

**DOCKETED**

<b>Docket Number:</b>	09-AFC-05C
<b>Project Title:</b>	Abengoa Mojave Compliance
<b>TN #:</b>	241162
<b>Document Title:</b>	Petition for Post Certification Amendment to Implement a Hydrogen Generation at Alpha and Beta Plants
<b>Description:</b>	N/A
<b>Filer:</b>	Patty Paul
<b>Organization:</b>	Mojave Solar LLC
<b>Submitter Role:</b>	Applicant
<b>Submission Date:</b>	1/13/2022 4:11:15 PM
<b>Docketed Date:</b>	1/13/2022

# Mojave Solar LLC

42134 Harper Lake Road  
Hinkley, California 92347

Phone: 760 308 0400

## Submitted Electronically

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**Subject:** 09-AFC-5C  
**Condition Number:** Post Certification Amendment  
**Description:** Install Hydrogen Generators for Alpha and Beta Plants  
**Number:** N/A

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January 13, 2022

Keith Winstead, CPM  
California Energy Commission  
1516 Ninth Street  
Sacramento, CA 95814  
[keith.winstead@energy.ca.gov](mailto:keith.winstead@energy.ca.gov)

Mr. Winstead,

Mojave Solar Project (MSP) is submitting this petition for a post certification amendment to implement a hydrogen generation at Alpha and Beta plants. This Petition to Amend (PTA) is filed to make the changes necessary to final design approved by California Energy Commission (CEC) in accordance with California Code of Regulations (CCR) title 20, section 1769 (a)(1).

We look forward to receiving CEC approval to proceed.

Sincerely,

Mahnaz Ghamati

Quality, Environmental & Compliance Manager  
**ASI Operations LLC**  
42134 Harper Lake Rd  
Hinkley, CA 92347  
Cell: (760)498-0549  
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Attachment: 09-AFC-05- PTA\_Abengoa Mojave Solar Hydrogen Project.

# Petition To Amend Hydrogen Generator Project

# **Abengoa Mojave Solar Project**

## **NO: 09-AFC-5**

### **12-13-2021**

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## 1 Definitions

Atlantica	Atlantica Sustainable Infrastructure
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
COCs	Conditions of Certifications
GEN-1	General Condition
LORS	Laws, Ordinances, Regulations, and Standards
AMSP	Abengoa Mojave Solar Project
MDAQMD	Mojave Desert Air Quality Management District
PTA	Petition to Amend
PTO	Permit To Operate
TAC	Toxic Air Contaminant

## 2 Introduction

Atlantica Sustainable Infrastructure (Atlantica or the Applicant) is submitting this petition for a post Certification Amendment of its Abengoa Mojave Solar Project (MSP), Docket 09-AFC-5. Atlantica is proposing to implement a hydrogen generation at MSP. This Petition to Amend (PTA) is filed to make the changes necessary to final design approved by California Energy Commission (CEC) in accordance with California Code of Regulations (CCR) title 20, section 1769 (a)(1).

### 2.1 Mojave Solar Hydrogen Project Overview

Abengoa Mojave Solar Project is an operating 280 megawatt (MW) concentrated solar project at Hinkley in San Bernardino County, California. The plant is divided in two power blocks (Mojave Alpha and Beta), each one with its own turbine. The electric generators are cooled in an atmosphere of hydrogen that is currently supplied by means of bottle racks, provided externally in a rental basis. The objection of this proposal is to be self-sufficient and reduce the operation cost at AMSP.

Pursuant to 20 CCR Section 1769(a)(1), as revised in September 2019, Atlantica, the Project Owner, is filing this PTA to include installation of the following new equipment and facility at

the AMSP:

1. Hydrogen generation with the use of an electrolyzer

The hydrogen generated on-site will be used for generator cooling, which is currently provided by purchasing hydrogen in compressed gas cylinders, which are stored on-site. Other than adding this component to the project description, only two Conditions of Certification (COCs) require modification to allow for implementation of this project.

The proposed modifications to the COCs are:

COMP-14 post certification changes to the approved plan.

GEN 1 for addition of Hydrogen Unit after issuance of the certificate of occupancy.

Since hydrogen is not a regulated pollutant or toxic air contaminant (TAC), Atlantica does not expect to need a revision of the Mojave Desert Air Quality Management District (MDAQMD) Permit to Operate (PTO) for the AMSP associated with the Hydrogen Project.

No other environmental permits related to water supply, biological resources, waste management, etc. are expected to be needed.

The proposed new Mojave Hydrogen Project components comply with all laws, ordinances, regulations, and standards (LORS) and do not have a significant environmental impact, as further described in this PTA. The proposed revisions to the COCs will not have significant impact on property owners, the public, or any other parties.

### **3 Information Requirements for Post-Certification Amendments**

This Petition contains the information required under the CEC's Siting Regulations for post-certification project modifications [20 CCR Section 1769(a)(1)], including the following:

- A. A complete description of the proposed change, including new language for any conditions of certification that will be affected.
- B. A discussion of the necessity for the proposed change.
- C. An analysis of the effects that the proposed change to the project may have on the environment and proposed measures to mitigate any significant environmental effects.
- D. A discussion of any exemptions from the California Environmental Quality Act (CEQA), of the Public Resources Code, that the project owner believes may apply to approval of the proposed change.

Each of these requirements is addressed in this section.

**A. Complete description of the proposed change, including new language for any conditions of certification that will be affected.**

***A.1 Facility Permitting Background***

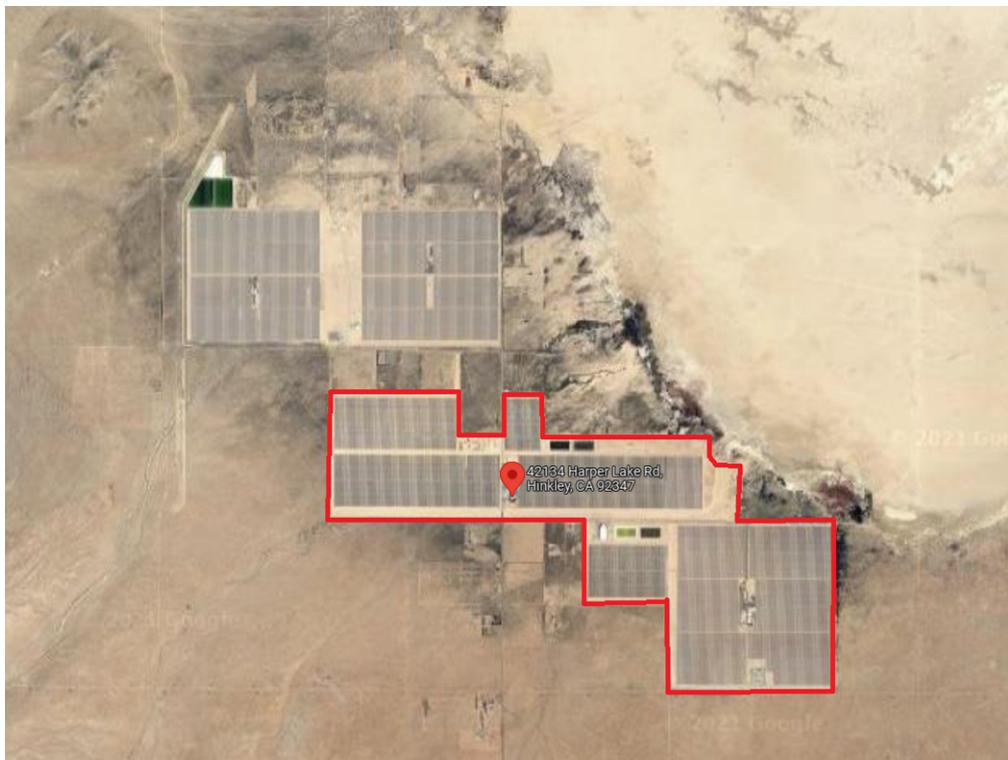
The AMSP, a Concentrated Solar Power Plant, was certified by the CEC with a Final Decision on September 8, 2010 and began commercial operation on December 24, 2014. The facility is located in the City of Hinkley in San Bernardino County, California. An aerial view of the facility and its environment is shown in Figure 3-1. Some of the subsequent amendments made to the COCs in the Final Decision are described below.

In June 27, 2016, AMSP proposed use of evaporators at Evaporation Ponds, SWAT02-15-00 and received approval for installation of the evaporators on March 2, 2017. (SWAT02-16-00)

On February 13, 2020, AMSP submitted the proposal for Carbon Absorption System Improvement, upon CEC approval the modification was completed on February 26, 2021.

On January 28, 2020, AMSP filed a petition (TN231771) for the construction of new warehouse building which was approved on February 13, 2020 and the construction completed on September 24, 2020.

**Figure 3-1: Aerial View of the Mojave Solar Project and Surrounding Area**



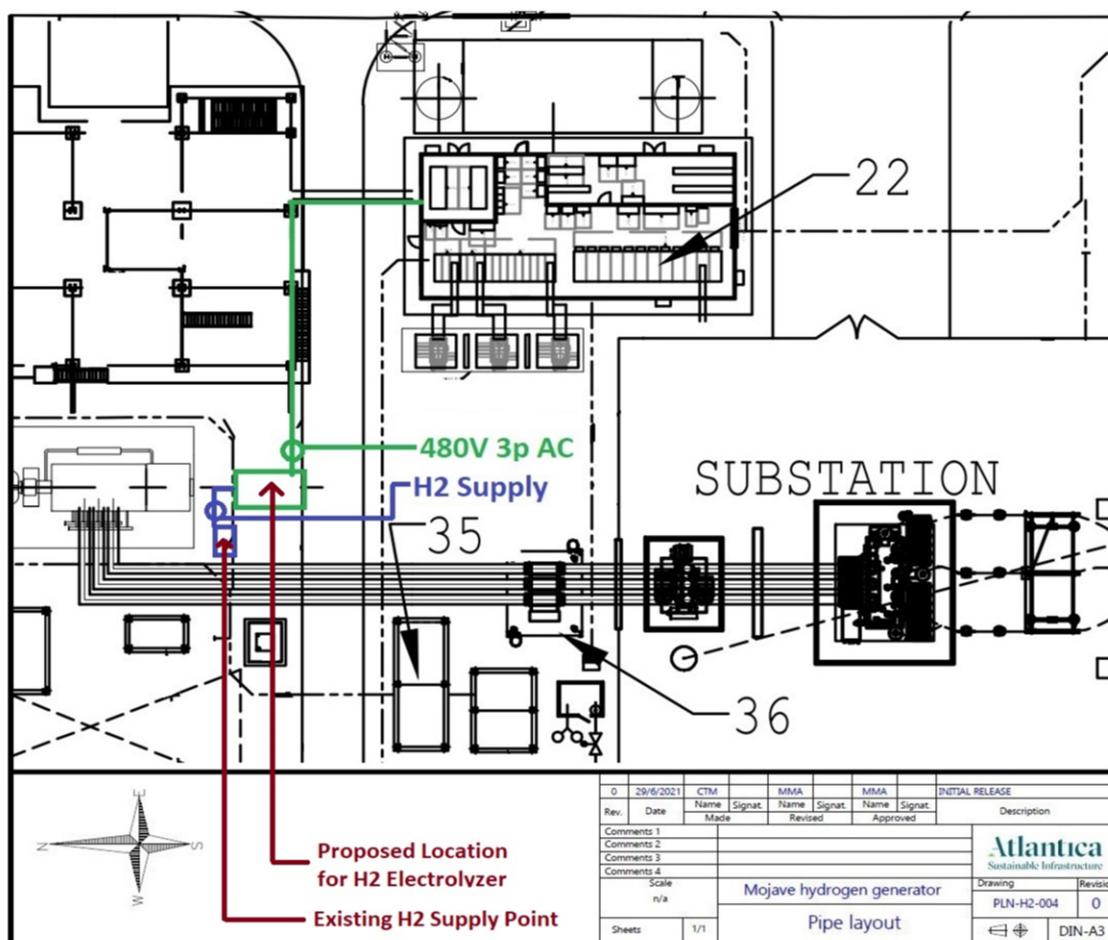
### **A.2 Proposed Project Description.**

Our facility uses two General Electric generators at its Alpha and Beta plants which are cooled using hydrogen gas. This gas is currently supplied by continuous injection from portable bottle racks.

The proposed project includes installation of the hydrogen production system, including an electrolyzer that uses electricity from the plant to decompose demineralized water into hydrogen and oxygen. The gases are then cooled, dried, and purified for use at the two separate outlets. Therefore, only de-mineralized water and electricity are consumed in this process. The hydrogen gas would then be condensed and supplied to the generator by the unit without the need for a storage tank.

The unit is proposed to be installed in the same location as our existing hydrogen storage bottles. A detailed drawing of the location is shown below (please refer to appendix item A "Hazardous Area Plot Plan" for complete drawing).

**Figure 3-2: Aerial View Showing the Existing Use of the Proposed Hydrogen Project Components Location**



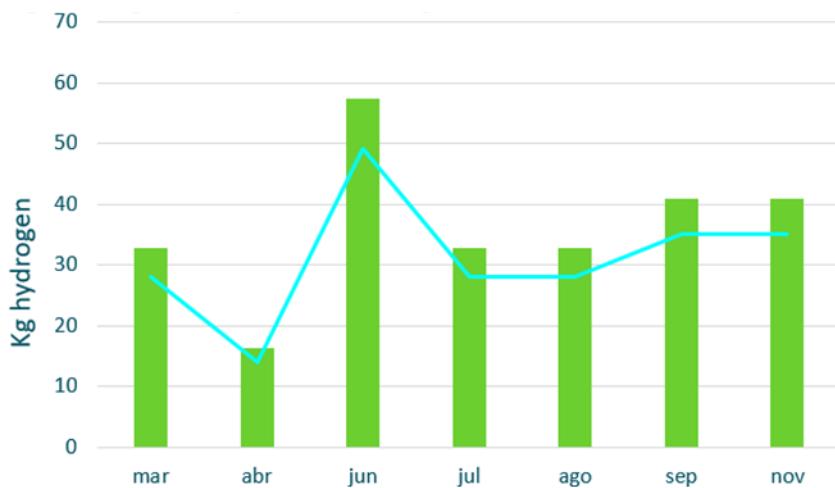
### **A.2.1 AMSP Hydrogen Consumption**

This proposed change will not affect the plant's current hydrogen consumption rate in any way. Gas will be generated by the proposed hydrogen electrolyzer to meet the cooling demand of the unit.

Hydrogen gas consumption for the plant is variable. Historical data shows that the current consumption rate is 32 Kg per month based on values from the last 7 months.

In terms of volumetric flow, the site average hydrogen consumption is 180SCFD, ranging from 100-290SCFD. This is equal to an average of 5Nm<sup>3</sup>/day and a range of 2.83-8.21Nm<sup>3</sup>/day.

**Figure 3-3: Mojave Solar Hydrogen Gas Consumption History**



### **A.2.2 Hydrogen Production and Integration**

The proposed generation system produces hydrogen and oxygen through the electrolysis of de-mineralized water. This process occurs in a containerized unit, in which water is split into Hydrogen and Oxygen gas by a DC current under the effect of a certain catalyst. The hydrogen and the oxygen are released separately.

After leaving the electrolyzer unit, the produced H<sub>2</sub> gas is fed to a chemical dryer to enhance the purity from 99.5% to upwards of 99.95%. After this stage, the gas is fed through a final molecular sieve dryer to removing traces of the electrolyte solution and other impurities. The final design purity of the H<sub>2</sub> will be 99.9995%. The unit consists of a hydrogen generator and a purification system. These components will be used together in a packaged indoor system (see Appendix item C).

The specific point of H<sub>2</sub> entry will be same location as our existing portable bottle system. Complete details are included in Appendix item D.

### **A.2.3 Project Construction Schedule**

Since the current H<sub>2</sub> supply contract expires in October 2022 and lead times for the proposed equipment is approximately 6 months, a purchase order shall be placed by March 2022 and commissioning activities performed in September/October same year.

### **A.3 Proposed Changes to the Conditions of Certification**

**COMP-14** The project owner must petition the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, in order to modify the project (including linear facilities) design, operation or performance requirements, and to transfer ownership or operational control of the facility.

**GEN-1** Once the certificate of occupancy has been issued, inform the CPM prior to any construction, addition, alteration, moving, demolition, repair, or maintenance to be performed on any portion(s) of the completed facility that requires CBO approval for compliance with the above codes.

### **B. A discussion of the necessity for the proposed change.**

The aim of this change is to minimize costs for the H<sub>2</sub> supply and to avoid reliance on third parties for it. This change will also have a positive environmental impact by generating hydrogen using Solar energy and reducing GHG emission from the production and long-distance transportation.

### **C. An analysis of the effects that the proposed change to the project may have on the environment and proposed measures to mitigate any significant environmental effects.**

A summary of the expected impacts on each of the environmental resource areas is provided in this section.

#### **C.1 Air Quality**

Since hydrogen is not a regulated pollutant, no direct criteria pollutant emissions increases are expected from operation of the proposed new hydrogen generation system.

### **C.2 Biological Resources**

The proposed project components will be added within the existing facility footprint and would not impact biological resources.

### **C.3 Cultural Resources**

The proposed project components will be added within the existing facility footprint and would not have an impact on cultural resources.

### **C.4 Efficiency and Reliability**

The proposed project would not have an impact on Efficiency and Reliability of AMSP.

### **C.5 Geology, and Paleontology**

The area where the proposed Project components will be installed is already level and disturbed and hence no substantial changes to the Project footprint are proposed. Therefore, there would be no impact to geologic or paleontological resources.

### **C.6 GHG Emissions and Energy Use**

There would be no impact on GHG emission associated with the electrolyzer since the unit will use generated electricity from the plant.

### **C.7 Hazardous Materials**

Hydrogen is already stored on-site, and the usage amount will remain the same. Therefore, there would be no impact on the amount of stored hazardous materials.

### **C.8 Land Use**

The use of hydrogen for generator cooling is already allowed at PEC and the proposed changes. Therefore, impacts related to land use are not expected.

### **C.9 Noises and Vibration**

According to the manufacturer manual, the Hydrogen unit noise level is less than 70 dBA. Therefore, there would be no impact.

### **C.10 Public Health**

This Petition does not affect any of the findings, conclusions, or conditions of certification in the Public Health section of the Final Decision.

### **C.11 Socioeconomic Resources**

The proposed Project does not require any changes in operations workforce; hence, there will be no socioeconomic impact.

### **C.12 Soil and Water Resources**

Impacts to Soils are not expected. The Hydrogen Unit will use portable demineralized water that was produced in the plant. The water tank is not connected to potable system and dose not generate any wastewater discharge.

### **C.13 Traffic and Transportation**

The proposed Project does not require any changes in MPC workforce for plant operation; hence, there will be no traffic or transportation impact due to worker commute. The proposed changes will reduce the quantity of hazardous materials delivered to the Facility since hydrogen will now be produced on-site.

### **C.14 Transmission Line Safety & Nuisance and System Engineering**

The unit will require a piping interconnection on-site, but no changes to the transmission system are required for the proposed project. There are no impacts related to the transmission system.

### **C.15 Visual Resources**

This Petition does not affect any of the findings, conclusions, or conditions of certification in the visual resources section of the Final Decision.

### **C.16 Waste Management**

The proposed Project will not affect the level of solid waste production from the AMSP; hence, there will be less than significant impact.

### **C.17 Worker Safety and Fire Protection**

All required plans such as the Hazardous Materials Business Plan (HMBP) will be updated if needed related to the production and use of hydrogen on-site. As a result of the safety

procedures in place and updated as needed, the proposed project will have a less than significant impact on worker safety and fire protection.

**D. A discussion of any exemptions from the California Environmental Quality Act (CEQA), of the Public Resources Code, that the project owner believes may apply to approval of the proposed change.**

Exemptions to CEQA have not been identified.

## **4 Summary and Conclusion**

The AMSP Hydrogen Project is proposed to install a Hydrogen generator unit (electrolyzer) to produce the required Hydrogen for cooling the electric generators to be self-sufficient and reduce the operation cost at AMSP.

The installation of the unit is expected to take approximately 1 months after receiving the approvals. Lead time for equipment is current 14 weeks, so a PO will be issued in March 2022.

Implementation of the proposed Project does not introduce any new LORS for operation of the AMSP since hydrogen is already used and stored on-site. There are only two Conditions of Certification (COCs) require modification to allow for implementation of this project; COMP-14 post certification changes to the approved plan, and GEN-1 for addition of Hydrogen Unit after issuance of the certificate of occupancy.

Hydrogen is not a pollutant or TAC and no new or revised environmental permits are needed.

The nearby property owners, residents, or the public should not be impacted by the project.

## **5 References**

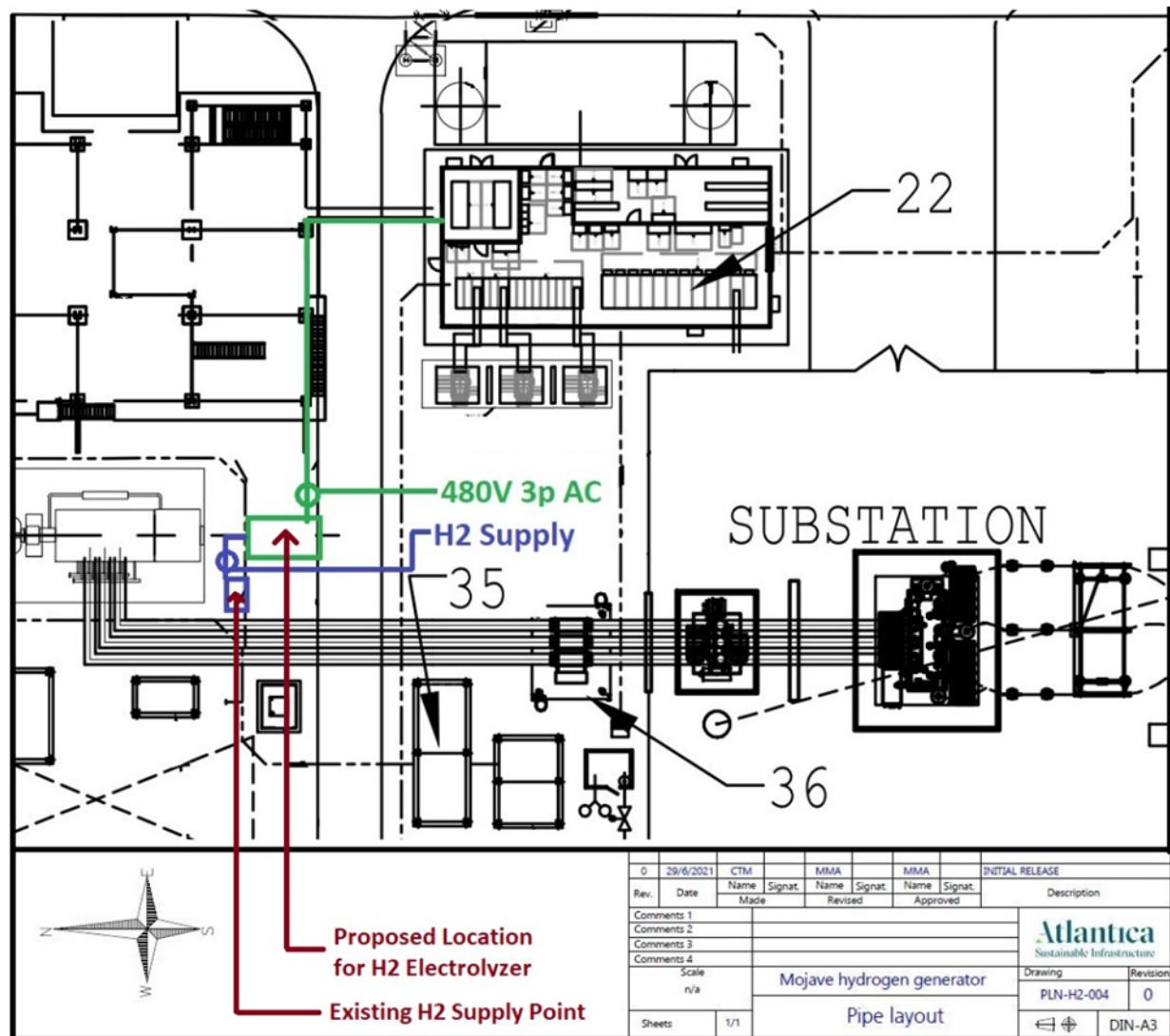
Abengoa Mojave Solar Project, Final Commission Decision, September 2010, CEC-800-2010-008-CMF, Docket Number 09-AFC-5

## **6 Appendix**

- A Plot Plan Sketch of Device Location
- B Drawing for Device Enclosure
- C Hazardous Area Classification Drawing
- D P&ID Drawing for Tie-In
- E Detailed Wiring Diagram for Device

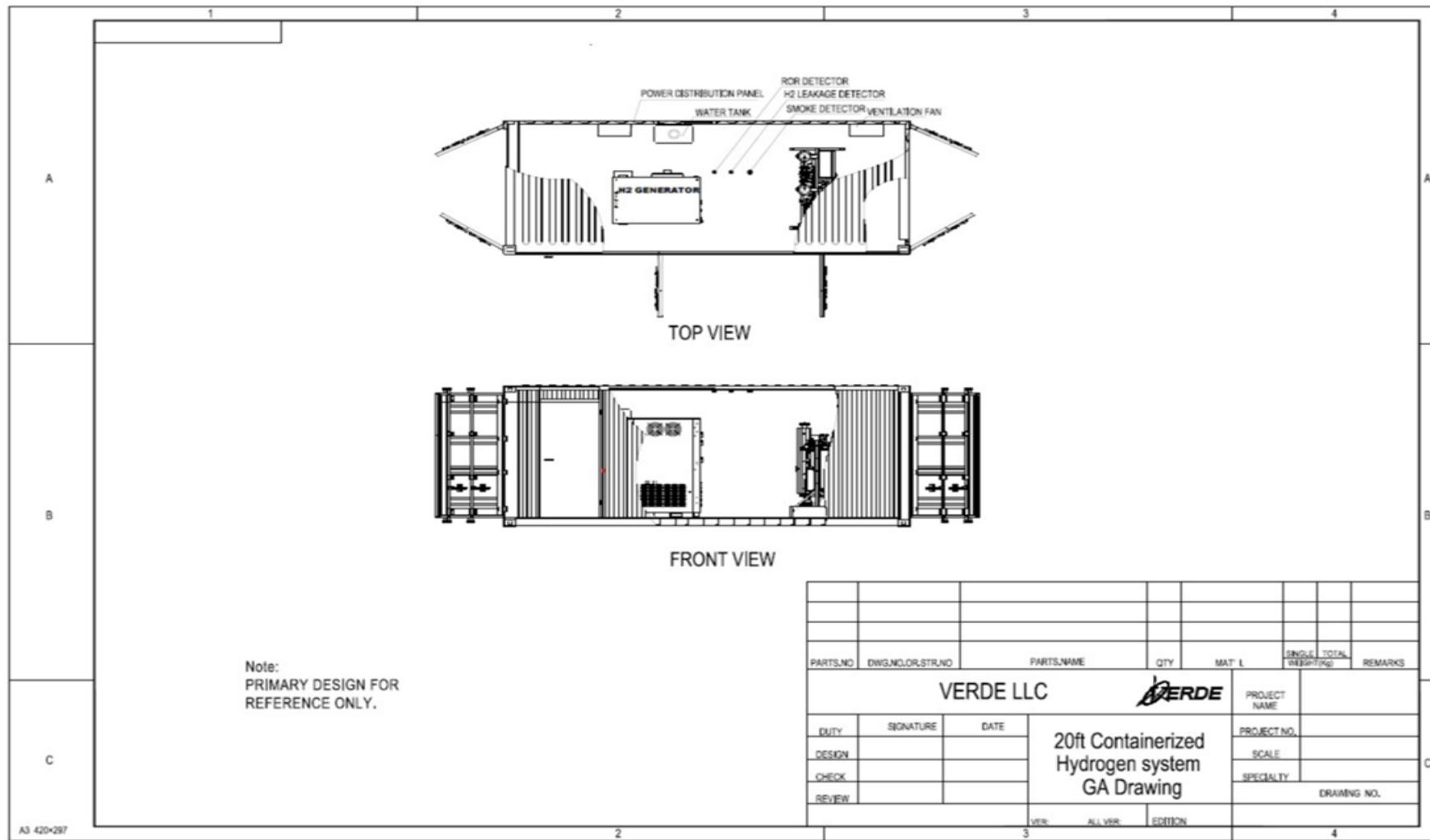
## Appendix A

### Plot Plan Sketch of Device Location

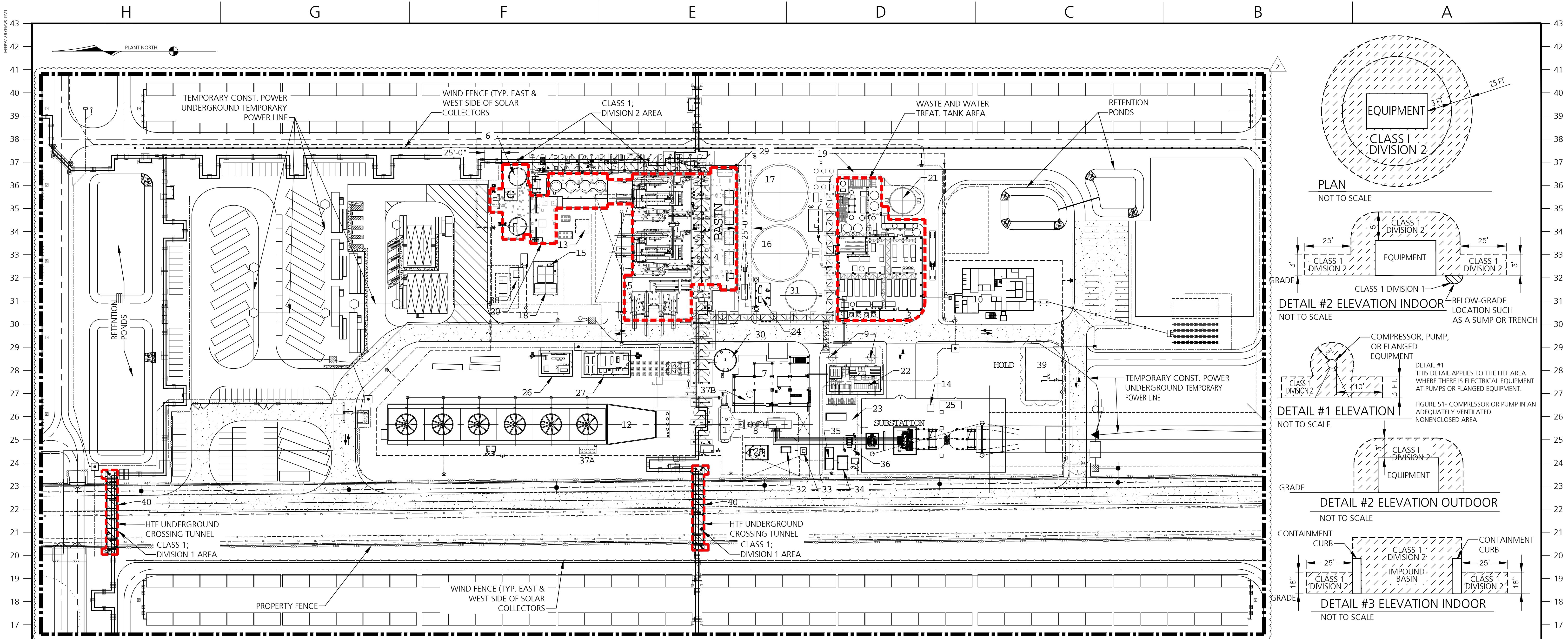


## Appendix B

## Drawing for Device Enclosure



**Appendix C**  
**Hazardous Area Classification Drawing**



# ALPHA SOLAR FIELD

NOT TO SCALE

SYSTEM LIST				
TAG	AREA	NOTE	DESCRIPTION	DESCRIPTION
1		1,2,5	NOT USED	
2		1,2,5	FIRE WATER PUMP BUILDING	UNCLASSIFIED
3		1,2,5	HTF EXPANSION VESSELS	CLASS 1 / DIVISION 2
4		1,2,5	HTF MAIN & RECIRCULATION PUMPS	CLASS 1 / DIVISION 2
5		1,2,3,5	2 SOLAR STEAM GENERATION SYSTEM	CLASS 1 / DIVISION 2
6		1,2,5	HTF OVERFLOW TANKS & OVERFLOW SYSTEMS	CLASS 1 / DIVISION 2
7		1,2,5	BFW HEATERS, DA, BFW PUMPS	UNCLASSIFIED
8		1,2,3,5	STEAM TURBINE GENERATOR	UNCLASSIFIED
9		1,2,5	RAW WATER PRODUCTION WELLS	UNCLASSIFIED
10		1,2,5	ADMINISTRATION & CONTROL BUILDING	UNCLASSIFIED
11		1,2,5,6	WATER TREATMENT BUILDING	SEE NOTE #6
12		1,2,5	2 COOLING TOWER	UNCLASSIFIED
13		1,2,5	2 FUTURE REGENERATION SYSTEM	SEE NOTES
14		1,2,5	SWITCHYARD	UNCLASSIFIED
15		1,2,5	NITROGEN HOLDING TANK	UNCLASSIFIED
16		1,2,5	COOLING TOWER MAKE-UP WATER TANK	UNCLASSIFIED
17		1,2,5	RAW / FIRE WATER STORAGE TANK	UNCLASSIFIED
18		1,2,5	NITROGEN SYSTEM	UNCLASSIFIED

19		1,2,5	OILY WATER SUMP & OIL/WATER SEPARATOR	UNCLASSIFIED
20		1,2,5	HTF CLEANING SYSTEM	CLASS 1 / DIVISION 2
21		1,2,5	POLISHER FEED TANK	UNCLASSIFIED
22		1,2,5	CONTROL ELECTRICAL POWER ROOM	UNCLASSIFIED
23		1,2,5	EM DIESEL GENERATOR	UNCLASSIFIED
24		1,2,5	COMPRESSED AIR SYSTEM	UNCLASSIFIED
25		1,2,4,5	SUBSTATION RELAY HOUSE	UNCLASSIFIED
26		1,2,3,5	CT ELECTRICAL BUILDING	UNCLASSIFIED
27		1,2,3,5	HTF ELECTRICAL BUILDING	SEE NOTES
28		1,2,5	LUBE OIL SKID	UNCLASSIFIED
29		1,2,3,5	HTF/STEAM FLASH VESSEL & ELECRTRIC HEATER	UNCLASSIFIED
30		1,2,3,5	POLISHED WATER TANK	UNCLASSIFIED
31		1,2,5	COOLING TOWER BLOWDOWN TANK	UNCLASSIFIED
32			EXCITATION BUILDING	UNCLASSIFIED
33			EXCITATION TRANSFORMER	UNCLASSIFIED
34			BATTERY BUILDING	UNCLASSIFIED
35			MAIN ELECTRICAL BUILDING	UNCLASSIFIED
36			CIRCUIT BRAKER	UNCLASSIFIED
37			COOLING TOWER CHEMICAL FEED SYS./BOILER FEED WATER CHEMICAL SYSTEM (BFW)	CLASS 1 / DIVISION 2
38			HTF/STEAM SECONDARY CONTAINMENT	UNCLASSIFIED
39			WAREHOUSE BUILDING	UNCLASSIFIED
40			HTF UNDERGROUND CROSSING TUNNEL	CLASS 1 / DIVISION 1

## NOTES:

- NOTES.**

  1. ALL SYSTEMS ARE ASSUMED TO BE ENCLOSED SYSTEMS WITH NO VAPORS IN THE ATMOSPHERE IN A NORMAL CONDITION.
  2. ALL ELECTRIC (CLASSIFIED AND UNCLASSIFIED) SHALL BE RATED BASED ON TEMPERATURE EXPOSURE TO THE ELEMENTS (RAIN AND SUN), AND FOR ATMOSPHERIC EXPOSURE. PIPING EXPOSED TO A CORROSIVE ATMOSPHERE SHALL BE LISTED FOR THE EXPOSURE.
  3. AREAS WHICH MAY EXTEND INTO THE CLASS 1 DIVISION AREAS SHOWN IN DETAILS 1 AND 2. THESE AREAS WOULD REQUIRE A CLASSIFIED ELECTRIC SYSTEM.
  4. IF IT FALLS INTO ONE OF THE AREAS OUTLINED IN DETAILS 1 AND 2, IT SHALL BE CLASSIFIED.
  5. THESE NOTES ASSUME THE ITEMS LISTED AS CLASS 1 / DIVISION 2 ARE WITHIN THE SPILL CONTROL AREA. IF THE SPILL CONTROL AREA EXTENDS PAST THE CLASSIFIED ARE LIMITS. ALL EQUIPMENT WITHIN THE SPILL CONTROL WOULD HAVE TO BE CLASSIFIED.
  6. THE WASTE WATER TREATMENT BUILDING MAY HAVE AREAS WITHIN THE BUILDING WHICH HAVE TO BE CLASSIFIED. ALL PIPING EXPOSED TO A CORROSIVE ENVIRONMENT SHALL BE LISTED FOR THE EXPOSURE. IF THERE IS A FLAMMABLE AREA WITHIN THE BUILDING, THE AREAS SHOWN IN DETAIL 2

# **ABENER TEYMA**

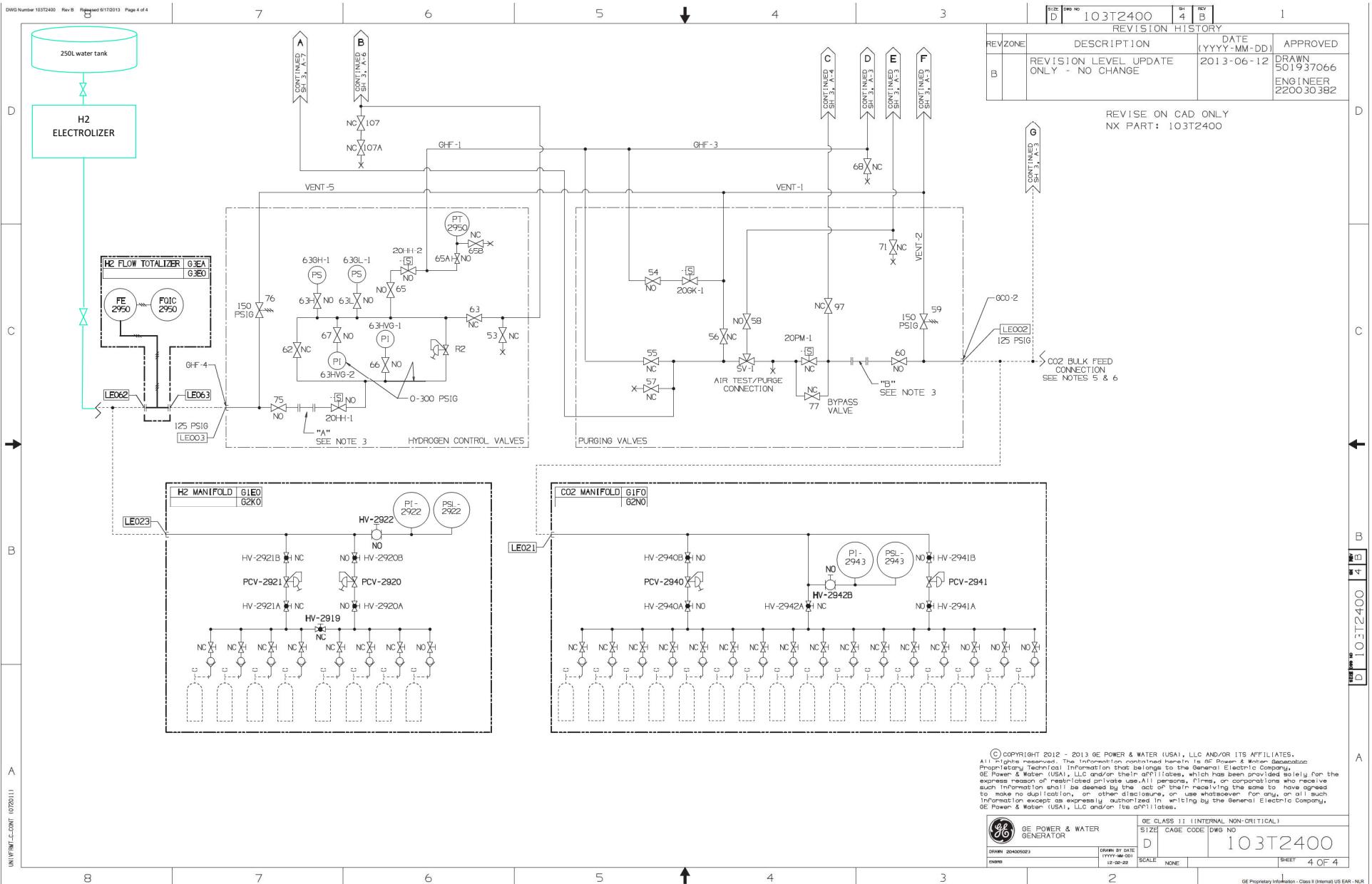
## **MO JAVÉ**

BENGOA SOLAR

# HAZARDOUS AREA CLASSIFICATION

MOJAVE SOLAR, LLC			HINKLEY, CALIFORNIA			
	BY	DATE	APP'D.	DATE	JOB NO.	REVISION
DRAWN	BRS	02/07/13			120010	
CHECKED						
SCALE	N/A					
ITION	DRAWING NUMBER					2
SUE	6007-PLN-ATP-00-00-H101					1

**Appendix D**  
**P&ID Drawing for Tie-In**



**Appendix E**  
**Detailed Wiring Diagram for Device**

# *WIRE DIAGRAM*

# *HYDROGEN GENERATOR V1*



Drawing. N.	H01EL8855	REV.	7A	Plant HYDROGEN GENERATOR MODEL V1	Designer	View	Approved	Date rev.	REV.	SHEET 01
CAD	SPAC				S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	
File Name	H01EL8855-7A_VERDE			Name GENERAL CIRCUIT DIAGRAM	S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	TOT. 45
Date	19/01/2012			Designer S. AGRETTI	View C. D'ANGELO	Approved M. MARRUCCI				

## INDEX

Sheet	Description	Revision		Sheet	Description	Revision	
		7	7A			7	7A
1	GENERAL CIRCUIT DIAGRAM	X		14	EMERGENCY CHAIN		
2	INDEX SHEETS	X		15	EMERGENCY CHAIN		
3	INDEX SHEETS	X		16	RELAY TERMINAL BOARD	X	
4	SINGLE LINE DIAGRAM			16A	RELAY TERMINAL BOARD		
5	SINGLE LINE DIAGRAM			17	ANALOG INPUT		
6	SINGLE LINE DIAGRAM			18	ANALOG OUTPUT	X	
7	SINGLE LINE DIAGRAM			19	DIGITAL INPUT	X	
8	POWER ELECTRIC DRAWING			20	DIGITAL OUTPUT		
9	POWER ELECTRIC DRAWING			21	DIGITAL INPUT	X	
10	AMPER/ VOLT CONVERTER			22	DIGITAL OUTPUT	X	
11	CIRCUIT CHECKS DEVICE			23	DIGITAL OUTPUT		
12	CIRCUIT CHECKS DEVICE			24	CPU EXPANSIONS CONNECTION		
13	CIRCUIT CHECKS DEVICE	X					

Note :



Drawing. N. H01EL8855 REV. 7A  
 CAD SPAC  
 File Name H01EL8855-7A\_VERDE  
 Date 19/01/2012

Plant HYDROGEN GENERATOR MODEL V1  
 Name INDEX SHEETS  
 Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI Date rev. 17/11/2014 REV. 7  
 Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI Date rev. 16/02/2015 REV. 7A  
 Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI

SHEET 02  
 TOT. 45

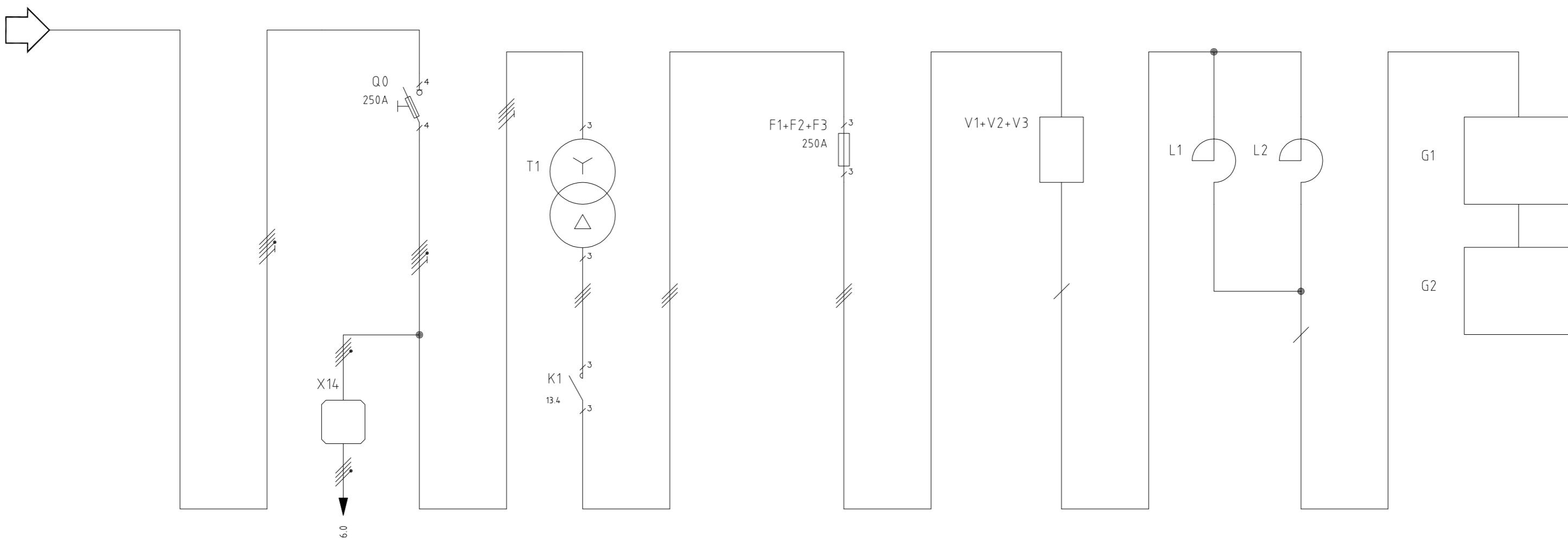
## INDEX

Sheet	Description	Revision		Sheet	Description	Revision	
		7	7A			7	7A
25	HMI CONNECTION			38	SYMBOLS LEGEND		
26	HMI-CPU / CPU-NETBITER CONNECTION CABLE			39	INPUT/OUTPUT LIST		
27	INSTRUMENT TYPICAL CONNECTION			40	INPUT/OUTPUT LIST		
28	CONNECTOR CONNECTION			41	INPUT/OUTPUT LIST		
29	INSTRUMENT TYPICAL CONNECTION			42	INPUT/OUTPUT LIST		
30	TERMINAL STRIP X11			43	INPUT/OUTPUT LIST		
31	TERMINAL STRIP X13			44	PANEL LAYOUT		
32	TERMINAL STRIP X14			45	PANEL LAYOUT		
33	TERMINAL STRIP X12-X15	X					
34	24VDC DISTRIBUTION TERMINALS						
35	FANS DRAWINGS						
36	FANS DRAWINGS						
37	SYMBOLS LEGEND						

Note :



Drawing. N. H01EL8855 CAD File Name H01EL8855-7A_VERDE Date 19/01/2012	REV. 7A SPAC	Plant HYDROGEN GENERATOR MODEL V1 Name INDEX SHEETS Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI	Designer S. AGRETTI	View C. D'ANGELO	Approved M. MARRUCCI	Date rev. 17/11/2014	REV. 7	SHEET 03
			S. AGRETTI	C. D'ANGELO	M. MARRUCCI	17/11/2014	7	
			S. AGRETTI	C. D'ANGELO	M. MARRUCCI	16/02/2015	7A	
								TOT. 45



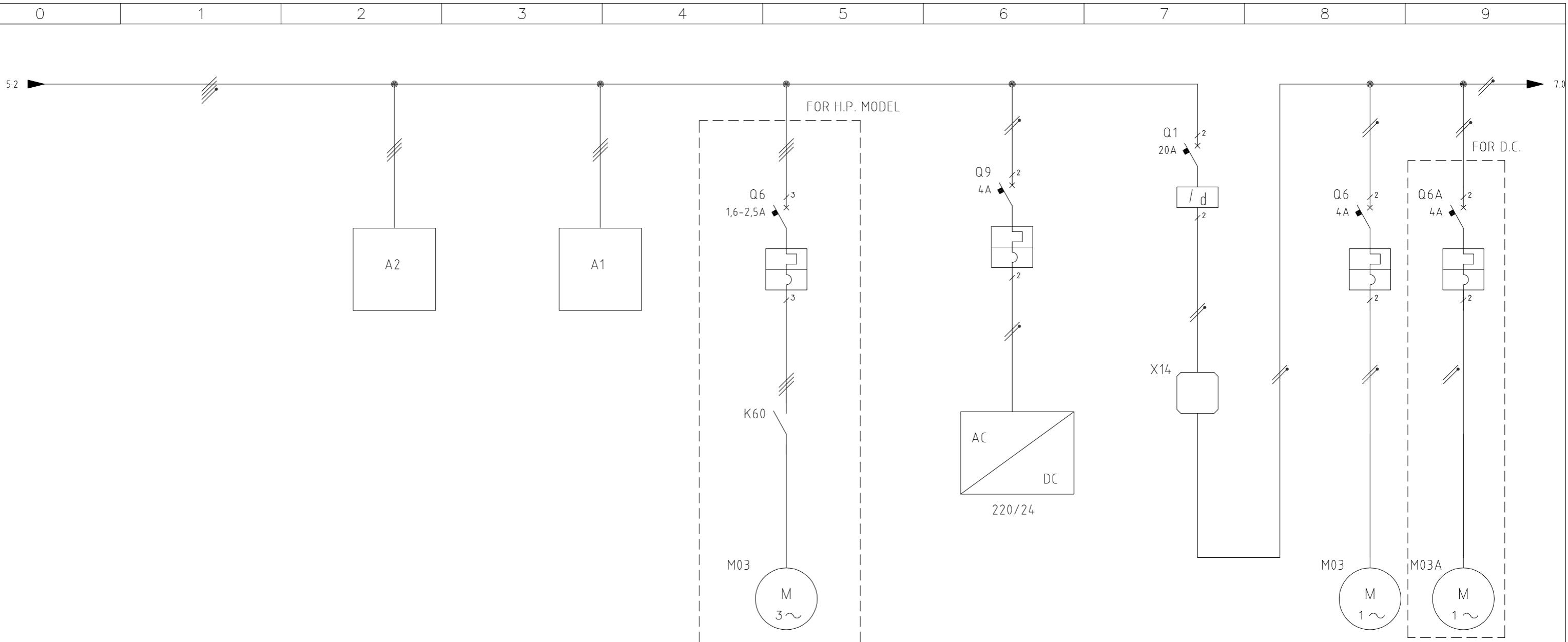
DEVICE	ITEM	Q0	T1	K1	F1-F2-F3	V1-V2-V3	L1-L2	G1-G2
	DESCRIPTION	MAIN SWITCH FUSE	TRASF.&CONTACT	RAPID FUSE	BRIDGE SCR	INDUTTANCE 1,5mH	ELETROLITIC CELL	
	NOMINAL POWER KW		G1-2=6-15KVA; G4-6=25-35KVA; G8-10=50-65KVA			W4DC90PB		
	NOMINAL CURRENT A	125A				110		
	NOMINAL VOLTAGE V		P380/400Y S.G1-2=55-105D; G4-6=190-280D; G8-10=350-400D					
SWITCH	TYPE							
	NOMINAL CURRENT A	125A						
	TYPE	05125D04N2-2						
	TERMICH SET A							
FUSE	MAGNETIC SET A							
	TYPE AND COURSE A	G1-2=20A; G4-6=32-50A; G8-10=63-80A			250V - 80A			
CONTACTOR	TYPE		K1					
	COURSE		75KW AC3-400V					
CABLE	RELATIONSHIP/PERFORMANCE							
	TYPE	FG7	FG7	FG7	FG7	FG7	FG7	
	SECTION mmq	25	25	25	25	25	25	
	COURSE A							



Drawing. N. H01EL8855 REV. 7A  
CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

Plant HYDROGEN GENERATOR MODEL V1  
Name SINGLE LINE DIAGRAM  
Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI Date rev. 17/11/2014 REV. 7  
Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI Date rev. 16/02/2015 REV. 7A  
Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI

SHEET 04  
TOT. 45

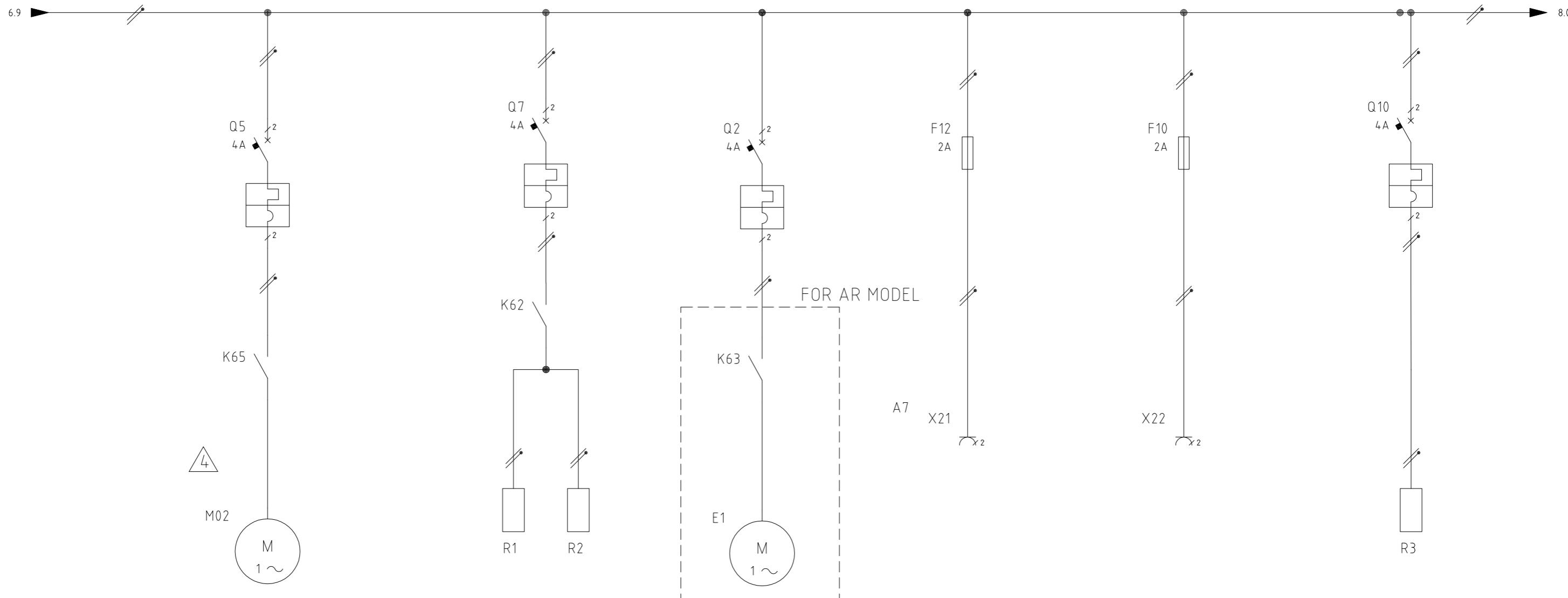


DEVICE	INITIAL CONSUMER	A2	A1	M03	A7	Q1	M03/M03A
	DESCRIPTION CONSUMER	SUPPLY CARD DRIVE SCR	PHASE SEQUENCE MODULE	ELETROLYTIC PUMP	POWER SUPPLY SWITCH	DIFFERENTIAL SWITCH	ELETROLYTIC PUMP
	NOMINAL POWER KW						
	NOMINAL CURRENT A				5		
	NOMINAL TENSION V						
SWITCH	TYPE						
	NOMINAL CURRENT A			4	4	20	4
	TYPE		OMRON K8AB-PM1	CURVE C	CURVE C	CURVE C	CURVE C
	TERMICH SET A					0,03	
	MAGNETIC SETTING A						
FUSE	TYPE AND COURSE A						
CONTACTOR	TYPE						
	COURSE						
TRASFO TENSION	RELATIONSHIP/PERFORMANCE						
CABLE	INITIAL	N07VVK	N07VVK	N07VVK	N07VVK	N07VVK	N07VVK
	SECTION mmq	1,5	1,5	1,5	1,5	6	1,5
	COURSE A						



Drawing. N.	H01EL8855	REV.	7A	Plant HYDROGEN GENERATOR MODEL V1	Designer	View	Approved	Date rev.	REV.	SHEET
CAD	SPAC				S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	05
File Name	H01EL8855-7A_VERDE			Name SINGLE LINE DIAGRAM	S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	TOT.
Date	19/01/2012				Designer	View	Approved			45
					S. AGRETTI	C. D'ANGELO	M. MARRUCCI			

0 1 2 3 4 5 6 7 8 9



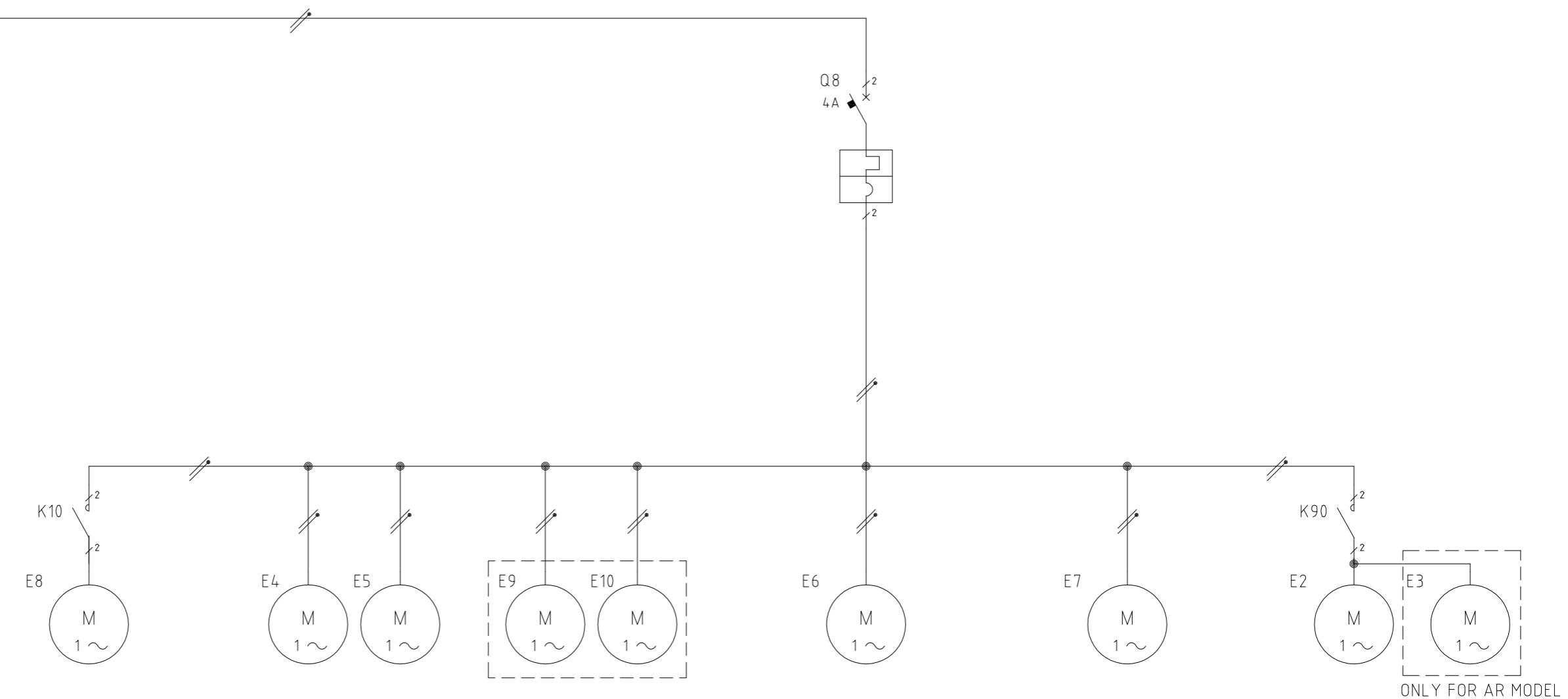
DEVICE	INITIAL CONSUMER	M02	R1-R2	E1	F12	F10	R3
	DESCRIPTION CONSUMER	WATER PUMP	HEATING RESISTANCE	COOLING MAIN FAN (AR MODEL)	FUSE (SOCKET)	FUSE (SOCKET)	HEATNG CABLE (DEMIN H2O CIRCUIT)
	NOMINAL POWER KW			0,2			0,2
	NOMINAL CURRENT A			1	16	16	1
	NOMINAL TENSION V						
SWITCH	TYPE						
	NOMINAL CURRENT A	4	4	4			
	TYPE	CURVE C	CURVE C	CURVE C			
	TERMICH SET A						
	MAGNETIC SET A				2	2	2
FUSE	TYPE AND COURSE A						
CONTACTOR	TYPE	20					
	COURSE	12	12				
TRASF.OF TENSION	RELATIONSHIP/PERFORMANCE						
CABLE	INITIAL	N07VVK	N07VVK	N07VVK	N07VVK	N07VVK	N07VVK
	SECTION mmq	1,5	1,5	1,5	1,5	1,5	1,5
	COURSE A						



Drawing. N. H01EL8855 REV. 7A  
CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

Plant HYDROGEN GENERATOR MODEL V1  
Name SINGLE LINE DIAGRAM  
Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI Date rev. 17/11/2014 REV. 7  
S. AGRETTI C.D'ANGELO M.MARRUCCI 16/02/2015 7A  
Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI

SHEET 06  
TOT. 45

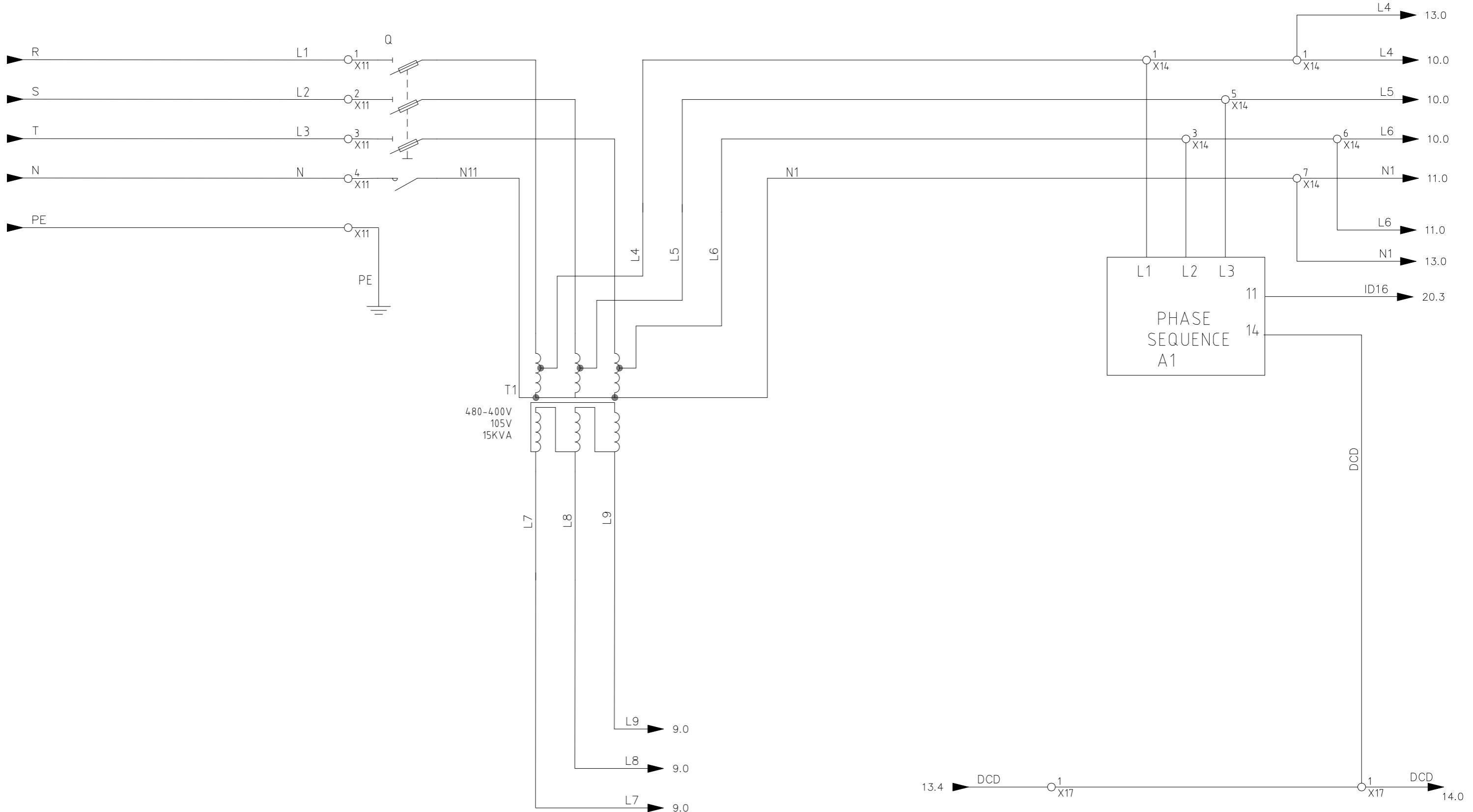


DEVICE	INITIAL CONSUMER	E8	E4-E5	E9-E10	E6	E7	E2 - E3 (AR MODEL)
	DESCRIPTION CONSUMER	COOLING ROOF	COOLING ELECTRICAL BOX	COOLING TASF. BOX	COOLING SCR	COOLING ELECTRICAL BOX	COOLING GAS
	NOMINAL POWER KW	17/15W	17/15W	17/15W	17/15W	35W	35W
	NOMINAL CURRENT A	0,1	0,1	0,1	0,1	0,3	0,3
	NOMINAL TENSION V						
SWITCH	TYPE						
	NOMINAL CURRENT A				4		
	TYPE				CURVE C		
	TERMICH SET A						
	MAGNETIC SET A						
FUSE	TYPE AND COURSE A						
CONTACTOR	TYPE						
TRANSFORMER	COURSE						
RELATIONSHIP/PERFORMANCE							
CABLE	INITIAL	N07VVK	N07VVK	N07VVK	N07VVK	N07VVK	N07VVK
	SECTION mmq	0,5	0,5	0,5	0,5	0,5	0,5
	COURSE A						



Drawing. N. H01EL8855 REV. 7A CAD SPAC File Name H01EL8855-7A_VERDE Date 19/01/2012	Plant HYDROGEN GENERATOR MODEL V1 Name SINGLE LINE DIAGRAM			Designer S. AGRETTI	View C.D'ANGELO	Approved M.MARRUCCI	Date rev. 17/11/2014	REV. 7	SHEET 07
				S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	
				S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	TOT. 45

0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9



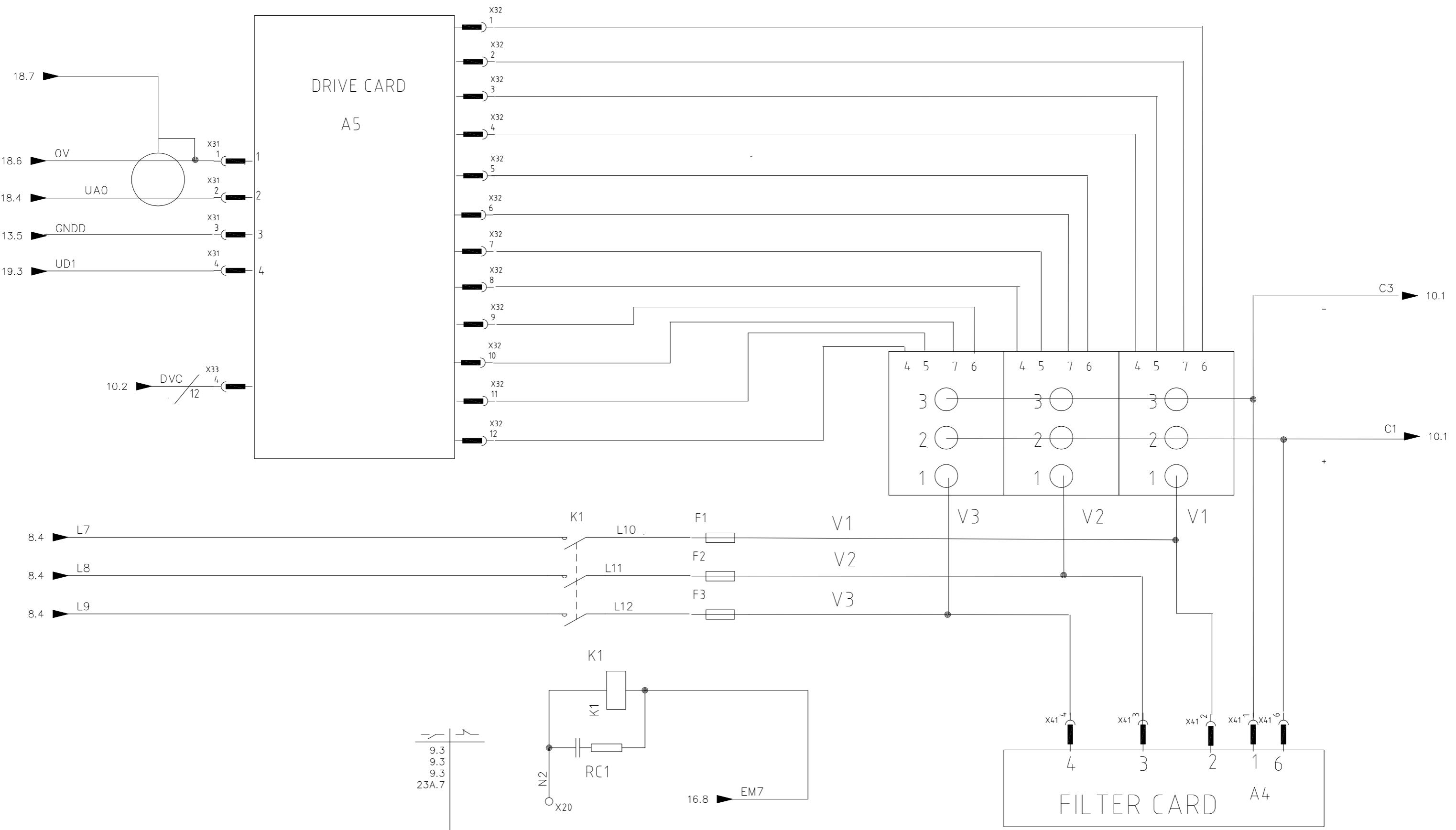
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CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

Plant  
HYDROGEN GENERATOR MODEL V1  
Name POWER ELECTRIC DRAWING  
Designer S. AGRETTI View C.D'ANGELO Approved M. MARRUCCI

Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI

Sheet	Rev.	Date Rev.	Approved	Date Rev.	Rev.
08	7	17/11/2014	M. MARRUCCI		
7A	7A	16/02/2015	M. MARRUCCI		
TOT.					
45					

0 1 2 3 4 5 6 7 8 9

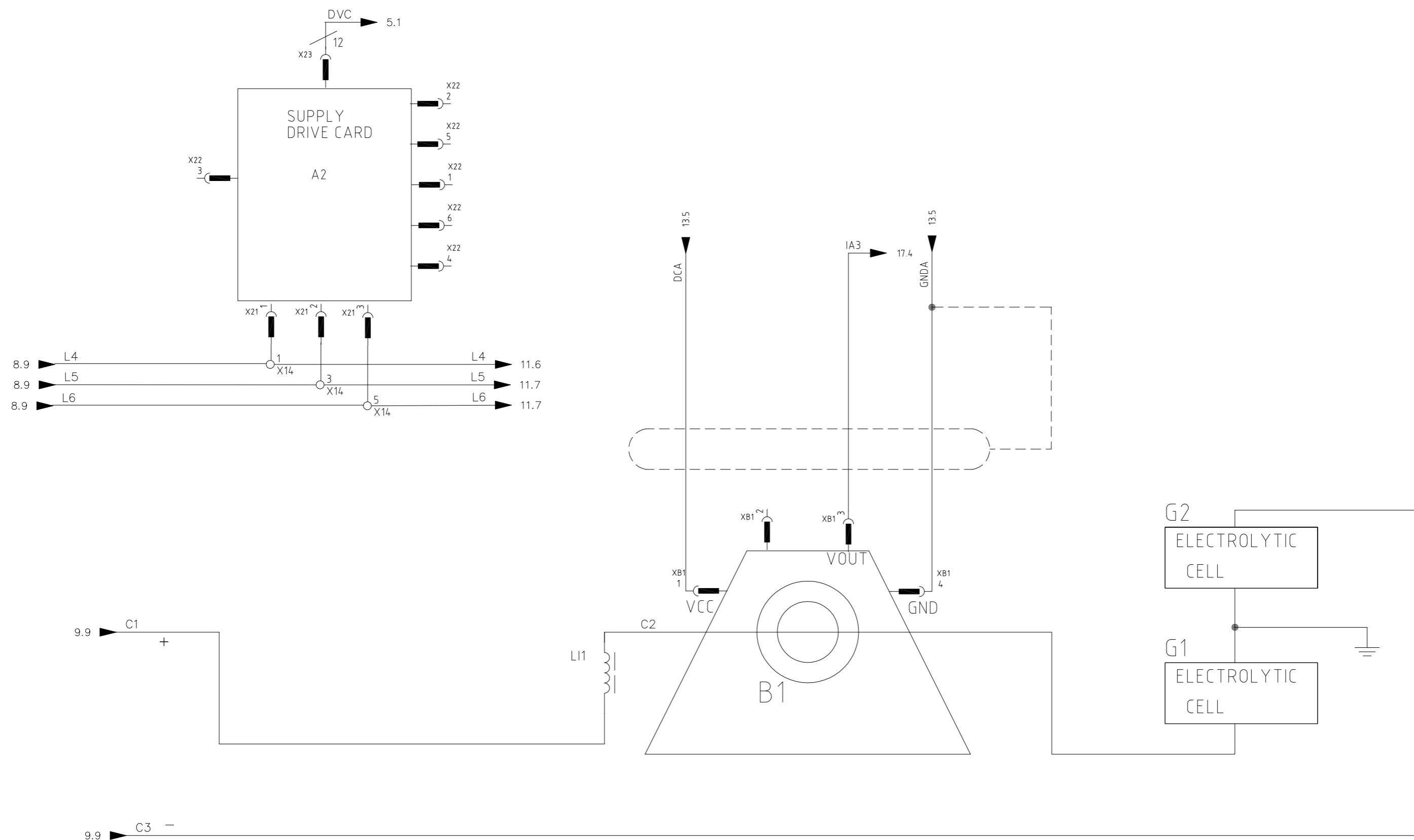


Drawing. N. H01EL8855 REV. 7A  
CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

Plant HYDROGEN GENERATOR MODEL V1  
Name POWER ELECTRIC DRAWING  
Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI  
Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI

Designer	View	Approved	Date rev.	REV.	SHEET
S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	09
S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	
					TOT. 45

0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

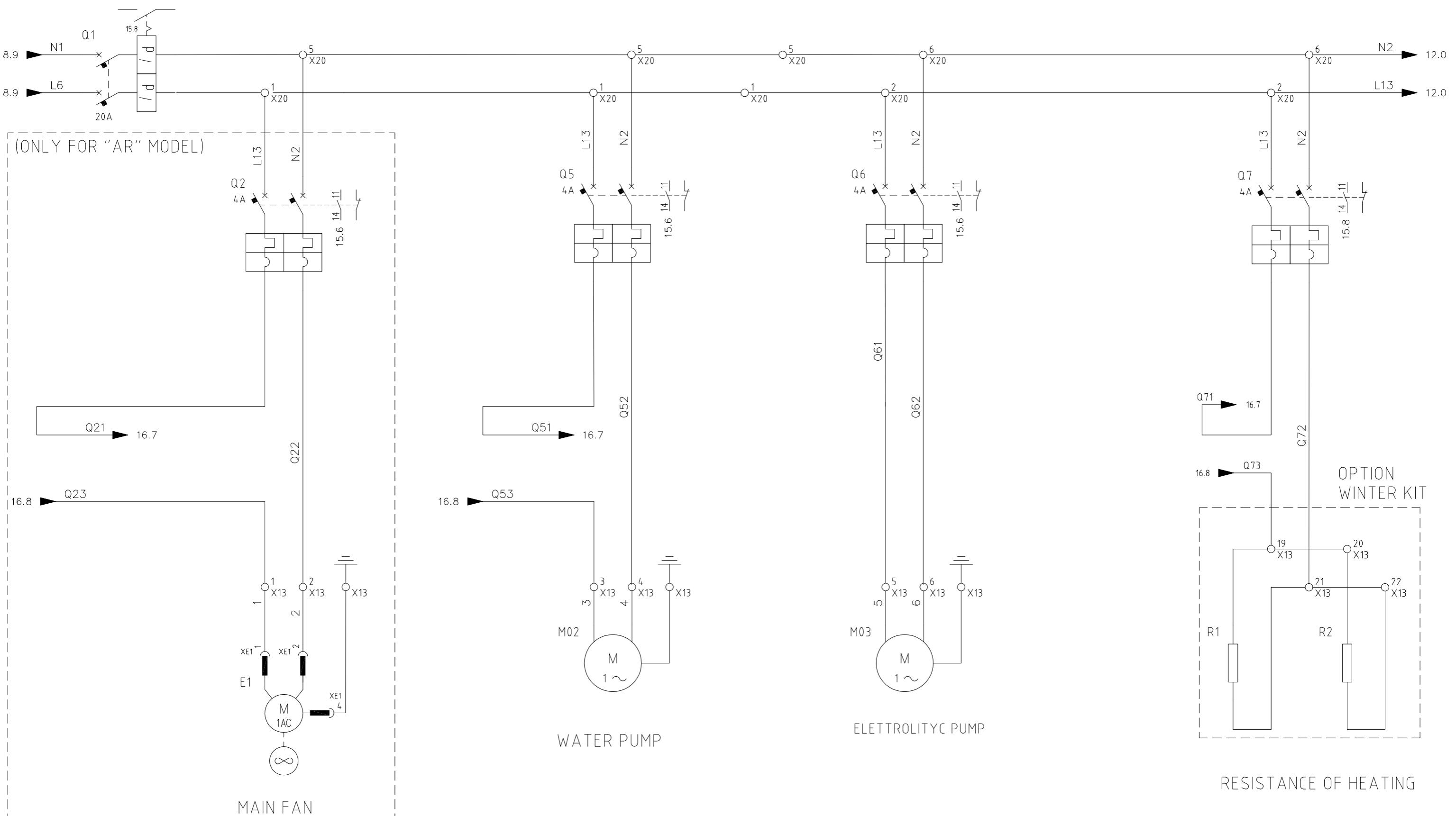


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CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

Plant HYDROGEN GENERATOR MODEL V1  
Name VOLT CONVERTER  
Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI Date rev. 17/11/2014 REV. 7  
Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI Date rev. 16/02/2015 REV. 7A

Designer	View	Approved	Date rev.	REV.	SHEET
S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	10
					TOT.
					45

0 1 2 3 4 5 6 7 8 9

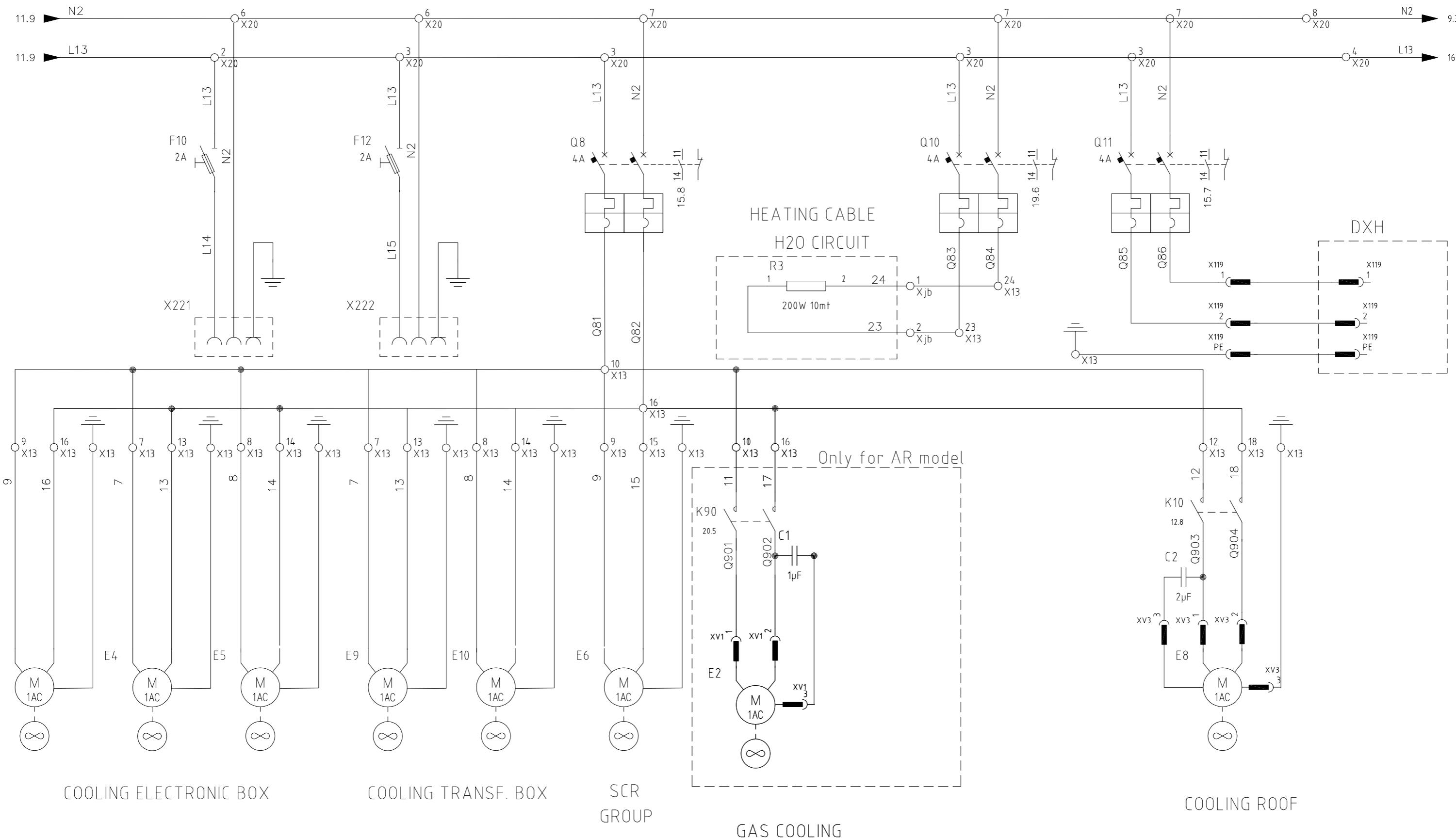


Drawing. N. H01EL8855 REV. 7A  
CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

Plant HYDROGEN GENERATOR MODEL V1  
Name CIRCUIT CHECKS DEVICE  
Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI  
Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI

Designer	View	Approved	Date rev.	REV.	SHEET
S. AGRETTI	C. D'ANGELO	M. MARRUCCI	17/11/2014	7	11
S. AGRETTI	C. D'ANGELO	M. MARRUCCI	16/02/2015	7A	
					TOT. 45

0 1 2 3 4 5 6 7 8 9



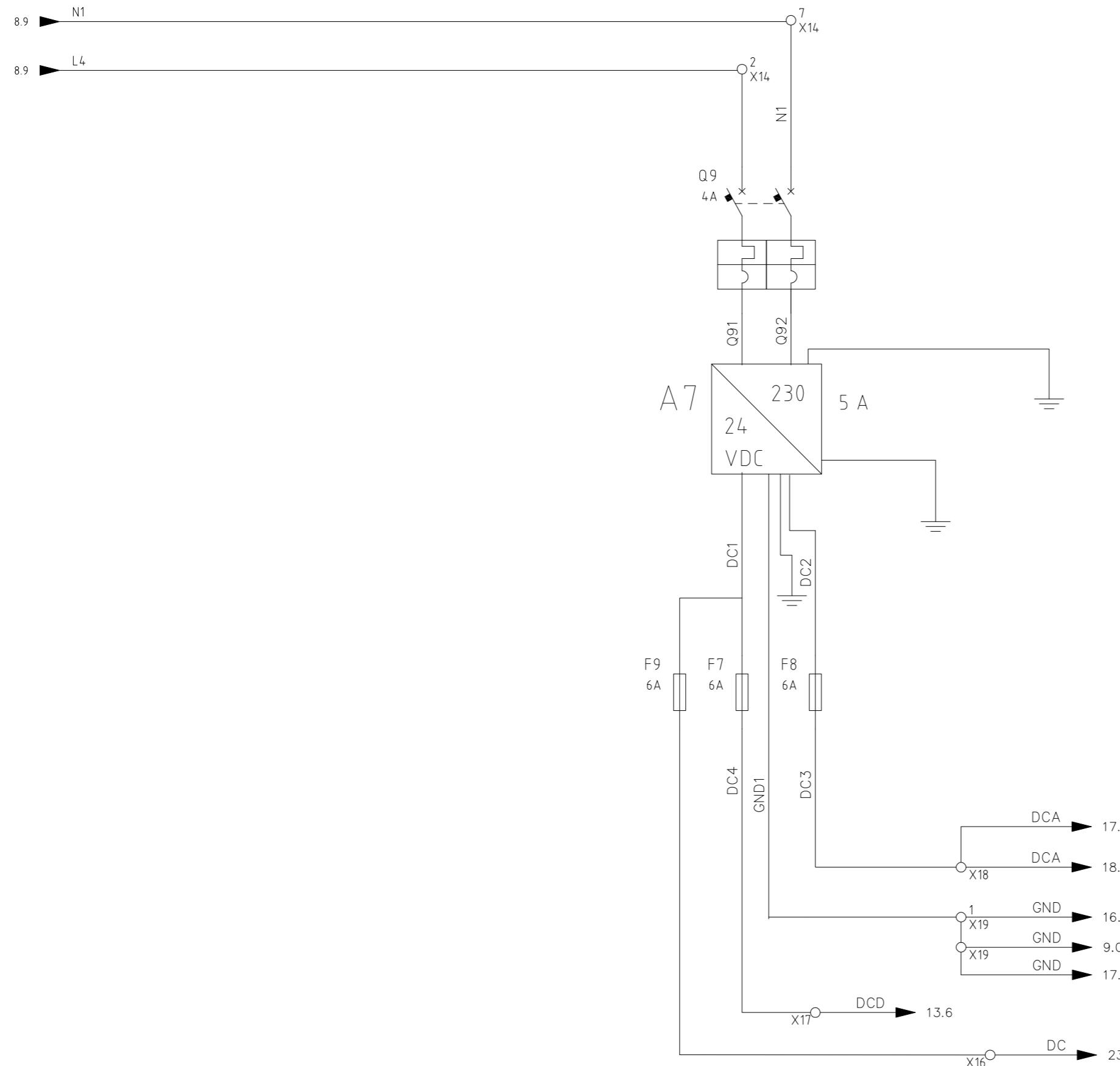
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CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

Plant HYDROGEN GENERATOR MODEL V1  
Name CIRCUIT CHECKS DEVICE

Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI

Designer	View	Approved	Date rev.	REV.	SHEET
S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	12
S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	
					TOT.
					45

0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9



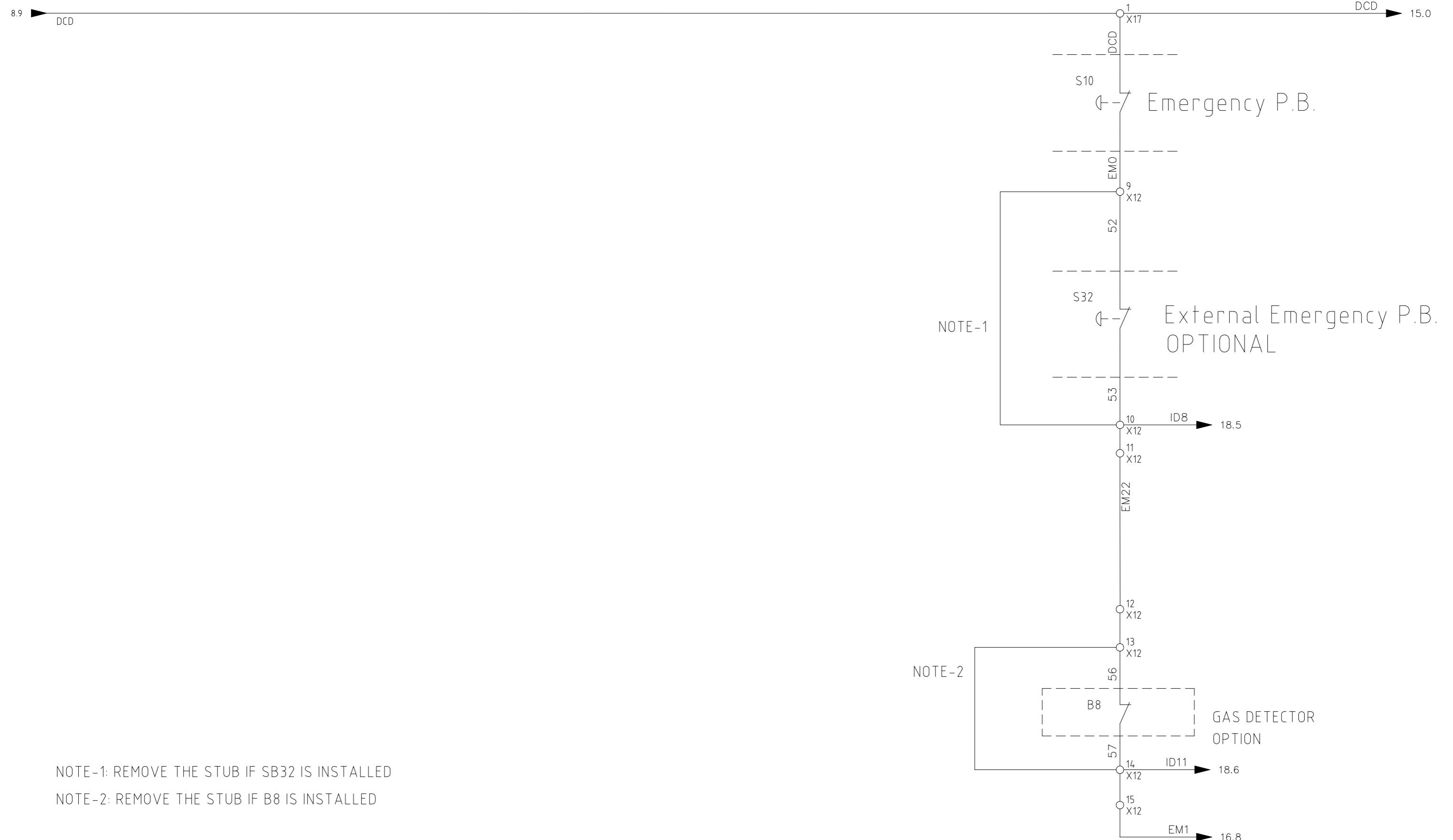
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CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

Plant  
HYDROGEN GENERATOR MODEL V1

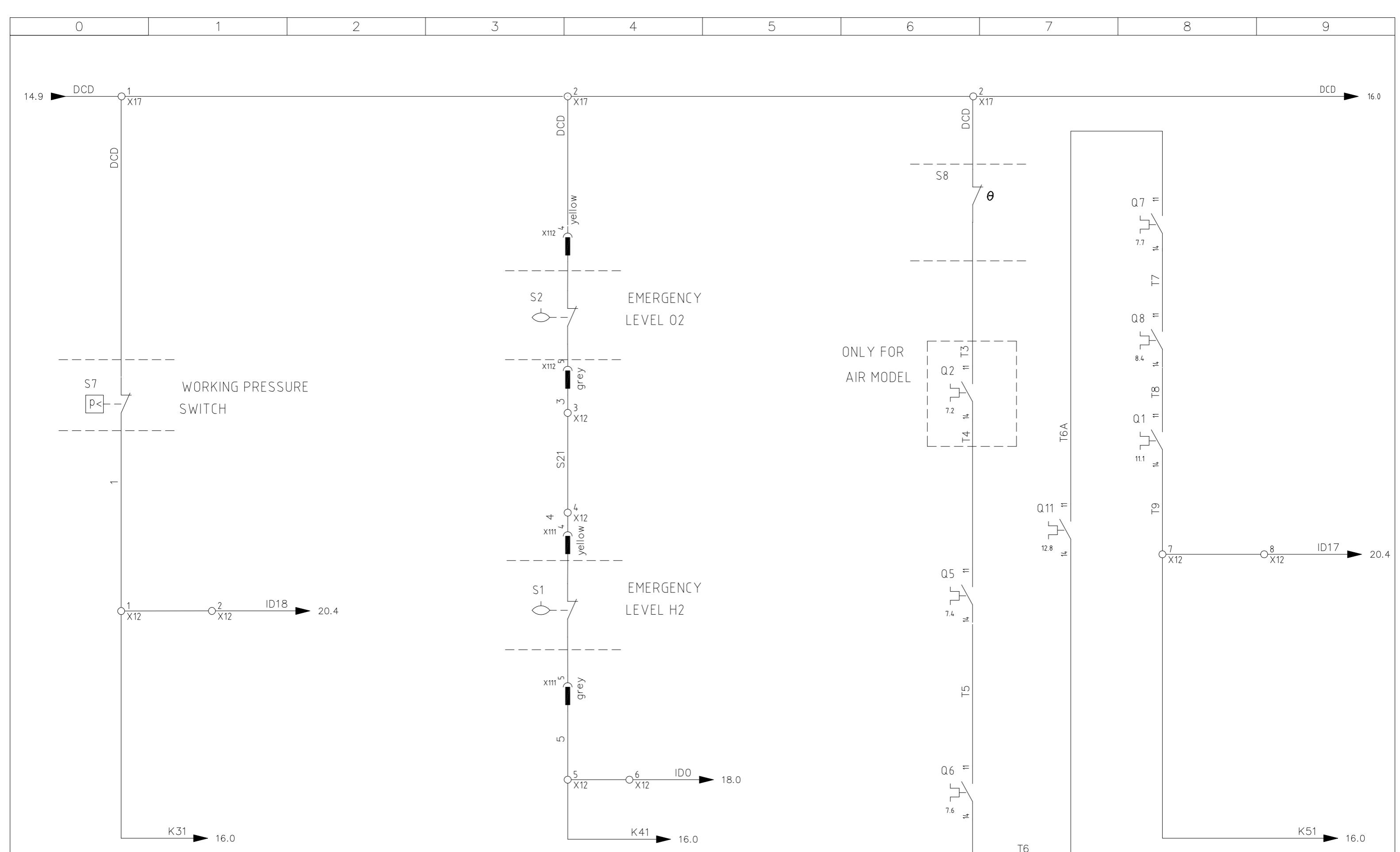
Name CIRCUIT CHECKS DEVICE

Designer S. AGRETTI	View C. D'ANGELO	Approved M. MARRUCCI
------------------------	---------------------	-------------------------

Designer S. AGRETTI	View C. D'ANGELO	Approved M. MARRUCCI	Date rev. 17/11/2014	REV. 7	SHEET 13
			16/02/2015	7A	
					TOT. 45



Drawing. N.	H01EL8855	REV.	7A	Plant	Designer	View	Approved	Date rev.	REV.	SHEET	
CAD	SPAC	Name	HYDROGEN GENERATOR MODEL V1		S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	14	
File Name	H01EL8855-7A_VERDE			EMERGENCY CHAIN		S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	TOT.
Date	19/01/2012	Designer	View	Approved						45	
		S. AGRETTI	C. D'ANGELO	M. MARRUCCI							



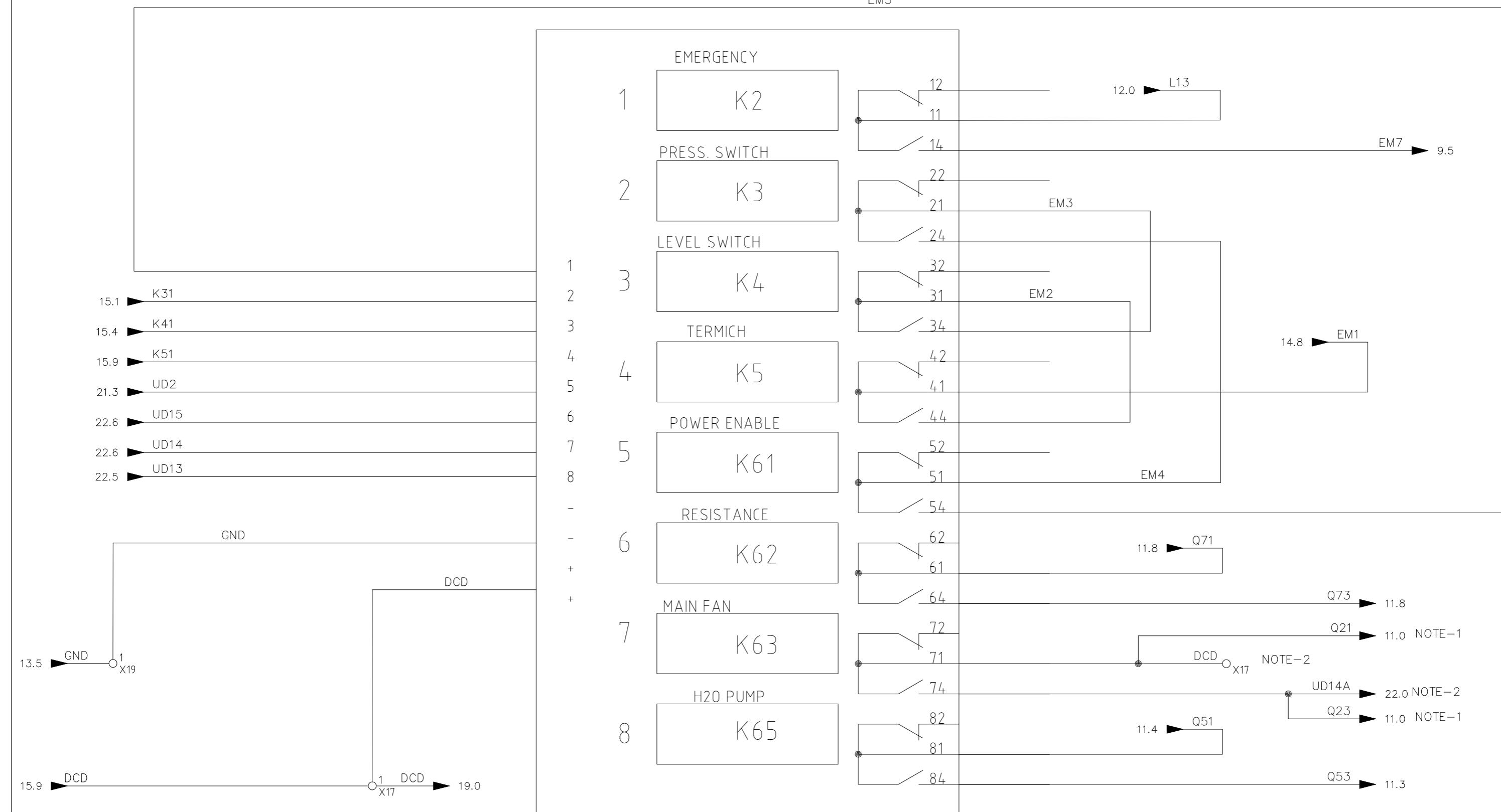
Drawing. N. H01EL8855 REV. 7A  
CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

Plant HYDROGEN GENERATOR MODEL V1  
Name EMERGENCY CHAIN  
Designer S. AGRETTI View C.D'ANGELO Approved M. MARRUCCI

Designer	View	Approved	Date rev.	REV.	SHEET
S. AGRETTI	C.D'ANGELO	M. MARRUCCI	17/11/2014	7	15
S. AGRETTI	C.D'ANGELO	M. MARRUCCI	16/02/2015	7A	
					TOT. 45

A6

EM5

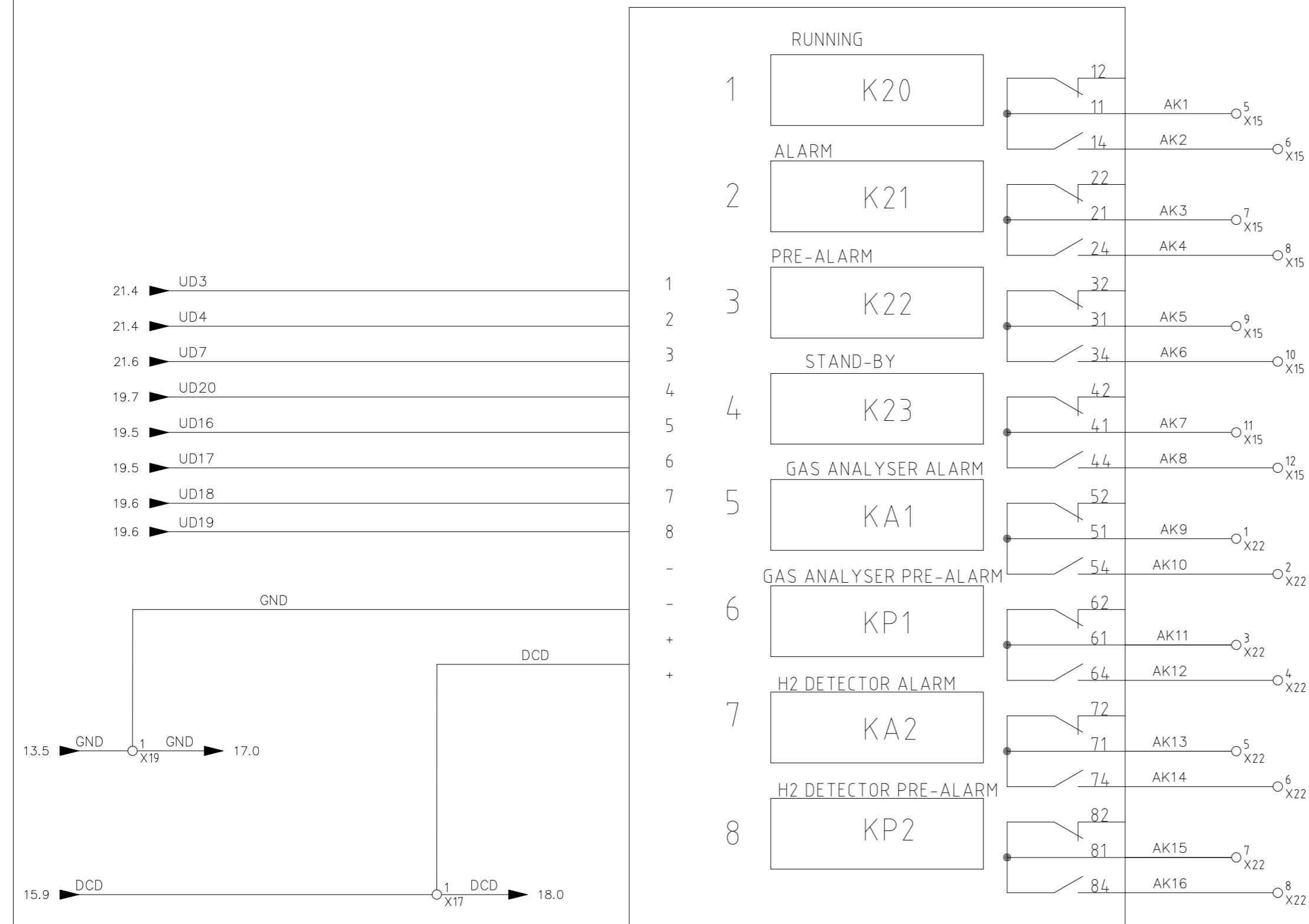


NOTE-1: Only for Air model  
NOTE-2: Only for AQ model



Drawing. N.	H01EL8855	REV.	7A	Plant	Designer	View	Approved	Date rev.	REV.	SHEET
CAD	SPAC	Name	HYDROGEN GENERATOR MODEL V1			S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7
File Name	RELAY TERMINAL BOARD			S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	16	
Date	19/01/2012	Designer	S. AGRETTI	View	C. D'ANGELO	Approved	M. MARRUCCI			TOT.
										45

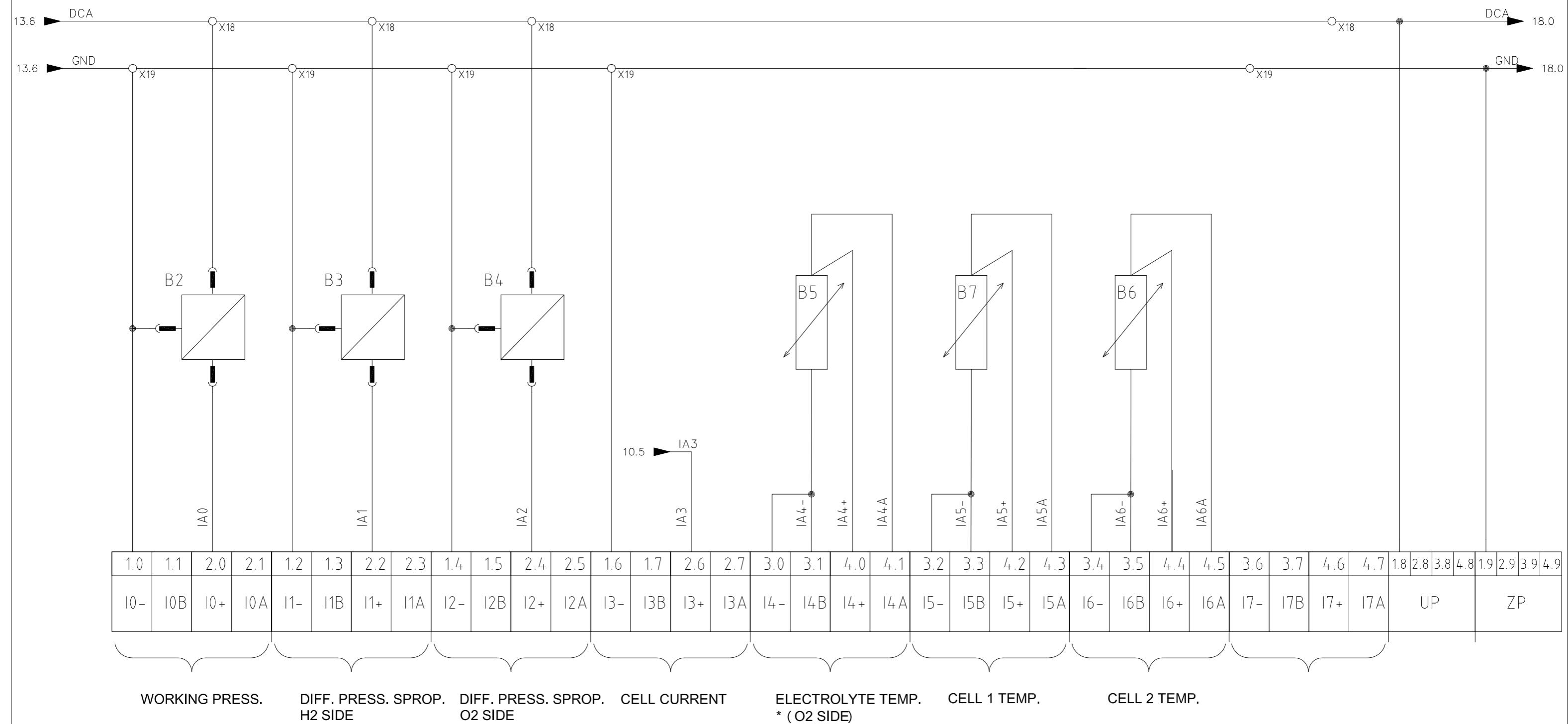
A8



Drawing. N.	H01EL8855	REV.	7A	Plant	Designer	View	Approved	Date rev.	REV.	SHEET
CAD	SPAC			HYDROGEN GENERATOR MODEL V1	S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	16A
Name				RELAY TERMINAL BOARD	S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	TOT.
File Name	H01EL8855-7A_VERDE									45
Date	19/01/2012			Designer S. AGRETTI	View C. D'ANGELO	Approved M. MARRUCCI				

0 1 2 3 4 5 6 7 8 9

## EXP.1.0 ANALOG INPUT &amp; PT-100 - AI531 EOPLC084



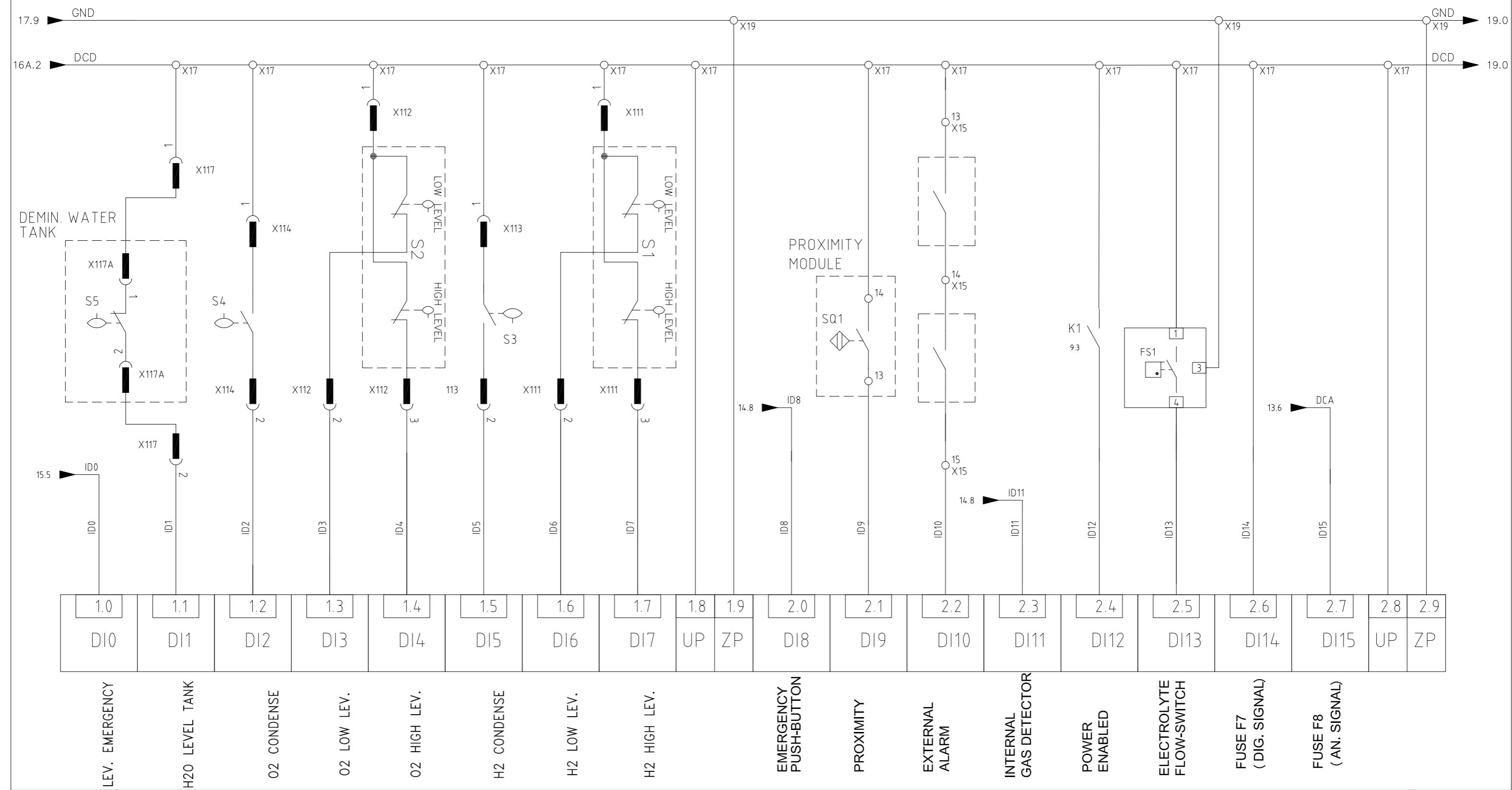
Drawing. N. H01EL8855 REV. 7A  
CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

Plant HYDROGEN GENERATOR MODEL V1  
Name ANALOG INPUT  
Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI Date rev. 17/11/2014 7  
Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI Date rev. 16/02/2015 7A  
Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI Date rev. 17/11/2014 7  
Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI Date rev. 16/02/2015 7A

SHEET 17  
TOT. 45

0 1 2 3 4 5 6 7 8 9

## EXP. 2.0 DIGITAL INPUT - DA501 EOPLC140



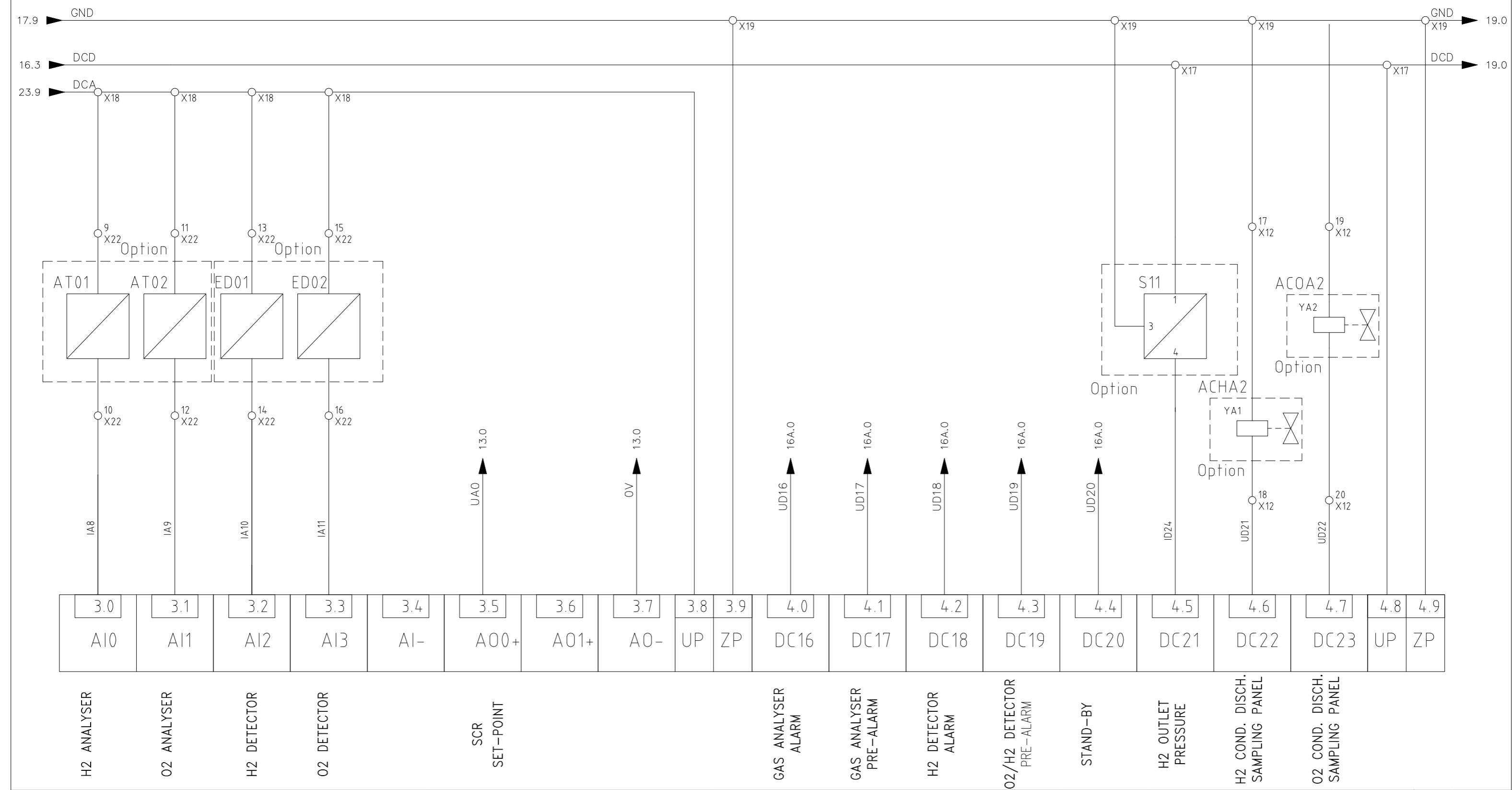
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CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

Plant  
HYDROGEN GENERATOR MODEL V1

Designer	View	Approved	Date rev.	REV.	SHEET
S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	18
S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	
					TOT.
					45

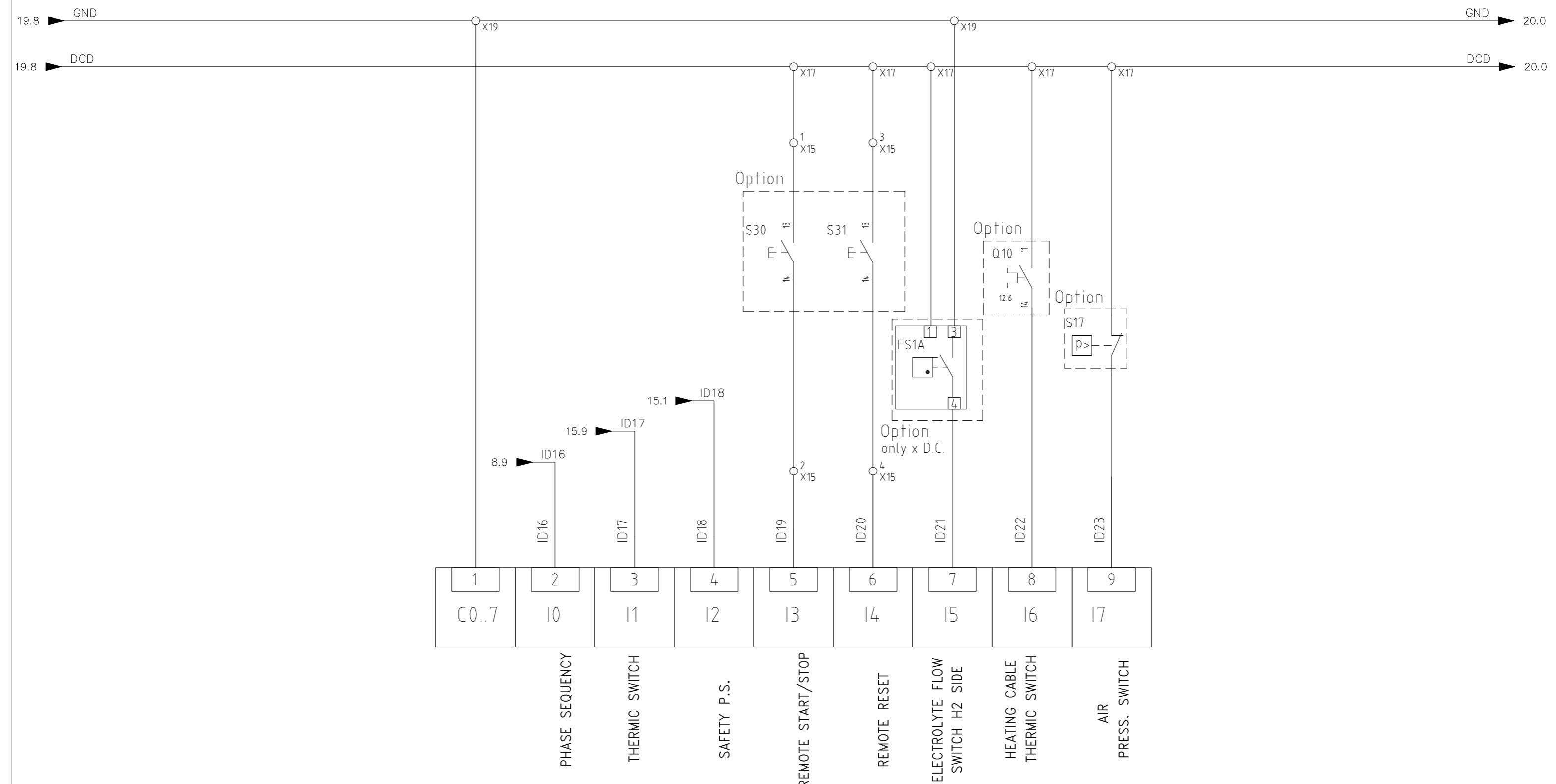
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# EXP. 2.0 ANALOG/DIGITAL INPUT/OUTPUT – DA501 EOPLC140



VERDE	Drawing. N. H01EL8855 REV. 7A		Plant HYDROGEN GENERATOR MODEL V1 Name ANALOG/DIGITAL INPUT/OUTPUT	Designer	View	Approved	Date rev.	REV.	SHEET
	CAD	SPAC		S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	19
	File Name	H01EL8855-7A_VERDE		S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	
	Date	19/01/2012		Designer S. AGRETTI	View C. D'ANGELO	Approved M. MARRUCCI			
									TOT. 45

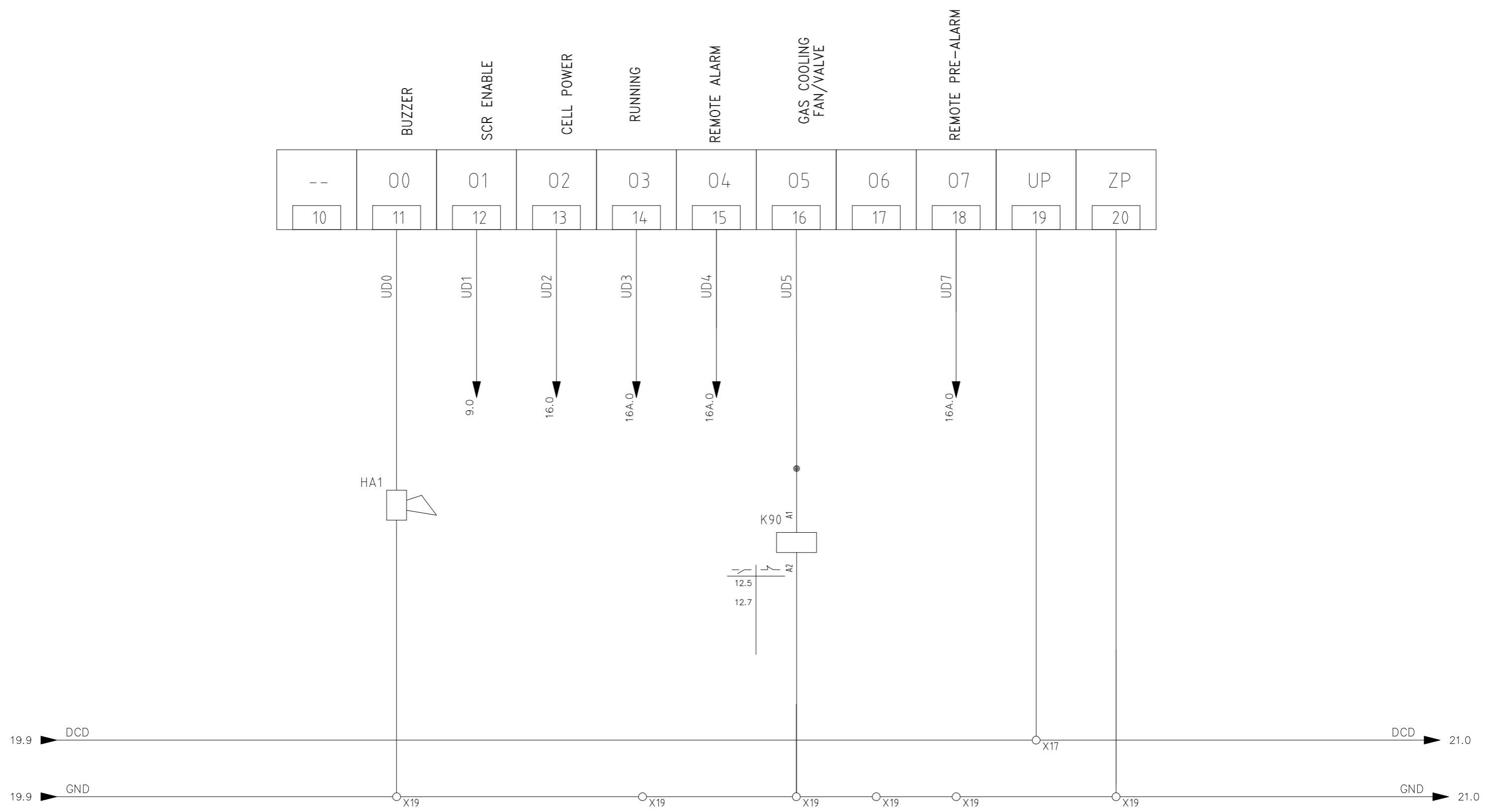
EXP. 3.0 DIGITAL INPUT - DX561 EOPLC082



Drawing. N.	H01EL8855	REV.	7A	Plant HYDROGEN GENERATOR MODEL V1	Designer	View	Approved	Date rev.	REV.	SHEET
CAD	SPAC				S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	20
File Name	H01EL8855-7A_VERDE			Name DIGITAL OUTPUT	S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	TOT.
Date	19/01/2012				Designer S. AGRETTI	View C. D'ANGELO	Approved M. MARRUCCI			45

0 1 2 3 4 5 6 7 8 9

## EXP. 3.0 DIGITAL OUTPUT – DX561 EOPC082



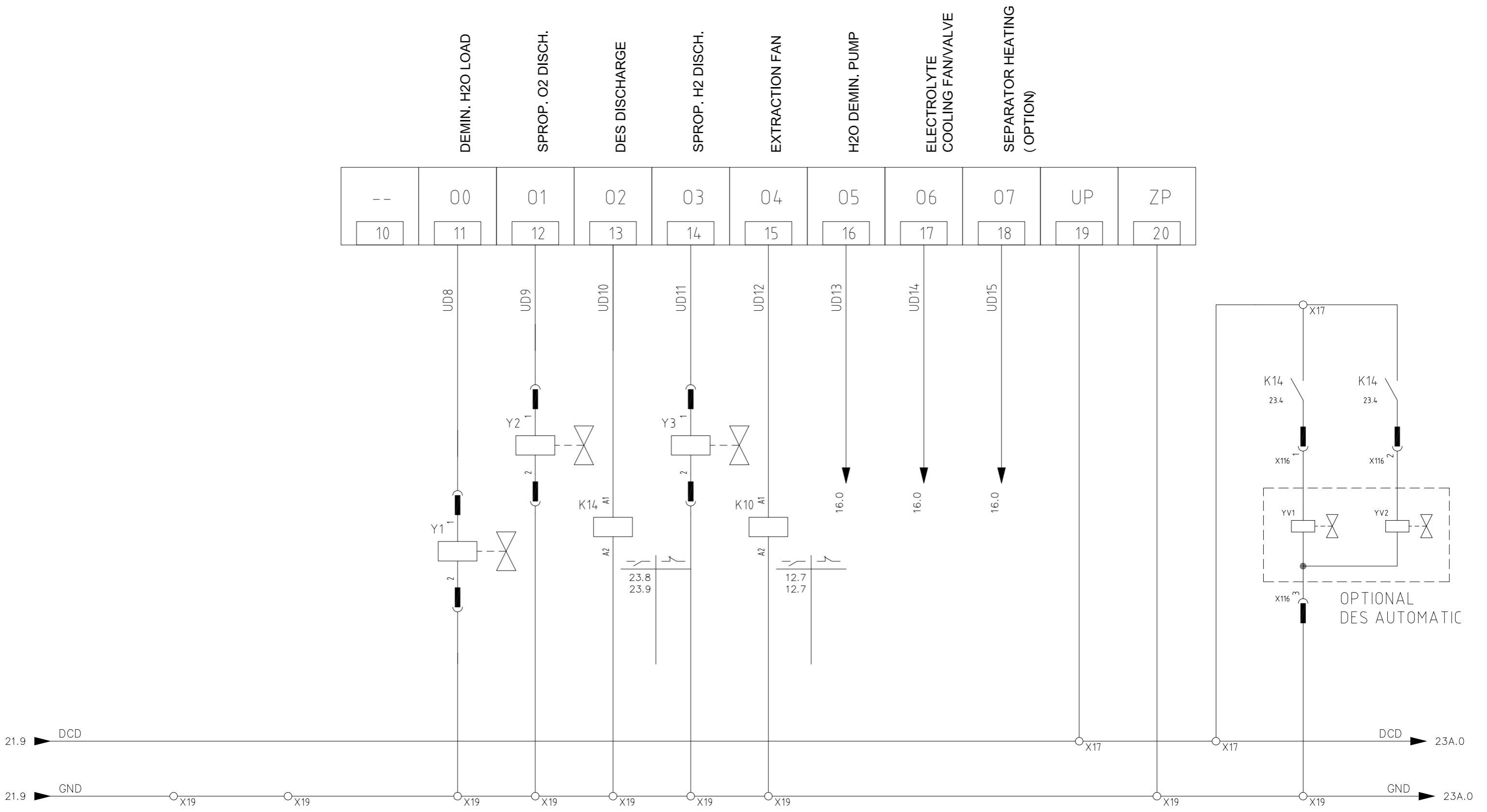
Drawing. N. H01EL8855 REV. 7A  
CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

Plant HYDROGEN GENERATOR MODEL V1  
Name DIGITAL OUTPUT  
Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI  
Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI

Designer	View	Approved	Date rev.	REV.	SHEET
S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	21
S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	
					TOT.
					45

0 1 2 3 4 5 6 7 8 9

## EXP. 4.0 DIGITAL OUTPUT - DO561 EOPLC083



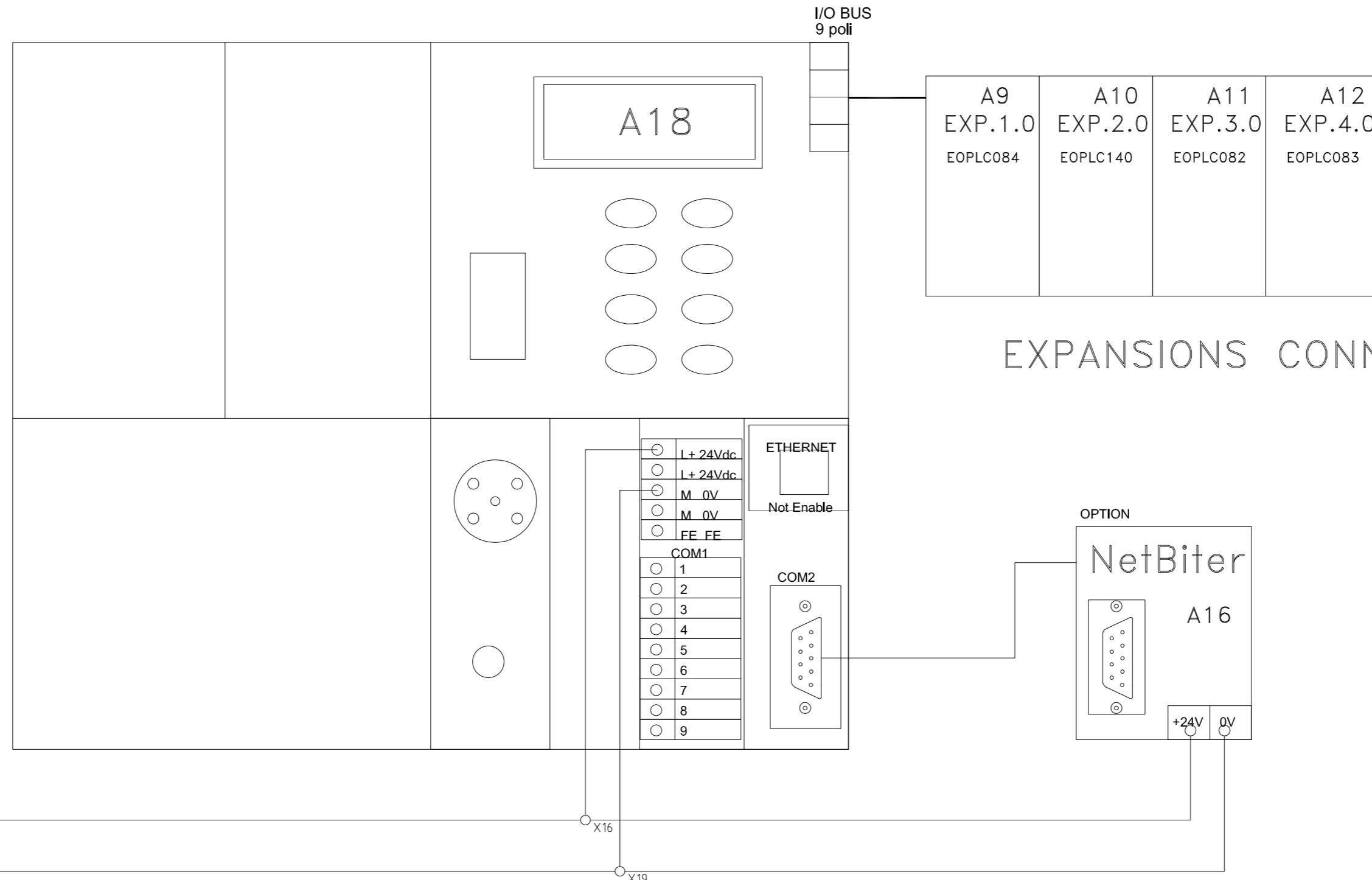
Drawing. N. H01EL8855 REV. 7A  
CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

Plant  
HYDROGEN GENERATOR MODEL V1  
Name DIGITAL OUTPUT  
Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI

Designer	View	Approved	Date rev.	REV.	SHEET
S. AGRETTI	C. D'ANGELO	M. MARRUCCI	17/11/2014	7	22
S. AGRETTI	C. D'ANGELO	M. MARRUCCI	16/02/2015	7A	
					TOT. 45



## BASE TB511 E CPU PM582 AC500 – EOPLC079 EOPLC094



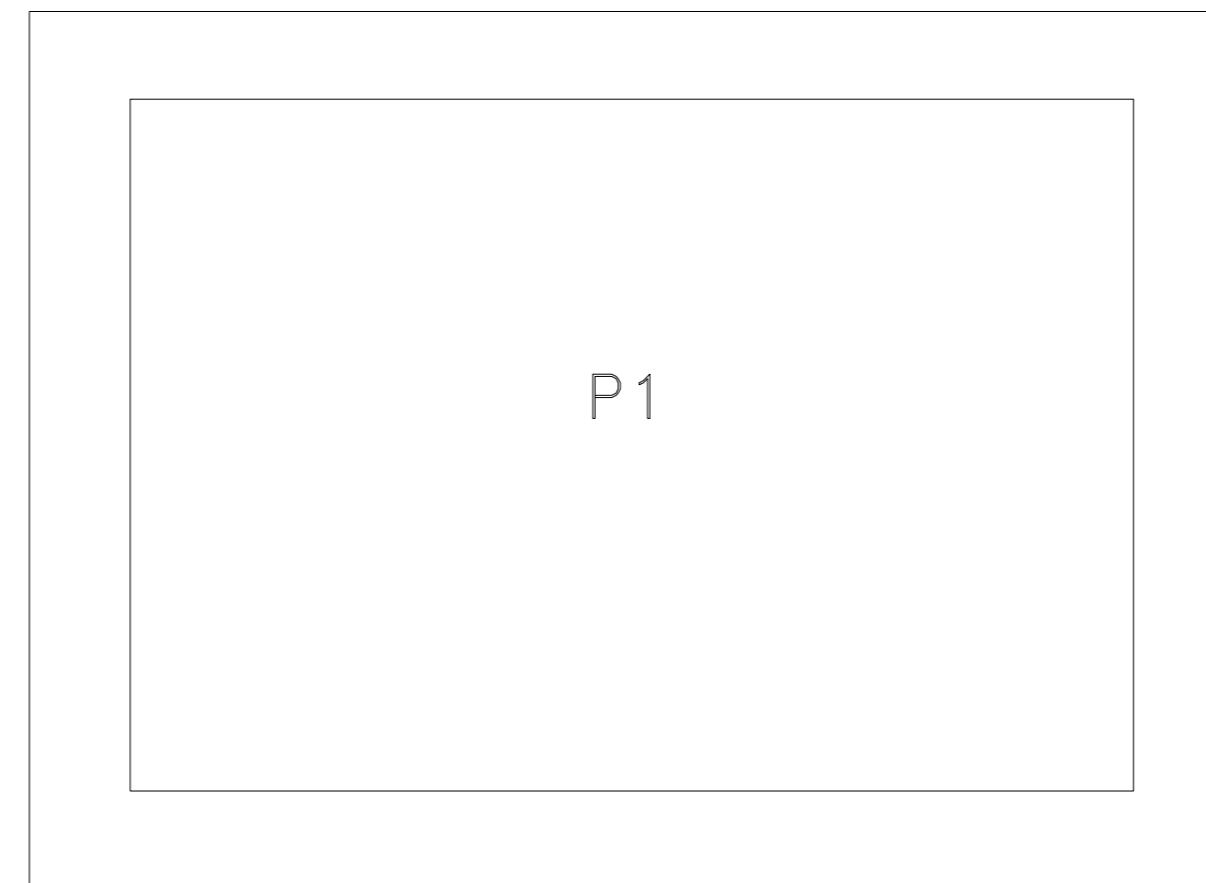
## EXPANSIONS CONNECTION

Drawing. N.	REV.	Plant	Designer	View	Approved	Date rev.	REV.	SHEET	
								7	
CAD	SPAC	Name	EXPANSION CONNECTION		S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A
File Name	H01EL8855-7A_VERDE	Designer	C. D'ANGELO	Approved	M. MARRUCCI				
Date	19/01/2012								

**VERDE**

TOT.  
45

## HMI CP620

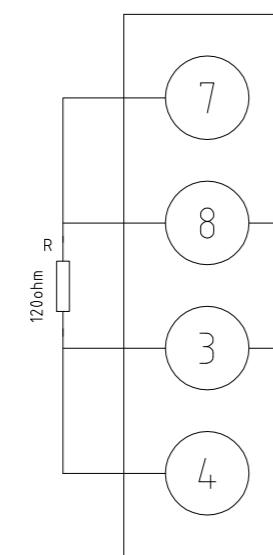


Drawing. N.	H01EL8855	REV.	7A	Plant	Designer	View	Approved	Date rev.	REV.	SHEET
CAD	SPAC	Name	HYDROGEN GENERATOR MODEL V1		S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	25
File Name	H01EL8855-7A_VERDE		HMI CONNECTION		S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	TOT.
Date	19/01/2012		Designer	View	Approved					45
	S. AGRETTI		C. D'ANGELO	M. MARRUCCI						

CPU-HMI CONNECTION

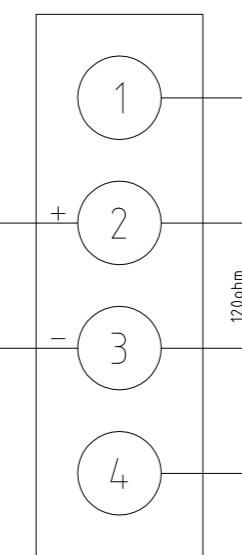
CP620/630

HM



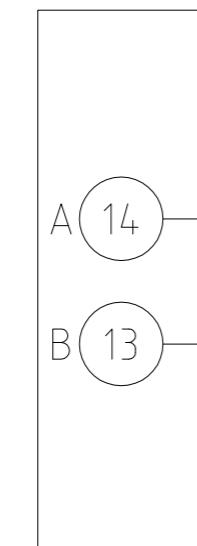
COM1

CPU



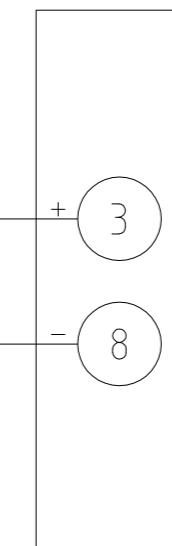
CPU-NETBITER CONNECTION

# NET-BITER



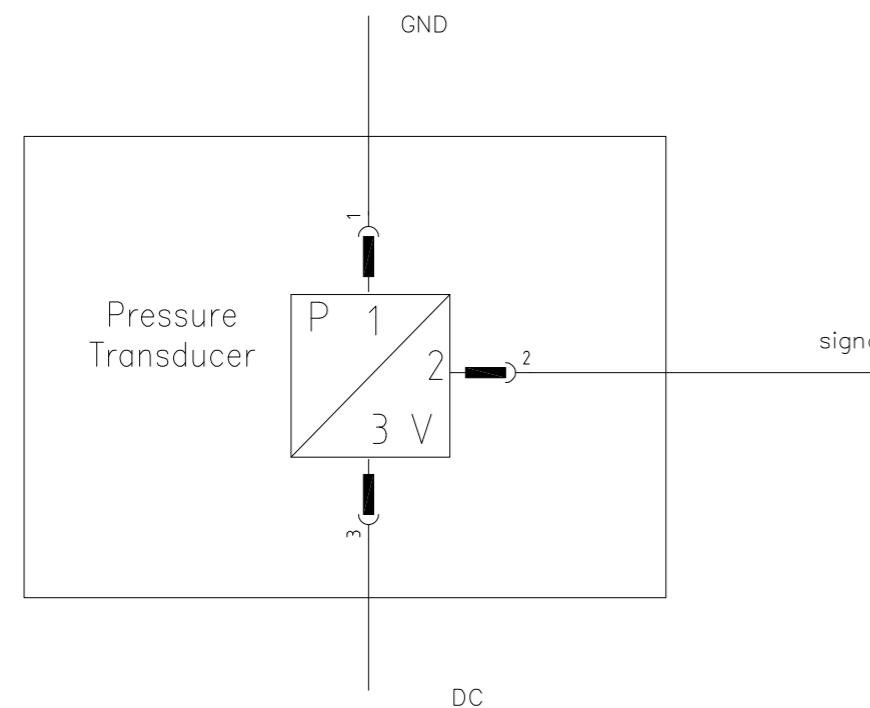
COM2

CPU

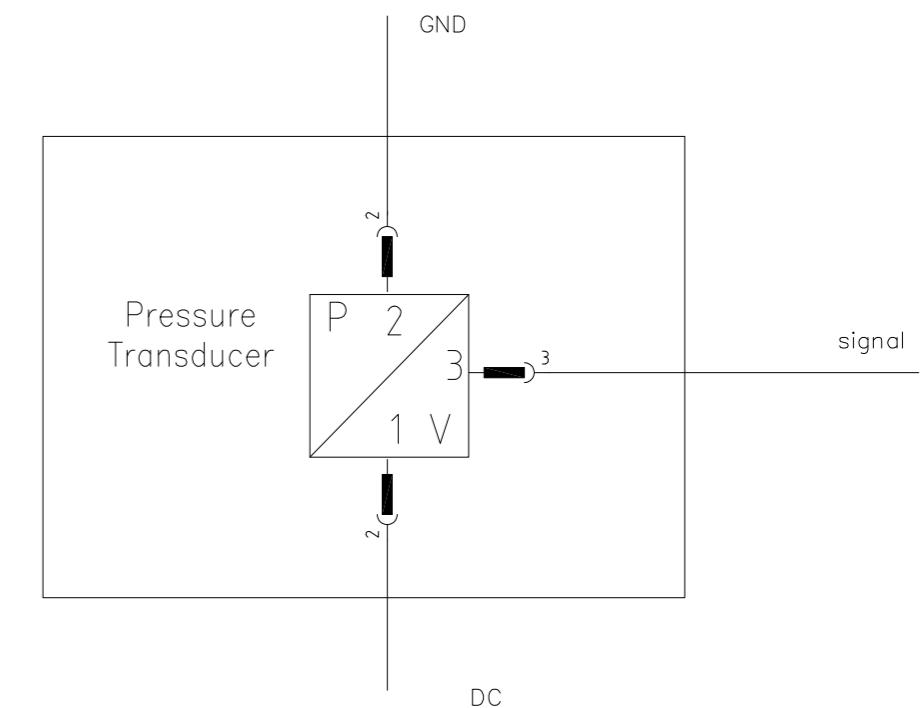


Drawing. N.	H01EL8855	REV.	7A	Plant HYDROGEN GENERATOR MODEL V1	Designer	View	Approved	Date rev.	REV.	SHEET 26
CAD	SPAC				S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	
File Name	H01EL8855-7A_VERDE			Name HMI-CPU / CPU-NETBITER CONNECTION	S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	TOT. 45
Date	19/01/2012			Designer S. AGRETTI	View C. D'ANGELO	Approved M. MARRUCCI				

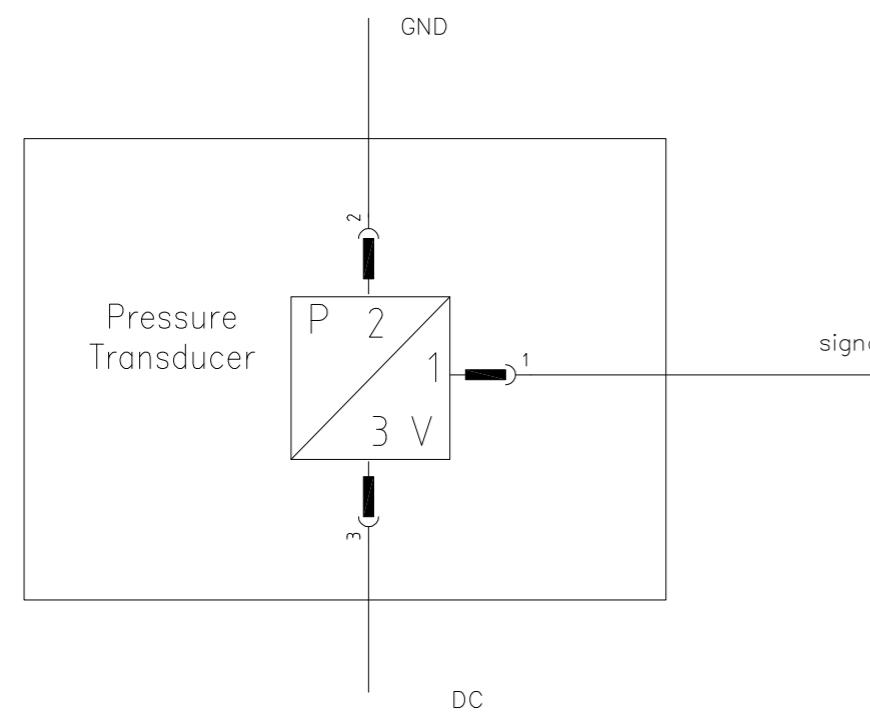
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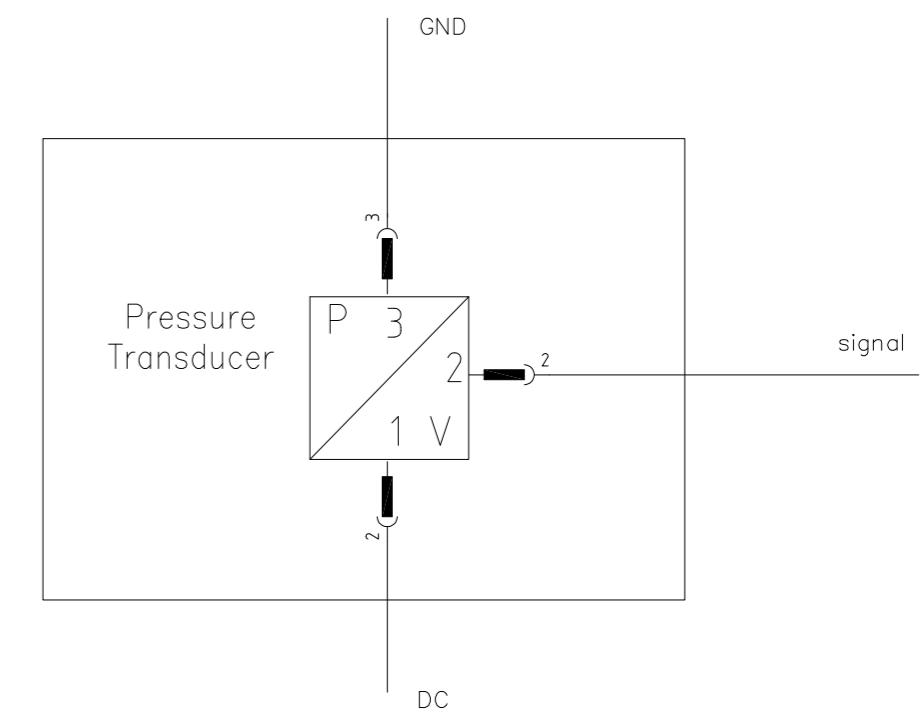
pressur transducer type KELLER



pressur transducer type JUMO



pressur transducer type GEFTRAN



pressur transducer type IFM



Drawing. N. H01EL8855 REV. 7A  
CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

Plant HYDROGEN GENERATOR MODEL V1  
Name INSTRUMENTS TYPICAL CONNECTION  
Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI Date rev. 17/11/2014 REV. 7  
S. AGRETTI C.D'ANGELO M.MARRUCCI 16/02/2015 7A  
Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI Date rev. 17/11/2014 REV. 7  
S. AGRETTI C.D'ANGELO M.MARRUCCI 16/02/2015 7A  
Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI Date rev. 17/11/2014 REV. 7  
S. AGRETTI C.D'ANGELO M.MARRUCCI 16/02/2015 7A

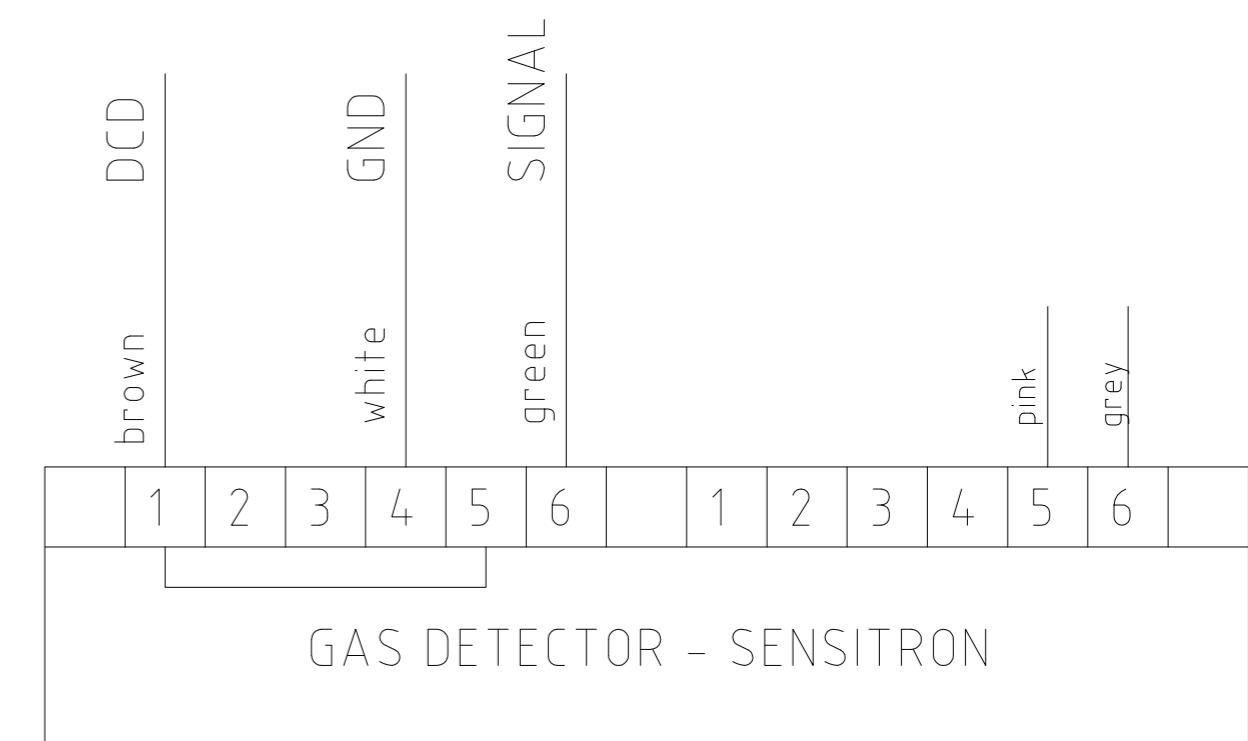
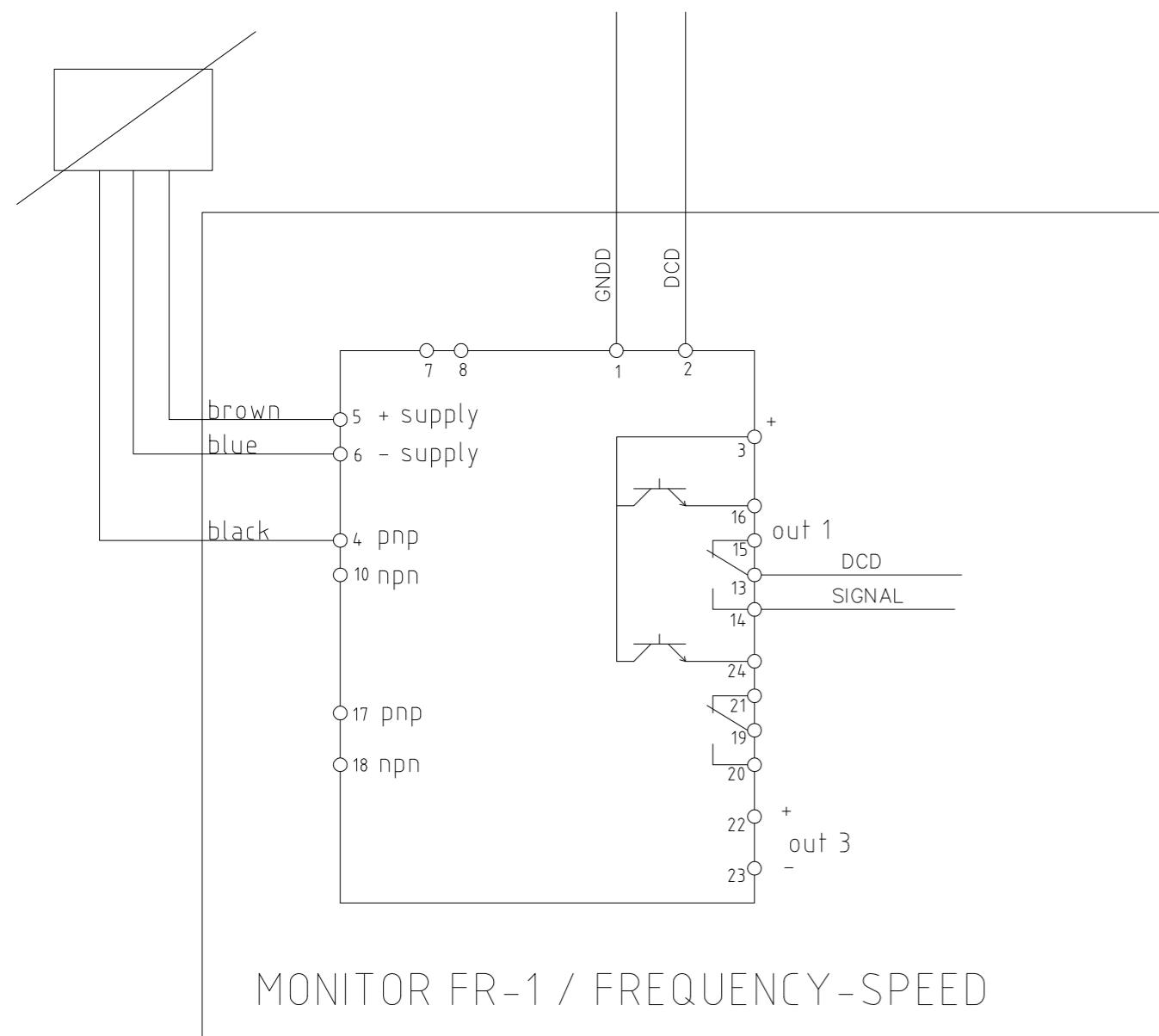
SHEET 27  
TOT. 45



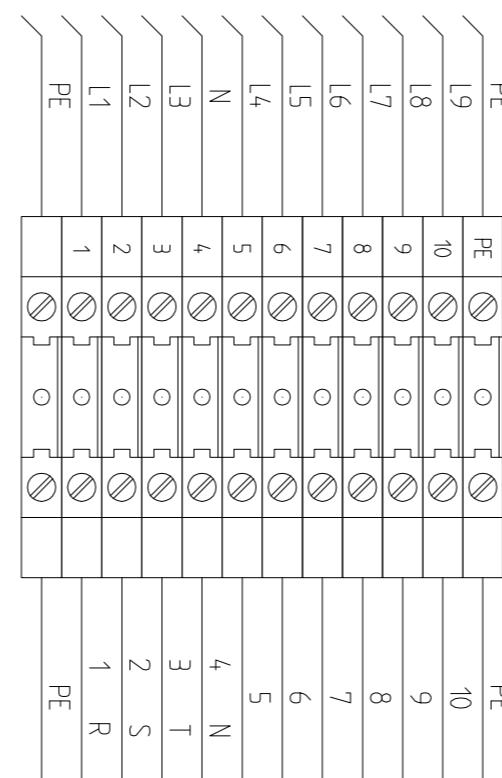
Drawing. N.	H01EL8855	REV.	7A	Plant HYDROGEN GENERATOR MODEL V1	Designer	View	Approved	Date rev.	REV.	SHEET 28
CAD	SPAC				S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	
File Name	H01EL8855-7A_VERDE				S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	
Date	19/01/2012			Designer S. AGRETTI	View C. D'ANGELO	Approved M. MARRUCCI				TOT. 45

SQ

B8



## TERMINAL X11

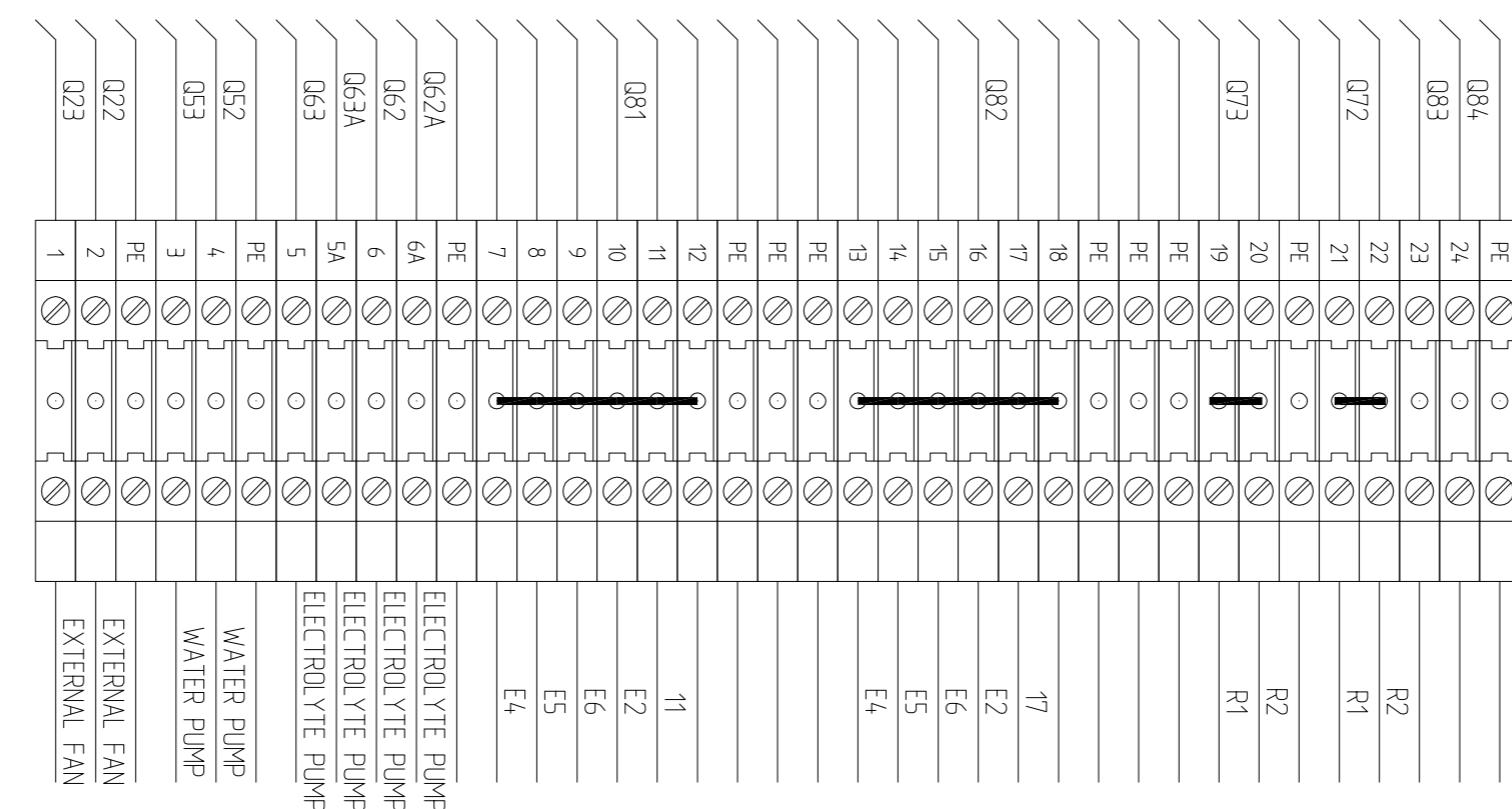


Drawing. N. H01EL8855 REV. 7A  
 CAD SPAC  
 File Name H01EL8855-7A\_VERDE  
 Date 19/01/2012

Plant  
 HYDROGEN GENERATOR MODEL V1  
 Name CONNECTION TERMINAL X13  
 Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI  
 Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI

Designer	View	Approved	Date rev.	REV.	SHEET
S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	30
Name	Connection Terminal X13				
S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	
Designer	View	Approved			TOT.
S. AGRETTI	C. D'ANGELO	M. MARRUCCI			45
Date					

## TERMINAL X1

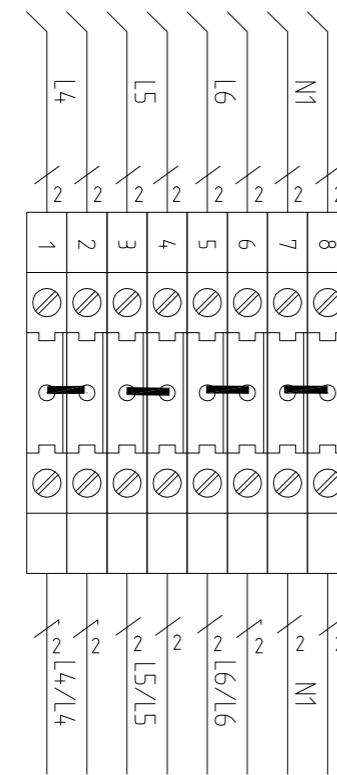


## PANEL FAN

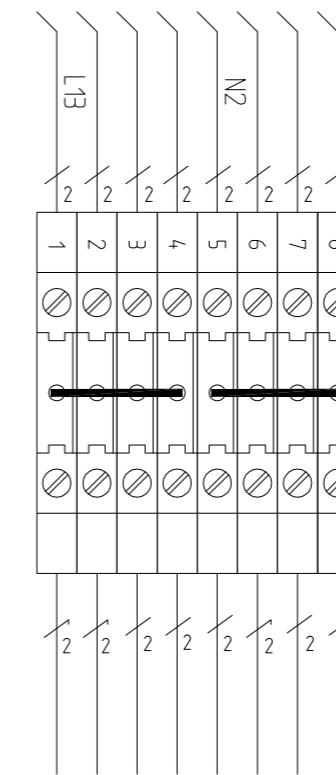


Drawing. N.	H01EL8855	REV.	7A	Plant	Designer	View	Approved	Date rev.	REV.	SHEET 31	
CAD	SPAC				S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7		
File Name	H01EL8855-7A_VERDE			Name	CONNECTING TERMINAL X14		S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A
Date	19/01/2012				Designer	View	Approved			TOT. 45	
					S. AGRETTI	C. D'ANGELO	M. MARRUCCI				

TERMINAL X14



TERMINAL X20

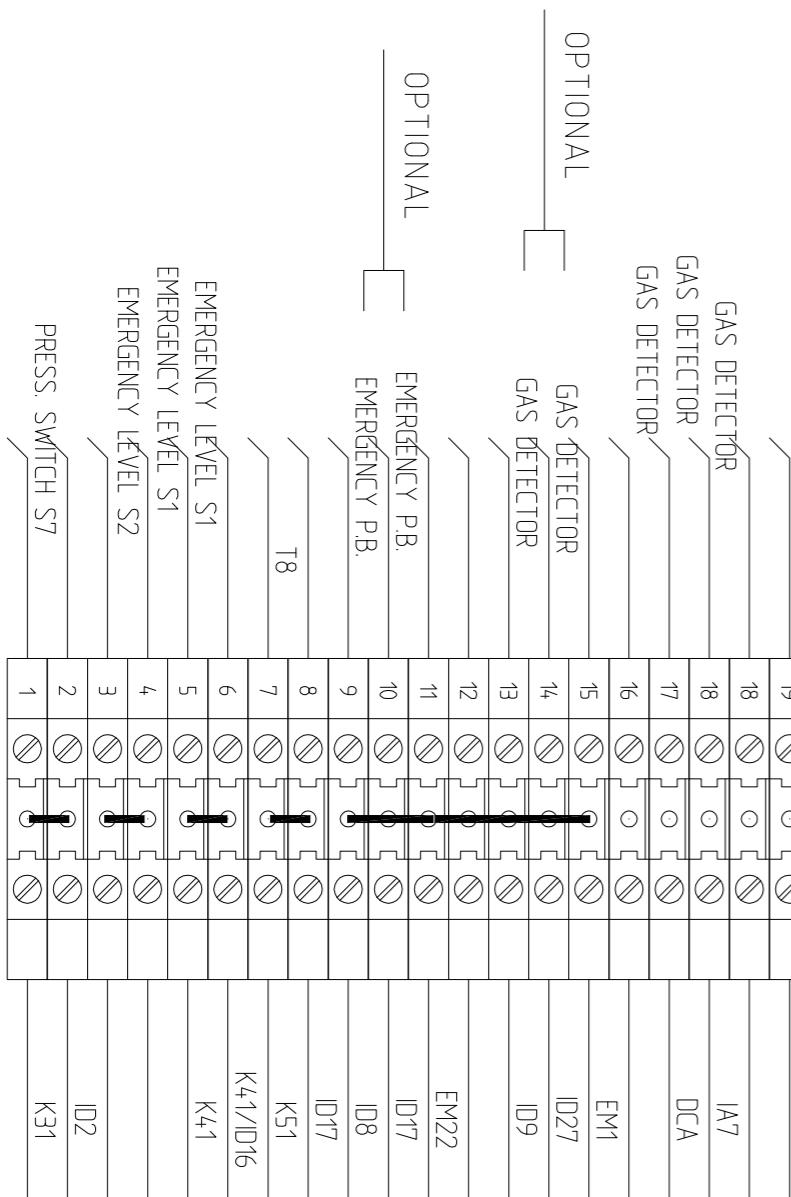


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CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

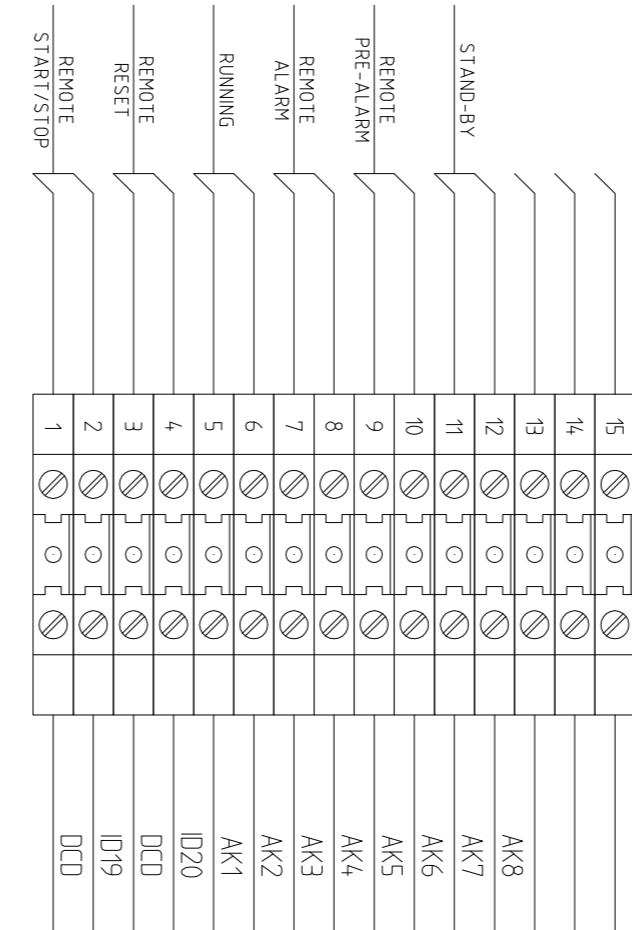
Plant HYDROGEN GENERATOR MODEL V1  
Name CONNECTING TERMINAL X12  
Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI Date rev. 17/11/2014 REV. 7  
Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI Date rev. 16/02/2015 REV. 7A  
Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI

SHEET 32 TOT. 45

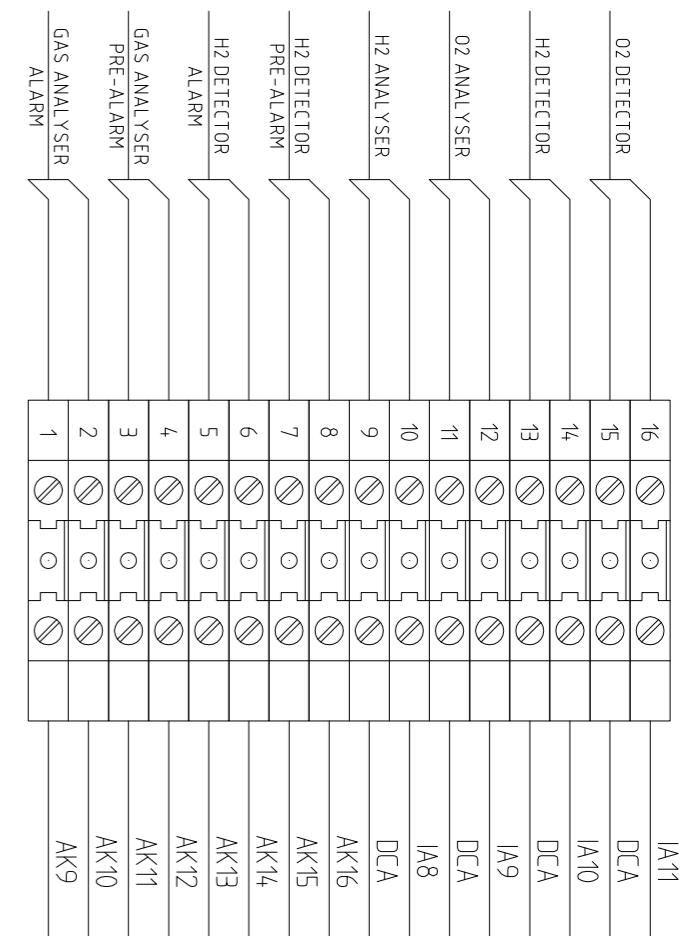
## TERMINAL X12



## TERMINAL X15



## TERMINAL X22

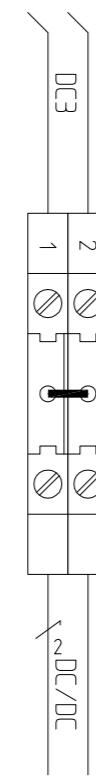


Drawing. N. H01EL8855 REV. 7A  
CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

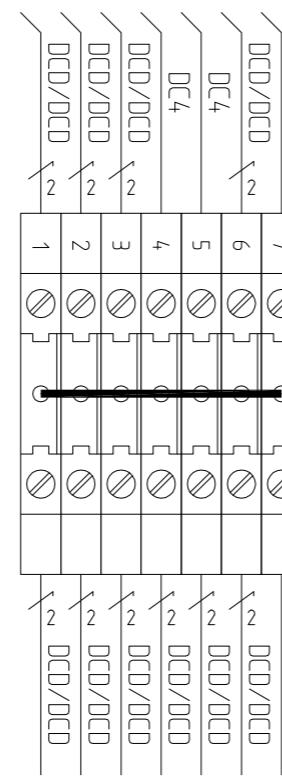
Plant HYDROGEN GENERATOR MODEL V1  
Name CONNECTING TERMINAL X12 - X15  
Designer S. AGRETTI View C.D'ANGELO Approved M. MARRUCCI Date rev. 17/11/2014 REV. 7  
Designer S. AGRETTI View C.D'ANGELO Approved M. MARRUCCI Date rev. 16/02/2015 REV. 7A  
Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI

SHEET 33 TOT. 45  
17/11/2014 7  
16/02/2015 7A

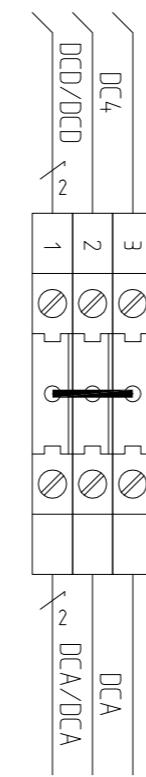
X16



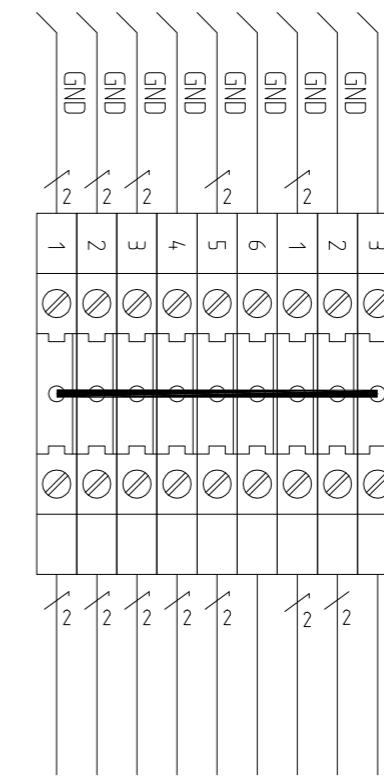
X17



X18



X19



Drawing. N. H01EL8855 REV. 7A  
CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

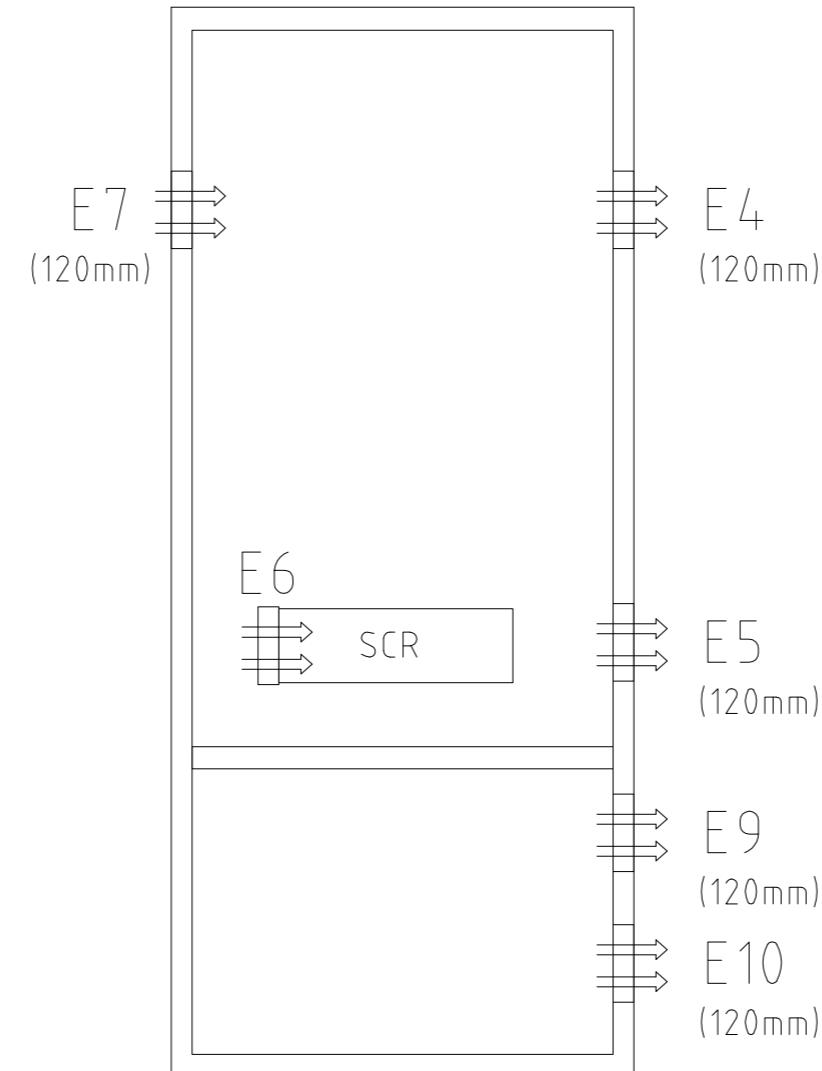
Plant  
HYDROGEN GENERATOR MODEL V1

Name	24VDC DISTRIBUTOR TERMINALS
Designer	S. AGRETTI
View	C. D'ANGELO
Approved	M. MARRUCCI
Date rev.	17/11/2014
REV.	7

Designer	View	Approved	Date rev.	REV.	SHEET
S. AGRETTI	C. D'ANGELO	M. MARRUCCI	17/11/2014	7	34
Name	24VDC DISTRIBUTOR TERMINALS				TOT.
Designer	S. AGRETTI	C. D'ANGELO	M. MARRUCCI	16/02/2015	45
View					
Approved					
Date rev.					
REV.					

# FRONT VIEW

## PANEL



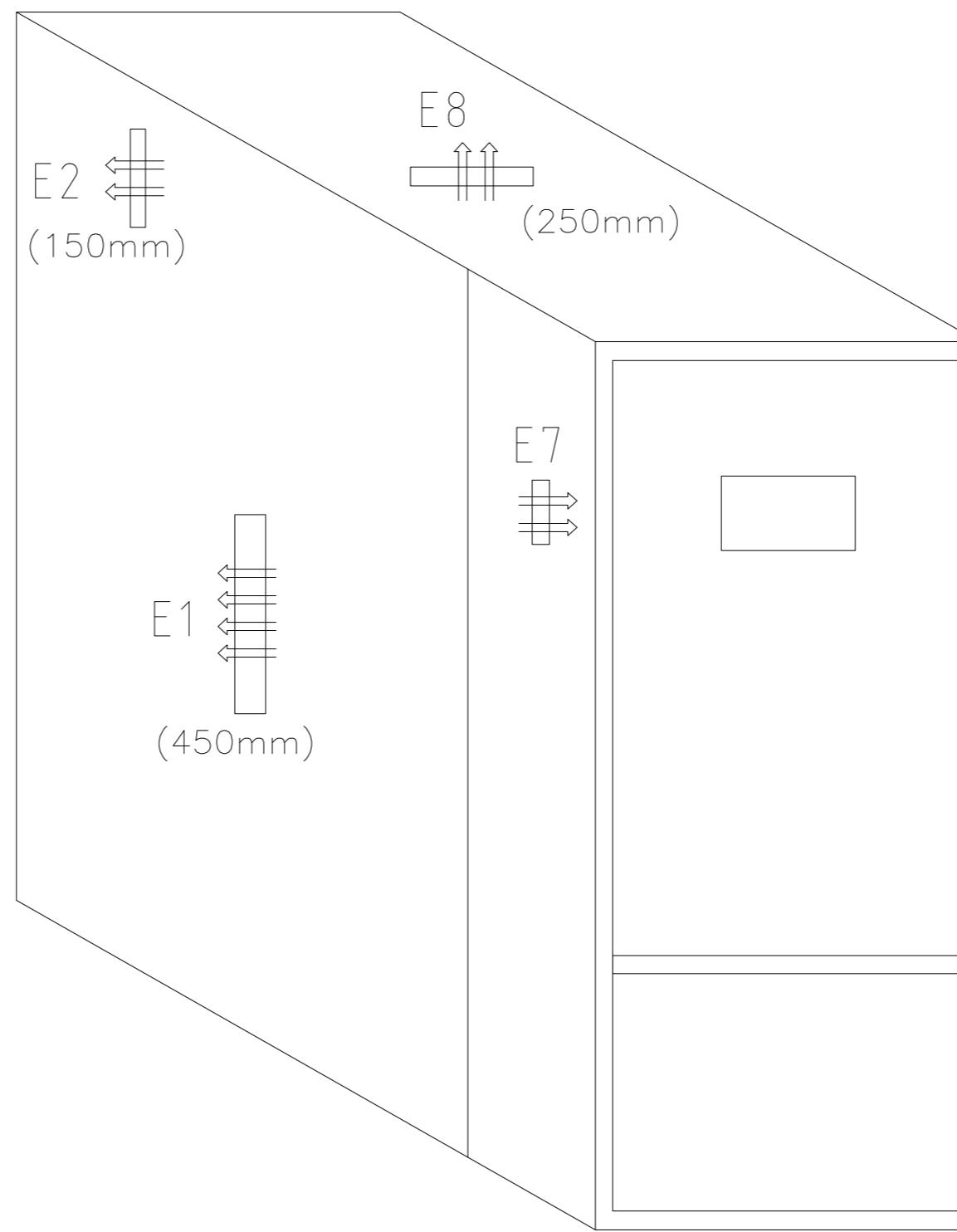
Drawing. N. H01EL8855 REV. 7A  
CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

Plant HYDROGEN GENERATOR MODEL V1  
Name FANS DRAWING  
Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI  
Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI

Designer	View	Approved	Date rev.	REV.	SHEET
S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	35
Name	FANS DRAWING				TOT.
					45
Designer	View	Approved	Date rev.	REV.	
S. AGRETTI	C. D'ANGELO	M. MARRUCCI	16/02/2015	7A	

0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

# FRONT VIEW GENERATOR 3D



Drawing. N. H01EL8855 REV. 7A  
CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

Plant  
HYDROGEN GENERATOR MODEL V1  
Name FANS DRAWING  
Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI

Designer	View	Approved	Date rev.	REV.	SHEET
S. AGRETTI	C. D'ANGELO	M. MARRUCCI	17/11/2014	7	36
S. AGRETTI	C. D'ANGELO	M. MARRUCCI	16/02/2015	7A	
					TOT.
					45

0	1	2	3	4	5	6	7	8	9
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Symbol	Tag	Description
	E3	Monophase Fan
	F3	Fuse
	F30	Fuse
	H20	Buzzer
	H5	Lamp
	L3	Inductance
	M9	Monophase motor
	Q10	Automatic switch bipolar
	Q180	Differential automatic switch
	Q81	Switch with fuse
	Q810	Switch with fuse

Symbol	Tag	Description
	Q830	Tripolar switch
	S4C	Emergency P.B. N.C.
	S400	Emergency P.B. N.C.
	S6	Manual Key N.O.
	S9C	Pressure switch N.C.
	S15C	Level switch N.C.
	S150	Level switch N.C.
	S74C	Thermic Switch N.C.
	T10	Power Transformer
	V1B	Diode
	X1	Bipolar socket



Drawing. N. H01EL8855 REV. 7A  
 CAD SPAC  
 File Name H01EL8855-7A\_VERDE  
 Date 19/01/2012

Plant

HYDROGEN GENERATOR MODEL V1

Designer	View	Approved	Date rev.	REV.	SHEET
S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	37
S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	
Designer	View	Approved			TOT.
S. AGRETTI	C. D'ANGELO	M. MARRUCCI			45

0	1	2	3	4	5	6	7	8	9
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Symbol	Tag	Description	Symbol	Tag	Description
	Y1	Electrovalve			
	KA1	Relay			
	KM1	Relay/Contactor			
	CEI1276	RC			
	CEI1277	RC			
	CEI2094	Electrovalve			



Drawing. N. H01EL8855 REV. 7A  
 CAD SPAC  
 File Name H01EL8855-7A\_VERDE  
 Date 19/01/2012

Plant HYDROGEN GENERATOR MODEL V1  
 Name SYMBOLS LEGEND  
 Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI Date rev. 17/11/2014 REV. 7  
 Designer S. AGRETTI View C.D'ANGELO Approved M.MARRUCCI Date rev. 16/02/2015 REV. 7A  
 Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI

SHEET 38 TOT. 45

# INPUT/OUTPUT LIST

## ANALOG INPUT - PT100 EXP. 1.0

DESCRIPTION	
WORKING PRESSURE	IA0
DIFF. PRESS. SPROP. H2	IA1
DIFF. PRESS. SPROP. O2	IA2
CELL CURRENT	IA3
ELECTROLITE TEMPERATURE	IA4
CELL TEMPERATURE 1	IA5
CELL TEMPERATURE2	IA6
ELECTROLITE TEMPERATURE	IA7

## ANALOG INPUT/OUTPUT - PT100 EXP. 2.0

DESCRIPTION	
H2 ANALYSER	IA8
O2 ANALYSER	IA9
H2 DETECTOR	IA10
O2 DETECTOR	IA11
SCR SET POINT	UA0
	0V



Drawing. N.	H01EL8855	REV.	7A	Plant	Designer	View	Approved	Date rev.	REV.	SHEET
CAD	SPAC			HYDROGEN GENERATOR MODEL V1	S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	39
File Name	H01EL8855-7A_VERDE	Name	INPUT/OUTPUT SIGNAL LIST	S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A		TOT.
Date	19/01/2012	Designer	View	Approved						45
		S. AGRETTI	C. D'ANGELO	M. MARRUCCI						

# DIGITAL INPUT EXP. 2.0

DESCRIPTION	
EMERGENCY LEVEL	ID0
H2O DEMIN. TANK LEVEL	ID1
O2 CONDENSE LEVEL	ID2
O2 LOW LEVEL	ID3
O2 HIGH LEVEL	ID4
H2 CONDENSE LEVEL	ID5
H2 LOW LEVEL	ID6
H2 HIGH LEVEL	ID7
EMRGENCY PUSH-BUTTON	ID8
POROXIMITY	ID9
EXTERNAL ALARM	ID10
GAS DETECTOR	ID11
POWER INSERT	ID12
ELECTROLITE FLOW-SWITCH	ID13
FUSE F7	ID14
FUSE F8	ID15



Drawing. N.	H01EL8855	REV.	7A	Plant HYDROGEN GENERATOR MODEL V1	Designer	View	Approved	Date rev.	REV.	SHEET 40
CAD	SPAC				S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	
File Name	H01EL8855-7A_VERDE			Name INPUT/OUTPUT SIGNAL LIST	S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	TOT. 45
Date	19/01/2012				Designer	View	Approved			
					S. AGRETTI	C. D'ANGELO	M. MARRUCCI			

## DIGITAL INPUT EXP.3.0

DESCRIPTION	
EMERGENCY P.B.	
THERMICH SWITCHES	
EXTERNAL ALARM	
GAS DETECTOR	
POWER ENABLE	
ELECTROLYTE FLOW SWITCH H2 SIDE	
HEATING CABLE THERMIC SWITCH	
AIR PRESS. SWITCH	

## DIGITAL OUTPUT EXP. 3.0

DESCRIPTION	
BUZZER	UD0
SCR ENABLE	UD1
CELL POWER	UD2
RUNNING	UD3
ALARM	UD4
COOLING GAS FAN	UD5
ELECTROLITE PUMP	UD6
PRE-ALARM	UD7



Drawing. N. H01EL8855	REV. 7A	Plant HYDROGEN GENERATOR MODEL V1	Designer	View	Approved	Date rev.	REV.	SHEET
			S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	41
CAD	SPAC	Name INPUT/OUTPUT SIGNAL LIST	S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	
			S. AGRETTI	C.D'ANGELO	M.MARRUCCI			TOT. 45
File Name	H01EL8855-7A_VERDE	Designer View Approved						TOT. 45
			S. AGRETTI	C. D'ANGELO	M. MARRUCCI			
Date	19/01/2012							

## DIGITAL OUTPUT EXP. 4.0

DESCRIZIONE	
EV. LOAD DEMIN WATER	UD8
EV. O2 SPROP. DISCHARGE	UD9
EV. DES DISCHARGE	UD10
EV. H2 SPROP. DISCHARGE	UD11
EXTRACTION FAN	UD12
DEMIN WATER PUMP	UD13
MAIN COLING FAN	UD14
SEPEARATOR RESISTANCE	UD15



Drawing. N.	H01EL8855	REV.	7A	Plant	Designer	View	Approved	Date rev.	REV.	SHEET
CAD	SPAC	Name	HYDROGEN GENERATOR MODEL V1		S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	42
File Name	H01EL8855-7A_VERDE		INPUT/OUTPUT SIGNAL LIST		S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	TOT.
Date	19/01/2012	Designer	View	Approved	S. AGRETTI	C. D'ANGELO	M. MARRUCCI			45

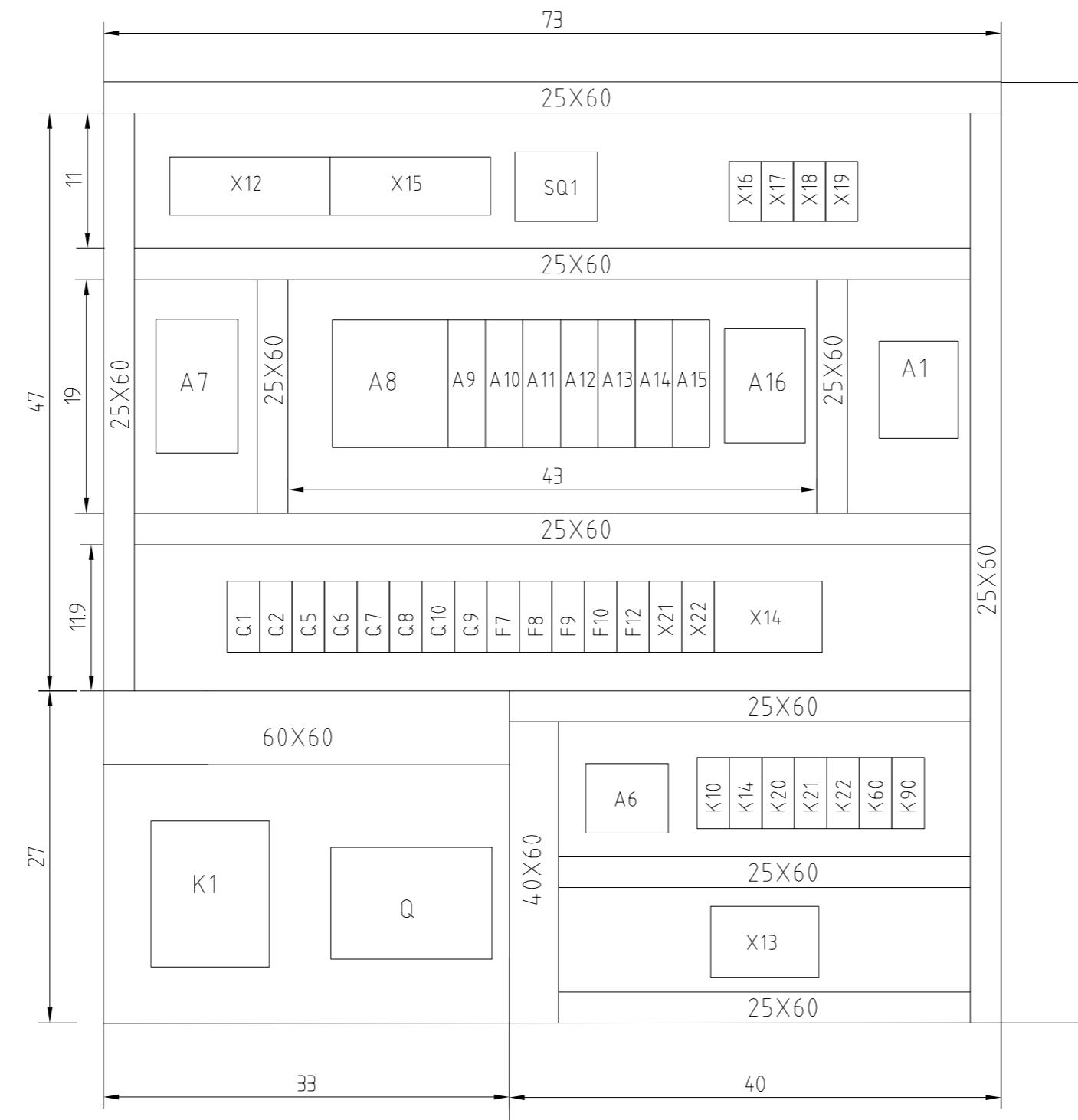
# DIGITAL INPUT/OUTPUT EXP. 2.0

DESCRIZIONE	
EV. LOAD DEMIN WATER	UD16
EV. O2 SPROP. DISCHARGE	UD17
EV. DES DISCHARGE	UD18
EV. H2 SPROP. DISCHARGE	UD19
EXTRACTION FAN	UD20
DEMIN WATER PUMP	ID24
MAIN COLING FAN	UD21
SEPEARATOR RESISTANCE	UD22



Drawing. N.	H01EL8855	REV.	7A	Plant	HYDROGEN GENERATOR MODEL V1	Designer	View	Approved	Date rev.	REV.	SHEET	
						S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	43	
CAD	SPAC			Name	INPUT/OUTPUT SIGNAL LIST	S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A		
						S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	TOT. 45	
File Name	H01EL8855-7A_VERDE			Designer	View	Approved						
Date	19/01/2012			Designer S. AGRETTI	View C. D'ANGELO	Approved M. MARRUCCI						

# PANEL LAYOUT

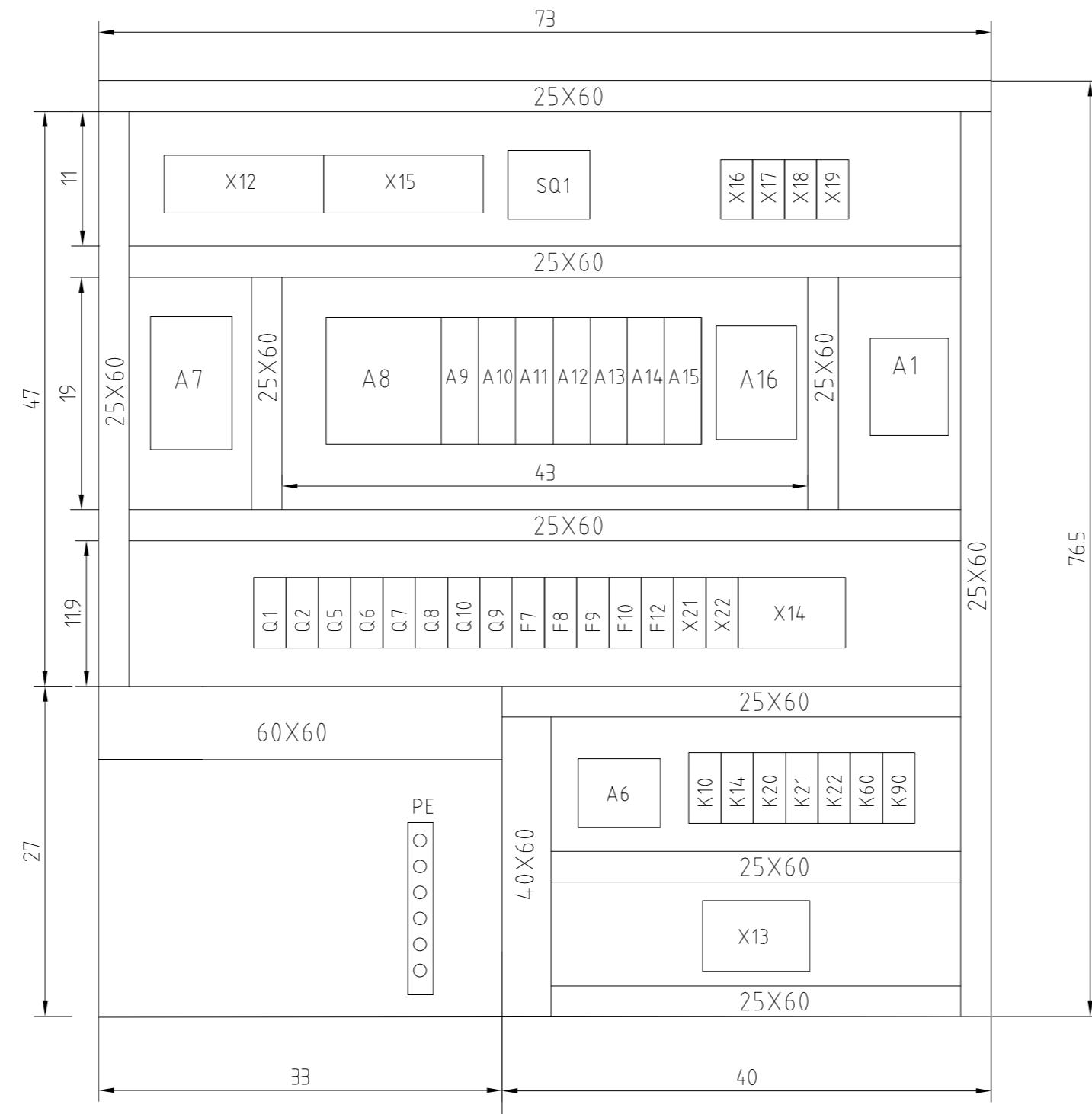


Drawing. N. H01EL8855 REV. 7A  
CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

Plant HYDROGEN GENERATOR MODEL V1  
Name PANEL LAYOUT  
Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI

Designer	View	Approved	Date rev.	REV.	SHEET
S. AGRETTI	C. D'ANGELO	M. MARRUCCI	17/11/2014	7	44
S. AGRETTI	C. D'ANGELO	M. MARRUCCI	16/02/2015	7A	
					TOT. 45

# PANEL LAYOUT



Drawing. N. H01EL8855 REV. 7A  
CAD SPAC  
File Name H01EL8855-7A\_VERDE  
Date 19/01/2012

Plant HYDROGEN GENERATOR MODEL V1  
Name PANEL LAYOUT  
Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI  
Designer S. AGRETTI View C. D'ANGELO Approved M. MARRUCCI

Designer	View	Approved	Date rev.	REV.	SHEET
S. AGRETTI	C.D'ANGELO	M.MARRUCCI	17/11/2014	7	45
S. AGRETTI	C.D'ANGELO	M.MARRUCCI	16/02/2015	7A	
					TOT. 45