

GENERAL NOTES

- PROVIDE SIGNAGE AS REQUIRED BY CODE AND AS INDICATED ON DWG E2.0.
- CONSULT DOOSAN MODEL 400 INSTALLATION DESIGN GUIDE (FUEL CELL POWER PLANT) AND STANDARD INSTALLATION DRAWINGS FOR TECHNICAL REFERENCE.

GROUNDING NOTES:

- THE FUEL CELL GROUND LUG INSIDE DISCONNECT SWITCH MD-1 SHALL BE CONNECTED TO AN EXTERNAL #10 COPPER EQUIPMENT GROUNDING CONDUCTOR FROM MAIN SWITCHBOARDS GROUNDING CONDUCTOR PER NEC ART 692.44, IN ORDER TO PROVIDE THE REQUIRED SINGLE POINT GROUND PER NEC ART. 250.24 & D.
- NOTE THAT THE FUEL CELL GROUND LUG INSIDE MD-1 IS BONDED TO ALL METALLIC NON-CURRENT CARRYING METAL PARTS BOTH INSIDE THE FUEL CELL AND ALSO AT EXTERNAL FUEL CELL ASSEMBLIES SUCH AS THE COOLING MODULE, SO ALL FUEL CELL PARTS ARE CONNECTED TO THE EQUIPMENT GROUNDING CONDUCTOR AS REQUIRED BY ART. 250.110.

CERTIFICATION:

- POWER PLANT IS CERTIFIED TO: ANSI/CSA AMERICA FC 1 - 2014 (FORMALLY ANSI Z21.183) "AMERICAN NATIONAL STANDARD FOR STATIONARY FUEL CELL POWER SYSTEM" INCLUDING:
- UL1741SA "INVERTERS, CONVERTERS, CONTROLLERS AND INTERCONNECTION SYSTEM EQUIPMENT FOR USE WITH DISTRIBUTED ENERGY RESOURCES."
 - IEEE 1547 "STANDARD FOR INTERCONNECTING DISTRIBUTED RESOURCES WITH ELECTRIC POWER SYSTEMS."
 - NFPA 70 NATIONAL ELECTRIC CODE (FOR INTERFACES TO CUSTOMER WIRING AND WIRING BETWEEN MODULES).

POWER PLANT SPECIFICATIONS

RATED POWER OUTPUT	460 kW / 532 kVA
OUTPUT TYPE	480VAC, 60 HZ, 3 PHASE, 3 WIRE
RATED OUTPUT CURRENT	639 AMPS AT RATED KVA

LEGEND

- LIGHT INDICATES EXISTING
- BOLD INDICATES NEW
- GC GRID CONNECT
- GI GRID INDEPENDENT

TABLE A - SEL547 RELAY
IEEE1547 / UL 1741SA GRID PROTECTION PARAMETER SETTINGS

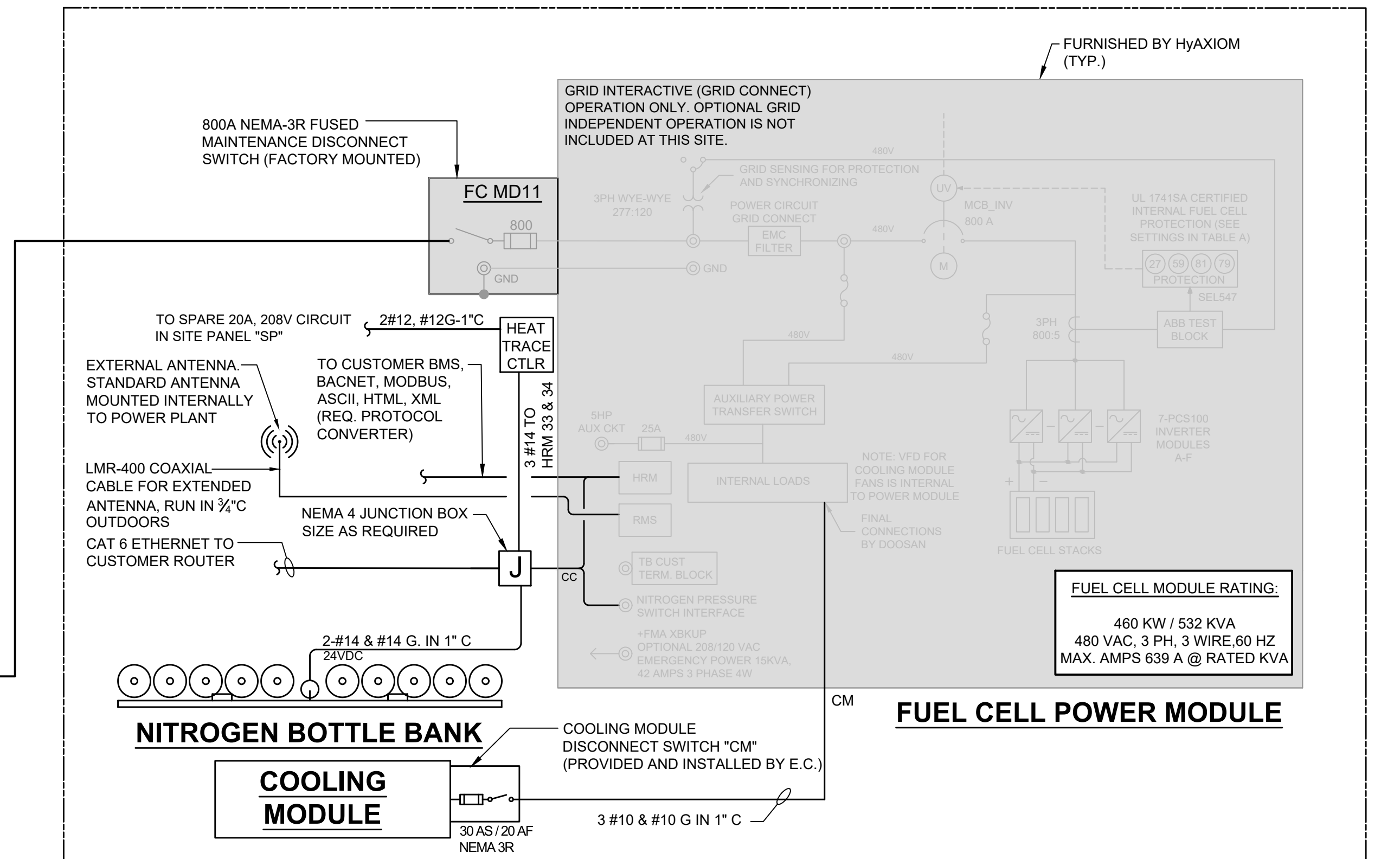
THE REQUIRED GRID PROTECTION FUNCTIONS AND SETTINGS PER UL1741SA/IEEE1547 RESIDE IN THE INTERNAL SEL547 RELAY WITH SETTING NAMES AS SHOWN BELOW.

SETTING NAME	DESCRIPTION	GROUP 1 - "SUPPORT" 60 Hz SETTING 480Vac Tx RATIO 2.31:1	VOLTAGE P.U.	ANSI C37 DEVICE NUMBER
27P1P	UNDER VOLTAGE LEVEL 88%(V)	106	0.88	27
27P2P	MID UNDER VOLTAGE	106	0.88	
27P3P	UNDER VOLTAGE LEVEL 50% (V)	60	0.50	27
59P1P	OVER VOLTAGE LEVEL 110% (V)	132	1.1	59
59P2P	OVER VOLTAGE LEVEL 120% (V)	144	1.2	59
81D1P	FAST UNDER FREQUENCY LEVEL (Hz)	56.5		81U
81D2P	SLOW UNDER FREQUENCY LEVEL (Hz)	58.5		81U
81D3P	SLOW OVER FREQUENCY LEVEL (Hz)	61.2		81O
81D4P	FAST OVER FREQUENCY LEVEL (Hz)	62		81O
SV1PU	RECONNECTION TIME DELAY (CYCLES)	18,000		
SV2PU	FAST OVER FREQUENCY CLEARING TIME (CYCLES)	*5		
SV3PU	SLOW OVER FREQUENCY CLEARING TIME (CYCLES)	18,000		
SV4PU	FAST UNDERFREQUENCY CLEARING TIME (CYCLES)	18,000		
SV5PU	FAST UNDER FREQUENCY CLEARING TIME (CYCLES)	*5		
SV6PU	OVER VOLTAGE 120% CLEARING TIME (CYCLES)	*5		
SV7PU	OVER VOLTAGE 110% CLEARING TIME (CYCLES)	120		
SV8PU	UNDER VOLTAGE 88% CLEARING TIME (CYCLES)	120		
SV9PU	MID UNDER VOLTAGE 88% CLEARING TIME (CYCLES)	120		
SV10PU	UNDER VOLTAGE 50% CLEARING TIME (CYCLES)	66		
SV12PU	DELAY BETWEEN GRID OK STATUS AND BREAKER OPENING (CYCLES)	0		

* NOTE 1: THE ACTUAL (TOTAL) PROTECTION CLEARING TIME EQUALS THE SUM OF THE PARAMETER CLEARING TIME SETTING IN THE TABLE PLUS 5 CYCLE BREAKER'S TRIPPING TIME. FOR EXAMPLE ACTUAL (TOTAL) FAST OVER CURRENT CLEARING TIME EQUALS PARAMETER SV6PU 5 CYCLES SETTING PLUS THE 5 CYCLE BREAKER CLEARING TIME FOR A TOTAL CLEARING TIME OF 10 CYCLES (0.16 SEC).
NOTE 2: GROUP 1 SETTINGS ARE FOR THE UL1741SA "GRID SUPPORT" AND GROUP 2 SETTINGS ARE FOR IEEE1547-2003 NON-SA SETTINGS - USE GROUP 1 FOR UL1741SA SITES.
NOTE 3: FOR DOOSAN ON-SITE PERSON - GROUP 1 OR GROUP 2 IS SET BY GROUP 9 PARAMETER "INVERTER MODE"
GROUP 1 = GRID SUPPORT (INVERTER MODE = 0 = FALSE) =UL1741SA

TABLE B - SEL451 RELAY

ANSI C37 DEVICE NUMBER	PROTECTION FUNCTION	MAGNITUDE	TIME
27	UNDER VOLTAGE	88%	2 SEC
27	FAST UNDER VOLTAGE	50%	66 CYCLES
59	OVER VOLTAGE	110%	2 SEC
59	FAST OVER VOLTAGE	120%	10 CYCLES
81	SLOW UNDER FREQUENCY	58.5 Hz	300 SECONDS
81	UNDER FREQUENCY	56.5 Hz	10 CYCLES
81	OVER FREQUENCY	62 Hz	10 CYCLES
81	SLOW OVER FREQUENCY	61.2 Hz	300 SECONDS
50P1P	INSTANTANEOUS OVERCURRENT	15 Inom (Inom = 250 A)	
50G	INSTANTANEOUS GROUND FAULT	1.0 Inom	
51S1P	TIME OVERCURRENT	1.4 x Inom (Inom = 250 A)	
51S1C	INVERSE TIME OVERCURRENT CURVE ELEMENT	18,000	I/2 (INVERSE CURVE)
51S1TD	TIME OVERCURRENT DIAL ELEMENT	18,000	1



TYPICAL FOR (11) MODEL 400 PureCell SYSTEM POWER PLANTS

STRATFORD SCEF
 540 LONGBROOK AVE, STRATFORD CT
 11 FUEL CELL INSTALLATION
ELECTRICAL ONE-LINE DIAGRAM

Project No:	Drawn By:
Date:	Design By:
Scale:	Check By:

Drawing No: **E1.0**

Rev.	Date	Description
A	05/29/24	ISSUED FOR CT SITING COUNCIL & UTILITY INTERCONNECTION

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