades during construction and until work is completed. Adequate lighting and receptacle outlets for operation of hand tools shall be provided throughout the project - including shanties, trailers. field offices, and temporary toilet enclosures - and shall be extended as construction progresses
- G Prior to bidding, the Electrical Contractor shall coordinate with the electric power company to ascertain, in detail, the division of work, and the extent of performance by the Power Company.
- H. Each panelboard, switchboard, disconnect, pullbox larger than 4"x4", transformer, contactor, separately enclosed breaker, separately enclosed starter, transfer switch, and time clock shall be labeled with the same designation shown on the drawings
- I. Labels shall be laminated plastic engraved, with letter size no less than 3/8 inch in height. Exterior labels shall be UV resistant and weatherproof.
- J. Furnish all equipment and personnel and conduct all tests required to secure approval of the installation. K. Safety Tests
- 1. All systems shall test free from short circuits and grounds, shall be free from mechanical and electrical defects, and shall show an insulation resistance between phase conductors and ground of
- not less than that specified by the cable manufacturer. 2. All systems shall show proper neutral connections. 3. Key-operated interlock mechanisms shall be demonstrated to
- perform as intended. M. Upon completion of each part of the electrical system, the contractor
- shall demonstrate to the Engineer that each item on that system is installed with proper covers, safeties, controls, etc., and that all are in proper working order.
- N. A set of "red-lined" electrical drawings shall be carefully maintained at the job site. Actual conditions are to be put legibly on the drawings in red on a daily basis so the drawings will continuously show locations and routings of cable travs, conduits, pull boxes, circuit
- numbers, and other information required by the Owner and Engineer. O. Shop drawings and product data shall be submitted on all equipment, fixtures, etc. Shop drawings shall be labeled in the same designation as individual piece of equipment for which they are being submitted; the proper designation shall be the designation used on the various equipment schedules and or in other Sections of this Specification. i.e. Fixture A, Panel B, MDP, etc. Each submittal package shall be
- combined into a single PDF file and emailed (or otherwise electronically transmitted) to Engineer
- P. Job condition shall be determined prior to bidding in the following Site visit to determine
- a. Existing conditions
- b. How and where materials will be delivered and stored
- Special problems encountered during construction 2. Examine all Contract Drawings and Specifications to determine:
- a. Type of construction to be used
- b. Nature and extent of work of other trades S. General
- 1. Contract Drawings show the intended arrangements and sizes of principal apparatus and devices to be provided under this Contract. Drawings shall be followed as closely as actual building construction will permit.
- 2. Dimensions of work as indicated on Plans are not guaranteed to be as-built dimensions.
- 3. Measurements shall not be scaled from Drawings and used as definite dimensions for layout or fitting of work in place.
- 4. Layout of equipment, as shown on the plan, shall be checked and
- exact location determined by dimension of equipment approved by the Architect.
- Consult the Drawings for all dimensions locations of partitions.
- sizes of structural members, foundations etc. 6. Do not make final layouts until shop or equipment drawings are approved and job conditions verified.
- T. Coordination:
- 1. Work shall be coordinated between all Contractors, Subcontractors, Installers, Suppliers, Trades, etc. to: a. Insure a neatly fitted installation
- b. Eliminate interferences
- c. Maintain maximum headroom and clearances 2. Any interference which develops or is foreseen and cannot be
- resolved by the affected trades, shall be handled as follows: a. Cease installation of the portion of the work which is in conflict
- b. Continue work on items which are not in conflict.
- Notify the Architect immediately. d. Architect's decision shall be final as to any relocation,
- rerouting, removal, or change.
- e. No additional compensation will be allowed for removal, relocation, repairs or changes required by interferences.
- U. Clear away all debris, surplus materials, etc. resulting from work.
- Maintain job and equipment in clean, first-class condition.
- V. Clean all panel boards, switches, boxes, etc., and leave them in a readv-to-use condition
- W. All panelboard and junction box covers shall be secured with proper
- screws or bolts. X. Where factory finish is provided on equipment, each marred or
- damaged surface shall be touched-up or refinished in accordance
- with manufacturer recommendations Y. In addition to provisions and stipulation set forth in other Sections of these Specifications, provide various types of protection as follows 1. Protect finished floors from chips and cutting oil by use of metal chip receiving pan and oil-proof floor cover
- Protect surfaces and items from over-spray and drops due to painting and finishing work associated with electrical work.
- 3. Protect grills, diffusers, parts, openings, and vents as necessary to prevent intrusion of smoke, dust, and debris into devices, equipment, and systems. Ensure protection of heat-generating
- equipment does not cause equipment to overheat. 4. Stored equipment shall be covered to exclude dust and moisture, shall be protected from weather, shall be protected from entry of foreign materials, and shall be protected from theft and vandalism.
- Z. Concrete housekeeping pad or pads shall be provided for floor-mounted equipment, U.N.O. Concrete shall be cast no less than 4" thick, shall be rated no less than 3000 PSI, and shall be cast with 1/2" chamfered top perimeter edges. Housekeeping pad vertical surfaces, chamfers, and a stripe 6" wide around the top perimeter of
- the pad shall be painted safety yellow. AA. Contractor shall be responsible for photographing the following items, or ensuring that the items are safely observable - with covers removed or easily removable - during substantial inspection: incoming feeder terminations at main disconnecting means, main bonding jumper, grounding electrode connection(s) at each system (main and separately derived), transfer switch terminations. transformer terminations, system bonding jumper(s) as applicable, isolated neutral at downstream equipment, panels, switchboards, switchgear, motor control centers, starters, disconnects, and
- pull-boxes AB. Each penetration of a rated assembly by a pipe, tube, wire, conduit, or cable tray shall be protected by a UL listed fire-stop system (tested per ANSI/UL 1479 or ASTM E814) with a rating no less than the

rating of the assembly, and in no case less than 1-hour. AC. Self-illuminated exit signs, emergency lighting fixtures, and emergency lighting drivers shall be connected to unswitched conductors. Such conductors shall be connected directly to the branch circuit breaker (bypassing all control devices, switches, contactors, timeclocks, photocells, etc.). Contractor shall provide additional conductor with switched lighting circuit conductor as necessary to meet this requirement.

Conduit runs shall comply with NEC

accessibility.

non-removeable.

environment installed):

of shape.

SUPPORTS AND HANGERS

clamps, or straps

type anchors (shield).

Uni-Strut, Globe, Kindorf, or equal.

environment, but not less than NEMA 3R.

galvanized steel, no less than 2-1/2" deep

M Provide null boxes as shown on the Drawings, as required by code

N. Outlets shall be installed in the locations shown on the drawings.

O. Contractor shall study the general building plans in relation to the

other work required by these Specifications.

Crouse-Hinds, Square D, Bryant, or equal.

locknuts and nonmetallic bushings.

between the conduit and box.

THHN/THWN-2 insulation.

compliance with the N.E.C.

than shown on the drawings

over 100 feet, use No. 8 AWG.

connections in colored hot wires

of a fixture, switch or receptacle shall be 8"

and typed directory card and holders.

used

devices in the box.

PANELBOARDS

G. All wiring shall be installed in conduit.

WIRE AND CABLES

and as needed for ease of construction. Pull boxes shall remain

space surrounding each outlet, in order that his work may fit with all

All steel supports for outlet boxes shall be furnished and installed.

Cast metal fittings shall be cast steel. Cast metal fittings shall be

Q. Outlet boxes for use with exposed steel conduit shall be cast steel.

galvanized steel, 1 1/2 inch deep

H. Through-wall boxes are prohibited

wood screws

applicable logo.

than N.E.C.

square.

NEC.

accessible.

noted otherwise

BOXES

3. Conduits shall not conflict with other trades.

1. Flexible metal conduit with stranded conductors

heavy moisture, condensation, etc.

waterproof joints or PVC-coated RMC.

columns, beams, purlins, block, studs, or joists.

. SPECIFIC CONDUIT TO BE USED

threaded waterproof fittings.

- DEMOLITION
- A. Demolition of each noted item shall include complete removal of associated dedicated circuiting back to source.
- B. Demolition of circuiting shall include complete removal of cables, conductors, raceway, conduit, tubing, conduit bodies, fittings, boxes labeling, splices, taps, mounting hardware, hangers, anchors, and supporting means. Empty raceway concealed below concrete floors, within concrete, or within existing-to-remain walls may be abandoned in place. Exposed conduit at floor stub-ups, at wall stub-outs, and at cast-ceiling stub-outs shall be cut off and shall be ground below surface; the affected surface shall be repaired to be flush with adjacent surfaces and shall be refinished to match adjacent surfaces.
- For each branch circuit removed: 1. The associated circuit schedule and source labeling shall be updated to identify existing breaker as "SPARE".
- 2. The associated existing branch breaker shall be opened (switched to the "OFF" position)
- An appropriately sized cover or plug shall be provided to close each opening - in raceways, boxes, and enclosures - caused by work under this project.
- Surface openings resulting from demolition shall be sealed, patched, repaired, and finished to match existing adjacent surfaces. Each existing-to-remain item damaged by demolition work shall be
- replaced or repaired to previous condition. Dedicated support accessories - such as concrete pads, tank
- saddles, support piers, equipment curbs, pole bases, posts. stanchions, trunions, anchors, guy wires, suspension means, and other support accessories - shall be removed if the item supported is removed Each surface exposed by the removal of a surface-mounted item
- shall be cleaned and repainted to match adjacent surfaces. Landscaping, sod, sidewalk, asphalt and grading damaged by
- emolition work shall be repaired to match surrounding area. Disposal of demolished items shall be in accordance with all
- applicable regulations. Fluids shall be removed from demolished items prior to transport.

EXCAVATION AND BACKFILL

- A. Contractor shall coordinate with the General Contractor to determine the extent of his responsibility to perform the excavation and backfilling related to the electrical scope of work.
- B. Contractor shall be responsible for contacting the appropriate "CALL BEFORE YOU DIG" authority prior to commencing excavation activities

ROUGH-IN

- A. Contractor shall rough-in for all equipment, fixtures, etc., in building whether or not such equipment is furnished by this Contractor or under other divisions of Specifications or by Owner. Determine in advance the location and size of all openings and
- chases necessary for proper installation of all work and have openings and chases provided during construction
- Install all inserts for hangers and supports of electrical work as С. general construction progresses
- Rough-in openings in masonry, brick, or stud walls shall be cut, not
- broken or chiseled Openings shall not be larger than the coverplate or box which will fit over it.
- A sleeves shall be required at each location where exposed conduit is to pass through a concrete wall, concrete floor slab, or masonry wall. Sleeves installed below grade or where subject to high water conditions shall be installed water tight.
- **BASIC MATERIALS & METHODS CONDUIT**
- A. Rigid metal conduit (RMC) shall be steel, hot dip galvanized,
- inimum trade size shall be 3/4". B. Electrical Metallic Tubing (EMT) shall be steel, electro or hot dip galvanized. EMT fittings shall be compression type, concrete-tight.
- C. Flexible Metallic Tubing shall be galvanized steel (aluminum not acceptable). Sealtite type UA or EF shall be used for all motor connections.
- D. Rigid Non-metallic conduit shall be listed for use as electrical raceways. PVC shall be high density Type I Schedule 40, unless noted otherwise
- Connectors shall have insulated throats.
- All fittings and connectors shall be steel or malleable iron. Pot-metal not acceptable.
- G. Power conductors shall be installed in conduit.
- Fittings or symmetrical bends shall be required wherever right angle turns are made in exposed work. Bends and offsets shall be avoided wherever possible, but where necessary, they shall be made with an approved conduit bending tool
- or machine J. All conduit joints shall be cut square, reamed smooth and drawn up
- K. Conduit shall be installed in horizontal and vertical runs in such a
- manner as to ensure against trouble from the collection of trapped condensation and shall be arranged so as to be devoid of traps. L. Special care shall be used to ensure that aboveground conduit runs are parallel or perpendicular to walls, structural members, building
- lines, or intersections of vertical planes and ceiling. M. During construction, all conduit work shall be protected to prevent introduction of water, dust, or debris into conduits, fittings or boxes.
- N. Previously plugged or capped conduit shall be entirely free of damage, accumulation, debris, and residue prior to use, or the conduit shall be replaced.
- O. All conduits in floors or below grade shall be swabbed free of debris and moisture before wires are pulled. P. Conduit noted as "SPARE", "EMPTY", or "FOR FUTURE USE" shall
- be provided with pullstring and readily removable caps or duct seal (no glue). Such conduit shall be labeled on both ends of run.
- Q. Conduit shall be properly supported per NEC and as specified herein. R. Expansion fittings or other approved devices shall be used to provide for expansion and contraction where conduits cross building expansion joints and as recommended by manufacturer for long runs
- S. Each conduit passing from conditioned to non-conditioned space (such as from interior to exterior) or between two conditioned spaces
- with temperature differences greater than 15°F (such as from conditioned building to refrigeration unit) shall be sealed internally with duct seal or similar at the the penetration.
- A flexible grounding strap shall bridge expansion joints and shall be bonded to conduit. Conduit, boxes, devices, lights, and other electrical items shall be located to eliminate interference with moveable or serviceable items,

Conduit above slab shall be run concealed in the walls or ceiling

unless specifically noted to be exposed. Noted exceptions include

. Conduit under ground shall be buried no less than 24 inches below

below finished grade for service entrance (unless utility requires

Conduit installed for incoming utilities (such as service entrance

appropriate utility requirements. Contractor shall coordinate with

Conduit bushings shall be provided at the termination point of all

Underground raceway shall be thoroughly photographed by the

contractor prior to backfill or concrete pour. The photos shall be

Engineer and Owner to accurately discern the raceway routing, burial

depth, type of bends (coated RMC, for example) and if applicable,

typically depicted on drawings, but shall be provided. Routing for

routing. Exact routing of conduit shall be determined in the field for

ease of installation provided that the following criteria is met:

1. All conduit, home runs, and circuits are made to the panel

conduit 2" trade size and larger is typically depicted to show intended

specified on the drawings, unless specifically noted to be routed

taken in sufficient quantity and in such a manner to enable the

AA. Routing with conduits less than 2" trade size is intentionally not

conduit runs, if not otherwise terminated at enclosures with

power, telephone, data, cable TV, etc.) shall comply with the

finished grade for non-service entrance, and no less than 30 inches

valves, or other items that may require clearance

utility inspection of installation prior to backfill.

duct bank layout and reinforcing steel

electrical and mechanical rooms.

areater depth).

onnectors.

such as eyebolts, cranes, equipment access doors, lifts, rollup doors,

- via a control device (such as a switch, contactor, or time clock). C. Panels rated 225 amp or less shall be Square D, type NQ, or equal, accepting 15A and 20A plugs. unless noted otherwise 2. Catalog numbers shall be: D. Panel rated 400 to 800 amp shall be Square D, "I-Line" or equal, unless noted otherwise. a. Single receptacle: 5361 4. Conduits shall not encroach on spaces dedicated for clearance or E. Panels greater than 800 amps are considered to be Distribution b. Duplex receptacle: 5362 Switchboards. G. Special purpose receptacle 5. Routing shall not render covers or doors inaccessible or F. Furnish and install electrical system as described on Drawings, panel AB. Final connection to motors, etc., shall be made via one of the schedules and electrical riser diagram. G. Panels shall be surface mounted or recessed (flush) as specified on following methods (method must also be appropriate for the the panel schedule. H. Switches H. All panelboards shall be circuit breaker type unless noted otherwise. 2. Liquid-tight flexible metal conduit with stranded conductors I. Voltage, phase, wires, poles/breaker space as specified on 20 amp, heavy duty. schedules and riser. 3. Armored flexible conduit which shall be waterproof for any locations outside, in kitchens, or any inside area subject to water, J. Solid neutral 4-Wav 1224 K. Panels rated at 10,000 AIC shall have stab-in breakers. . Panels rated greater than 10,000 AIC shall have bolt-on breakers. singles phase motors. 1. All conduit and fittings shall be in new, unused condition, shall be M. Breakers size and quantity as shown on Schedules. free from rust, dirt, moisture, kinks, flats, cuts, or other distortions N. Breakers listed as "spare" shall be furnished and installed. O. Panel listed with "space" shall be provided with extra space for future Cover plates 2. Concealed and exposed conduit in building, above slab shall be breakers EMT with compression fittings. IMC and RMC also permitted. 1. Each "space" shall be on one single pole. For I-Line (or similar) 3. Straight conduit embedded in concrete shall be PVC with residential grade materials not acceptable panels, each "space" shall be understood to be the mounting space required to accommodate one 20A single-pole breaker 4. Exposed conduit outside building, above grade shall be RMC with Panels rated 225 amps or less shall be provided as full 42 space cover plates shall be galvanized steel. panels unless specifically noted otherwise. 5. Underground straight conduit shall be PVC with waterproof joints. Q. Unless otherwise indicated on Drawings, install all panels with the weatherproof while-in-use covers. 6. Underground bends, penetrations through slabs-on-grade, and top of the trim 6'-3" above finished floor stub-ups from final bends up to equipment shall be PVC-coated R. Install panelboards in location shown on the Drawings. RMC with radius of bend no less than 8x trade size of conduit. shall be written on back side of cover plate. S. Panelboards shall be mounted with screws, bolts, or anchors as 5. Catalog numbers: required T. Panels shall not be supported by conduit alone. A Conduit shall be supported on structural building members such as U. Panelboards shall be internally and externally clean and shall be free b. Single Receptacle 93091 from dust debris and non-intentional markings Panelboards shall B. Conduit shall be supported on galvanized or aluminum brackets, be vacuumed and wiped down (internally and externally) prior to d. Special purpose outlets: Single gang P7882, Duplex 7423 substantial inspection. e. Weatherproof covers: Switches 7420 Receptacles 5205W0 Conduit hangers shall be attached to building steel by beam clamps. V. Neutral and equipment grounding terminals shall be electrically isolated, unless specifically noted otherwise. D. Hangers and supports shall be attached to wooden stud walls with GROUNDING AND GROUND FAULT PROTECTION W. Panelboard cover shall be provided with engraved phenolic plastic A. All equipment and circuits shall be grounded and bonded in identification and wiring color code nameplates. Refer to detail on E. Hangers and supports shall be attached to masonry with expansion accordance with the National Electrical Code, Article 250. Provide ground fault protection for all circuits noted on the drawings F. Supports shall be channel type supports such as manufactured by Mount a typewritten directory behind glass or plastic on the inside of as GFL all receptacles indicated on the drawings via GFL receptacle each panel door, showing panel information, circuit number, and symbol, all restroom/bathroom receptacles, all receptacles in exterior complete description of all outlets on each circuit. Handwritten edits G. Supporting means shall not be attached to roof decking. locations, and for all locations required by N.E.C. Standard are not acceptable. Directory shall be installed prior to substantial receptacles shall be considered ground fault protected if in series inspectior with the GFI protection provided in an upstream GFI receptacle or A. Pullboxes in air-conditioned spaces shall be code gauge and size, GFI breaker. CIRCUIT BREAKERS C. Provide ground fault protection on all temporary construction circuits galvanized steel with screw-type or hinged-type cover. J. Breakers shall be of the size specified on the Panel Schedules. B. Exterior pullboxes above grade shall be code gauge and size, as required by OSHA or the National Electrical Code. K. Breakers rated at 10,000 AIC shall be plug-on. galvanized steel with enamel finish and with screw-type or D. Service-entrance neutral and separately-derived neutrals shall each L. Breakers rated greater than 10,000 AIC shall be bolt-on. hinged-type cover. Boxes shall be rainproof and rated for the be bonded to the grounding electrode system once and as located on M. Breakers shall have visual trip indicators. the electrical riser diagram. C. Exterior pullboxes underground and associated covers shall be no N. Breaker sizes shall be verified against equipment it serves. E. Grounding electrode conductors shall be sized per N.E.C., yet no less than code size, shall be ANSI-Tier-rated as noted on drawings, smaller than shown on drawings. O. Current-limiting breakers shall be used where shown on panel and shall be fiberglass-reinforced-concrete polymer. Covers shall be F. All conduits shall contain a continuous "green" solid-colored schedules. gasketed, with logo on top - such as ELECTRIC, TELECOM, or other P. On three-phase panels, breakers shall alternate equipment grounding conductor, sized in accordance with Table 250.122 of the N.E.C. consecutivelybetween busses to provide a balanced load. D. Device boxes in stud walls (3-1/2" thickness or greater) shall be G. All metallic raceway shall be bonded to the equipment grounding Q. Breaker types listed below are for Square D equipment and are listed conductor for reference only. E. Device boxes in furred and stud walls less than 3-1/2" thick shall be H. Provide driven ground rod(s) as close as possible to the service R. For Type NQ Panels, the main breaker shall be equal to the Square entrance location, sized and separated as shown on the drawings D numbers as listed below: Wall boxes in four inch block shall be galvanized steel 2-1/2" deep. and in accordance with N.E.C. 1. 10,000 AIC - Q1B, Q2, KA, LA And In walls larger than four inch block, galvanized steel 3-1/2" deep. Nearest metallic cold water supply pipe, concrete encased steel, 2. 22,000 AIC - Q1B-VH, Q2-H, KA, LA G. Boxes may be ganged as required for multiple devices. building steel, and other electrodes per N.E.C. shall be bonded 3. 42.000 AIC - KH, LA together to create the grounding electrode system. 4. 65,000 AIC - KH, LH Lighting outlet boxes and specified junction boxes shall be J. Mechanical Equipment J. For type NQ Panels, the branch breakers shall be equal to Square D galvanized steel, 4" octagon with cover. Ratings shall not be less 1. All mechanical equipment motors shall have grounded cases. models 2. All equipment shall have its metallic enclosure, frame, etc. bonded 1. 10,000 AIC - QO, QOH, Q1-H Floor boxes shall be standard depth-cast steel, flush-mounted cover to the circuit equipment grounding conductor. 2. 22,000 AIC - QO-VH, Q1-VH with brass. Furnish with threaded brass receptacle covers, unless 3. 42,000 AIC - Q1H DATA/TELEPHONE 4. 65,000 AIC - QH K. Telephone/data boxes shall be standard gauge galvanized steel, 4" A. Provide conduit system for Telephone/Data including fish
- L. All wiring devices shall be installed in metallic boxes. Provide outlet boxes, receptacle boxes, junction boxes, and ceiling boxes at locations noted on the drawings and at locations required by the
 - and equal to Square D Models FA, FH, FY, IF, Q2, Q2-H, Q2H, KA, KH, IK, Q4, LA, LH, MA, MH, ME. M. Breakers listed as
 - N. Furnish and install all circuits breakers as described on the panel schedules and drawings.
 - O. Contractor shall be responsible for confirming brand, breaker type, to be installed in existing panelboards. Existing panelboard information and characteristics shall be field-verified.

FUSES

All openings in electrical equipment, enclosures, cabinet, outlet and iunction boxes shall be by means of welded bosses, standard knockouts, or shall be sawed, drilled, or punched with tools specially made for the purpose. The use of a cutting torch is prohibited. All conduit connections to electrical boxes shall be made with

Locknuts shall be drawn down tight to make ground connection

All boxes shall be labeled to indicate circuit (and/or feeder name). Boxes larger than 4x4 shall be provided with painted or adhesive labels. Boxes 4x4 and smaller may be legibly labeled via permanent marker. Refer to wiring devices specs regarding cover plate labeling.

A. All wire used throughout work shall be soft drawn copper of not less than 98% conductivity. Aluminum is not acceptable. Wire and cable shall be new: and manufacturer's name permanently

- marked on the outer covering at regular intervals. Conductors AWG No. 8 or smaller may be solid or stranded; larger sizes shall be stranded. Stranded conductors shall be used for final connections to vibrating equipment (such as motors).
- All conductors for general wiring shall be insulated with
- E. Conductors shall have solid-colored insulation with specific colors as noted on the details (based on voltage and phase), and shall be in
- Grounding conductors, if insulated, shall have green solid-colored
- H. Conductors shall be sized according to the N.E.C., yet not smaller Minimum conductor size for 20A receptacle and lighting circuits shall
- be No. 12 AWG. Where one-way circuit distance from panelboard to furthest circuit load exceeds 65 feet, use No. 10 AWG minimum;
- All wiring shall be fully polarized throughout using white (or gray depending on voltage) wires for neutral and making all switching
- K. No conductors shall be drawn into conduits until all work which may
- cause damage is completed; only approved cable lubricants shall be
- L. As far as practical, all feeder cables shall be continuous from feeder source to load termination without using splices at intermediate pull
- M. All cable terminals, taps, and splices shall be made with solderless pressure type connectors; connectors shall be Type QA-B or Q2A as manufactured by Burndy, Okonite, McJunkin or equal.
- N. The minimum free length of conductor at each box for the connection
- O. Each branch circuit requiring a neutral connection shall be provided with a dedicated neutral conductor, even if multiple branch circuits share the same raceway. No shared neutrals permitted.
- Boxes for light switches or other lighting control devices shall be
- provided with a neutral conductor from each branch circuit brought to
- A. The panelboards shall be of dead-front construction with code gauge
- galvanized steel box, and door-in-door hinged front finished in gray B. Doors shall be provided with a plate tumbler lock with flush handle

- K. For I-Line panels, the main breaker shall be 65,000 AIC rated, and equal to Square D Models FA FH KA LA LH MA MH L. For I-Line panels, the branch breakers shall be rated at 65,000 AIC
- D I Limiterm, in IF or IK frame sizes.
- mounting type, kits, accessories, and compatibility of new breakers
- Unconnected, spare, and future breakers shall be switched to and remain in the "OFF" (open) position.

- A. General duty fuses shall be equal to Bussman 250 volt, "Tron JJN" Fuses
- B. Motor circuit fuses and compressor fuses shall be equal to Bussman 250V, "Fusetron FRN" dual element fuses
- C. Current-limiting fuses shall be equal to Bussman KTN-R fast acting

- DISCONNECTS
- A. Ampere-rated for general disconnects. Horsepower-rated for motor disconnects
- Meet Federal Spec. W-S-865c for Heavy Duty Switches.
- D. UL Listed
- Grey baked enamel finish F. Quick-break operating mechanism.
- G. Visible handle.
- H. Meets NEMA KSI-1975 for Type HD.
- I. Indoor disconnects shall be NEMA 1, unless noted otherwise J. Outdoor disconnects shall be NEMA 3R, unless noted otherwise.
- K. Supply and install a disconnecting means for each motor where required by N.E.C. or if shown on drawings
- L. Locate disconnect as shown or as near as possible to motor within
- N.E.C compliance. M. Disconnects furnished as an integral part of any piece of equipment
- shall be acceptable in lieu of a safety switch. N. Switches shall be fused where shown on drawings.
- Motor-rated switches shall be acceptable as disconnects for motors of 1/3 HP or less. P. Disconnect switches shall be provided with machine-produced labels (on front cover) to indicate circuit source, circuit number, and load
- STARTERS
- A. Provide magnetic or manual starters and associated equipment as required for each motor. B. Each starter shall have properly sized thermal overload protection for
- the motor it serves, based on nameplate FLA markings. Overloads shall be manual reset type.
- Supply and install magnetic motor starters with appropriate control buttons or switches for each piece of equipment unless other specifications call for starter to be furnished with equipment.
- E. Contractor shall coordinate with both general contractor and mechanical contractor to assure that a starter has been provided for
- all equipment. F. Where both a disconnect switch and motor starter are required in the same location, a combination starter shall be acceptable in lieu of
- individual components. WIRING DEVICES

- A. Model or part number listed below are for reference and establishing B. In so far as practical, all wiring devices shall be of the same
- manufacturer. C. All catalog numbers listed are Hubbell unless noted.
- D. Acceptable manufacturers shall be Hubbell, Pass and Seymour, Leviton, or Arrow-Hart.
- Contractor shall be responsible for confirming device color and cover plate color with owner and architect.
- General Purpose Receptacles and single appliance type receptacles. 1. General purpose receptacles shall be specification grade, 120

- volt AC, 20 amp, NEMA 5-20R, grounding type, capable of
- 1. Special purpose receptacles shall be installed as required and as shown to match equipment and appliance cord. 2. Refer to plan and/or equipment schedule for NEMA configuration.
- 1. General light switches shall be specification grade, 125-277 volt,
- 2. Catalog numbers shall be: SPST 1221 DPST 1222 3-Way 1223
- 3. Motor rated switches shall be used for any switches controlling

SEAL AFTER -

CONDUCTOR

INSTALLATION

- 4. Motor rated switches shall be 120-277 volt and rated in accordance with the voltage and amperage of the motor.
- 1. In finished areas with flush boxes: All cover plates shall be thermoplastic smooth nylon for finished areas. Thermoset or
- 2. In areas with exposed raceway and surface-mounted boxes:
- 3. Exterior receptacles shall be provided with metallic, gasketed,
- 4. Contractor shall provide adhesive label on each cover plate to indicate source panel and circuit number. Also, circuit number
- a. Switches: Single gang--P1, Two gang----P2, Three gang---P3
- c. Duplex Receptacle Single gang P8, Two gang P82

wires, boxes and blank plates.

Contractor.

this purpose

svstems

controlled fixture(s).

SURGE PROTECTION DEVICE (SPD)

A. Provide TYPE 2 on panels as shown.

2. 20KA Nominal Discharge Current.

to indicate loss of protection

DIMMERS

the drawings and the telephone riser.

B. Conduit, cabling, and outlets shall be provided as shown on

C. Consult the local utility representative prior to bidding for any

special requirements. All electrical work required by the tele

company shall be furnished and performed by the Electrical

A. LED 0-10V, unless otherwise required to be compatible with

B. Dimmers shall not rely on equipment grounding conductor as

C. Dimmers shall be fully compatible with the drivers they control.

B. Provide SPD with integral audible and visible alarm features

4. 150V MCOV (Maximum Continuous Operating Voltage) for

120/240V and 208Y/120V systems, 320V MCOV for 480Y/277V

C. MOV TYPE meeting UL-1449, 3rd edition, TYPE 2 listing.

1. 120KA Surge Current Rating (L-L and L-G)

200KA SCCR (Short Circuit Current Rating)

a return current path for control power, provide a neutral for

