Appendix G

NOISE ANALYSIS REPORT

Mantle Rock Solar LLC

Livingston County, Kentucky

COPPERHEAD
ENVIRONMENTAL CONSULTING

Acoustical Analysis for the Proposed Mantle Rock Solar LLC Project Livingston County, Kentucky

Prepared for:

Mantle Rock Solar LLC

25 August 2025

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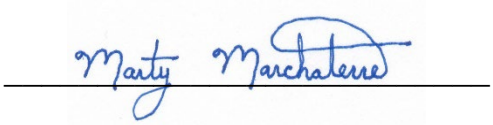

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August 25, 2025

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INTRODUCTION

Mantle Rock Solar LLC (Mantle Rock) contracted Copperhead Environmental Consulting, Inc. (Copperhead) to conduct an acoustical analysis for the proposed Mantle Rock Solar Project (Project) near the intersection of Carrsville Road (KY 135) and KY 1608, between the communities of Hampton and Joy in Livingston County, Kentucky (Figure 1). The Project Area consists of approximately 537 acres.

The Project is an approximately 42 megawatt (MW) solar facility that would generate electricity using photovoltaic solar panels. It would include solar panel arrays, inverter boxes, a utility interconnection substation, transformer, a Battery Energy Storage System, and overhead and underground electrical conveyance lines.

EXISTING LAND USE AND SITE CONDITIONS

According to the National Land Cover Database (NLCD), the Project Area currently consists of agricultural fields/cultivated crops and pasture (Figure 2). Historically, the Project Area has been used for agriculture. Land uses on adjacent properties include agriculture, scattered wood lots, and rural residences.

EXISTING SOUND CONDITIONS

Nearest Sensitive Receptors

Sound-sensitive receptors are generally defined as locations where people reside or where the presence of unwanted sound may adversely affect the existing land use. Typically, sound-sensitive land uses include residences, hospitals, places of worship, libraries, performance spaces, offices, and schools, as well as nature preserves, recreational areas, and parks.

Receptors adjacent to the Project Area are nearby residences located primarily along Carrsville Rd, Maxfield Rd, and Quertermous Rd (Figure 3) and cemeteries and a church around the intersection of Maxfield Rd and Carrsville Rd (Figure 4). A total of 12 receptors, which are primarily residences (12), were identified near the PSA (within 2,000 feet).

The nearest receptor to a proposed solar array is a cemetery (NR-04) located on Carrsville Road, approximately 250 feet from the nearest array. The shortest distance between a receptor and a proposed inverter pad is approximately 975 feet (NR-07). The nearest receptor is approximately 1,487 feet from the proposed substation (R-06). Table 1 displays the distance from each receptor to the nearest proposed solar infrastructure.

Table 1. Residential (R) and Non-Residential (NR) Receptors within 2000-ft of the Project Area, Distances to the Nearest Infrastructure Components.

Receptor ID	Receptor Type	Distance to Project Area Boundary (feet)	Distance to Nearest Array (feet)	Distance to Nearest Inverter Pad (feet)	Distance to Substation (feet)	Distance to Battery (feet)
R-01	Residential	1,176	1,306	1,831	5,925	6,561
R-02	Residential	1,212	1,664	2,887	7,401	7,948
R-03	Residential	351	686	1,357	4,815	5,482
R-04	Residential	98	445	1,269	4,650	5,320
R-05	Residential	97	409	1,254	4,649	5,321
R-06	Residential	1,455	1,525	1,555	1,505	1,973
R-07	Residential	177	256	1,540	2,456	2,534
R-08	Residential	1,589	2,018	3,055	4,162	4,106
NR-01	Agricultural	1,818	2,061	2,581	6,312	6,976
NR-02	Church	122	290	891	2,859	3,523
NR-03	Cemetery	98	348	1,020	2,984	3,637
NR-04	Cemetery	50	530	1,105	2,591	3,248

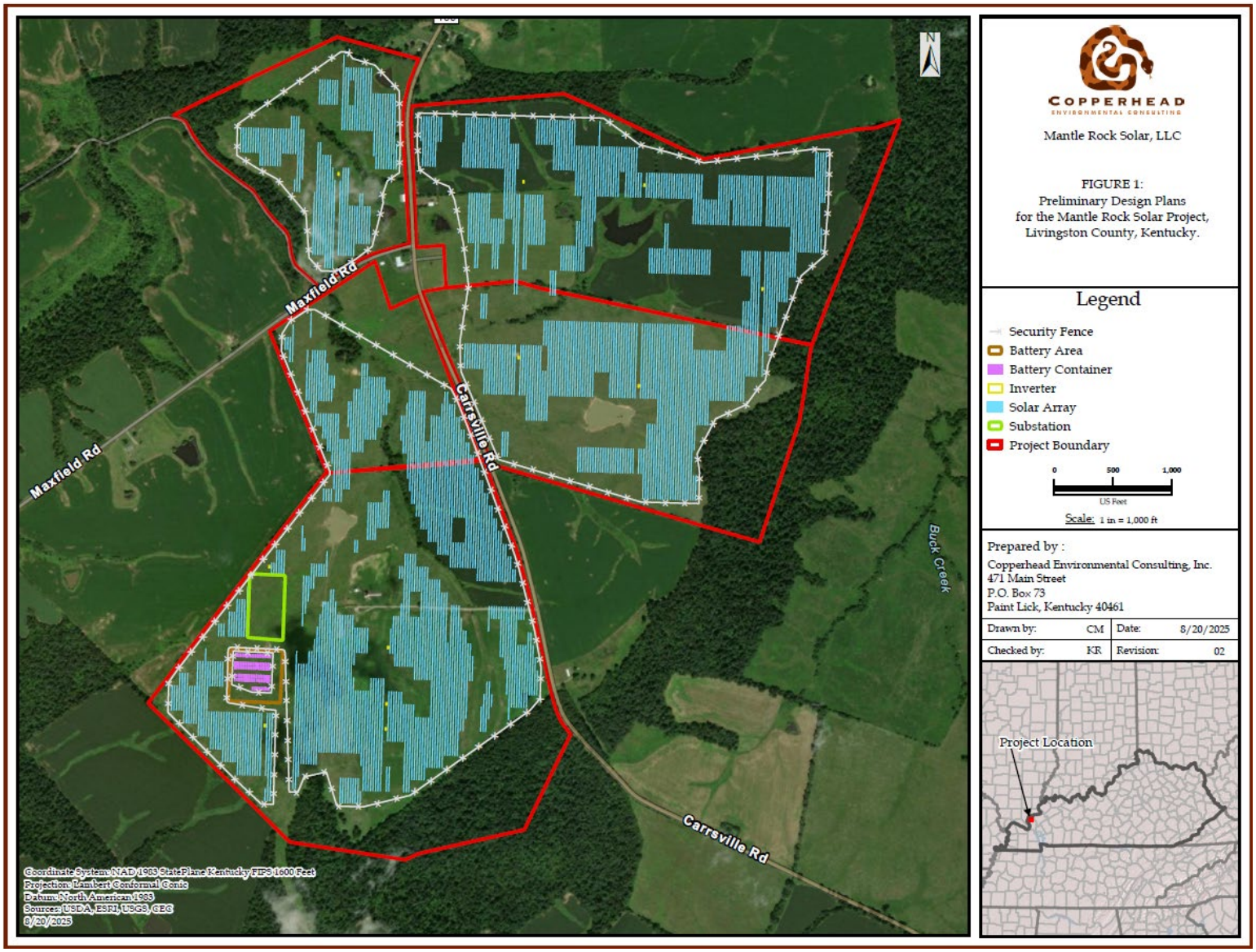

Figure 1. Project location and preliminary design plans.

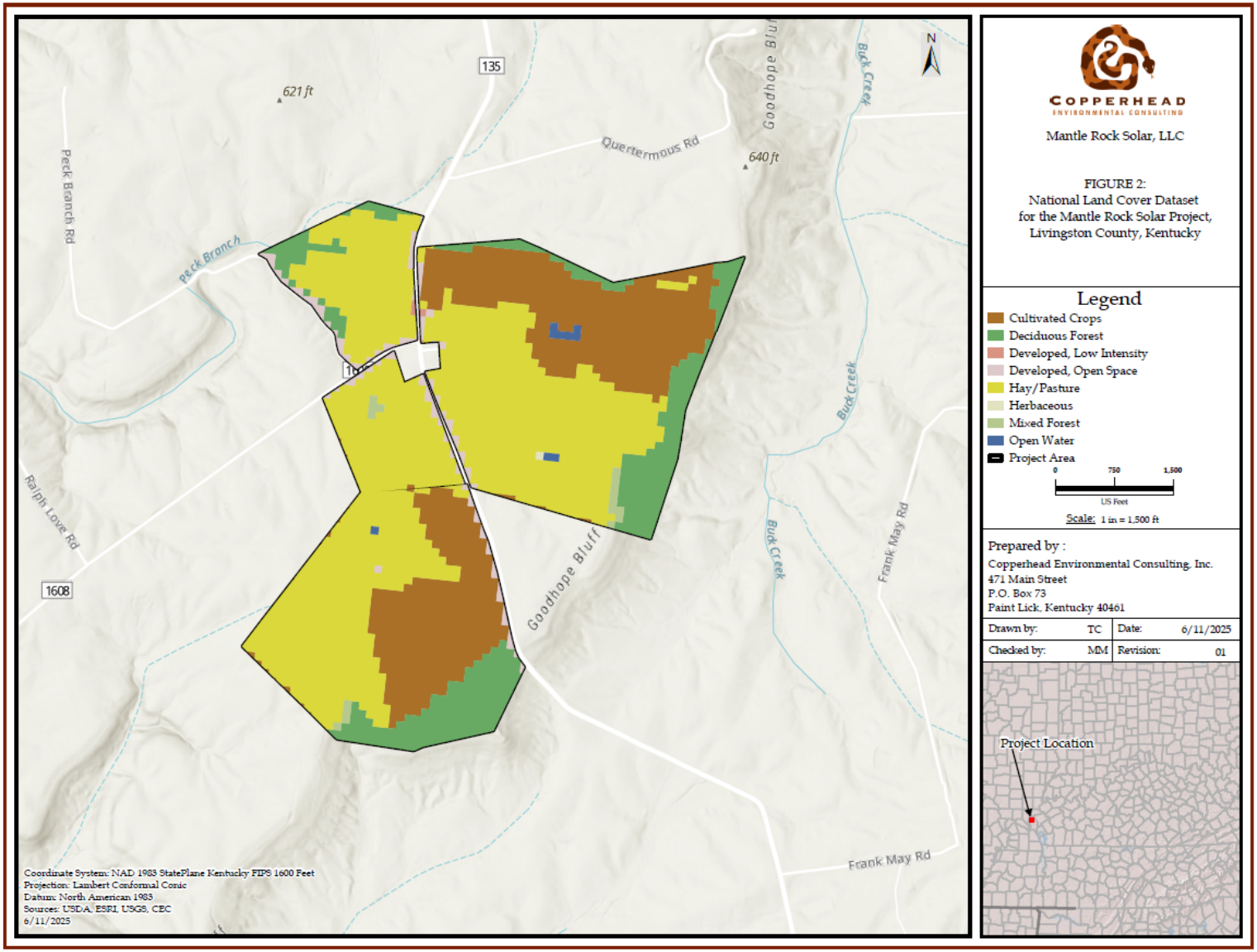

Figure 2. Land cover types within the Project Area.

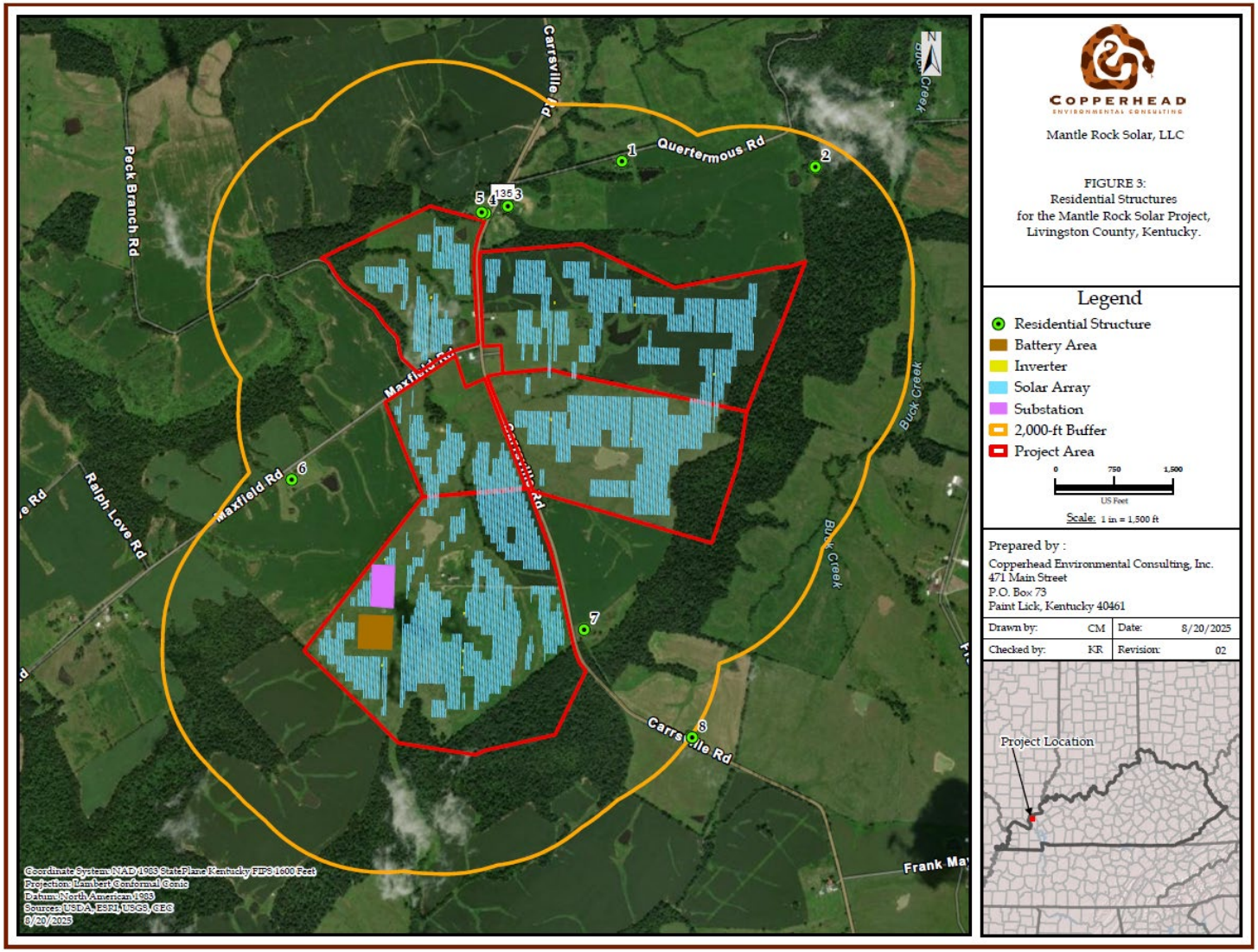

Figure 3. Residential receptors within 2,000 ft of the Project Area.

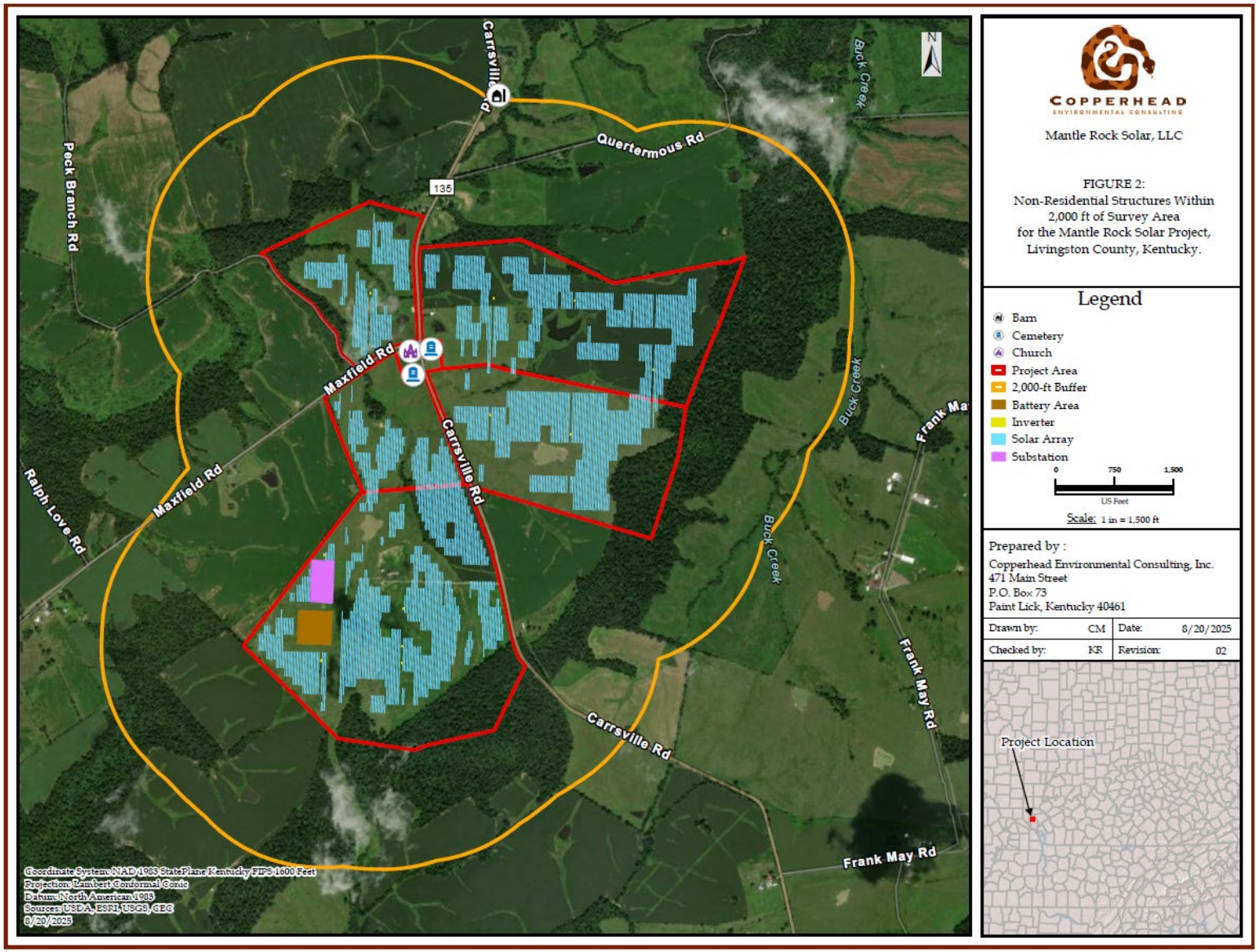

Figure 4. Non-residential receptors within 2,000 ft of the Project Area.

Existing Sound from Surrounding Areas

Noise is generally described as unwanted sound, which can be based either on objective effects (hearing loss, damage to structures, etc.) or subjective judgments (such as community annoyance). Sound is usually represented on a logarithmic scale with a unit called the decibel (dB). Sound on the decibel scale is referred to as sound level. The threshold of human hearing is approximately 0 dB, and the threshold of discomfort or pain is around 120 dB.

Noise levels are computed over a 24-hour period and adjusted for nighttime annoyances to produce the day-night average sound level (Ldn). Ldn is the community noise metric recommended by the US Environmental Protection Agency (USEPA) and has been adopted by most federal agencies (USEPA 1974). A Ldn of 65 A-weighted decibels (dBA) is the most common level for noise planning purposes and represents a compromise between community impact and the need for activities such as construction. The A-weighting network measures sound in a similar fashion to how a person perceives or hears sound, thus achieving a strong correlation with how people perceive acceptable and unacceptable sound levels.

Areas exposed to a Ldn above 65 dBA are generally not considered suitable for residential use. A Ldn of 55 dBA was identified by USEPA as a level below which there is no adverse impact (USEPA 1974). For reference, approximate sound levels (measured in dBA) of common activities/situations are provided in Table 1.

Table 2. Sound Levels of Common Activities/Situations.

Activity/Event	dBA
Lowest audible sound to person with average hearing	0
Quiet rural, nighttime (outdoors)	25
Crickets, distant frogs	30
Birds, distant dog bark	40
Quiet urban, nighttime (outdoors)	45
Large business office (indoors)	60
Normal speech at 3 feet (indoors)	60-70
Noisy urban area, daytime (outdoors)	75
Food blender at 3 feet	85
Gas lawn mower at 3 feet	100
Jet flyover at 1,000 feet	110

Source: Caltrans 2013.

Local conditions such as traffic, topography, and wind can alter background sound conditions. In general, the Ldn sound levels for outdoor quiet rural nighttime conditions is approximately 25 dBA (EPA 1974). Sound levels attenuate (or diminish) at a rate of approximately 6 dBA per doubling of distance from an outdoor point source due to the geometric spreading of the sound waves. The inverse square law is used to estimate noise levels at different distances.

Existing Project Site Area Sound

The PSA is within an agricultural, rural-residential, and undeveloped area of Livingston County. Ambient sound at the PSA consists mainly of agricultural sounds, such as noise from farm machinery; natural sounds, such as from wind and wildlife; and moderate traffic sounds. Sound levels of these types generally range from 45 to 55 dBA (USDOT 2015).

Typical sounds produced from farming and agriculture activities surrounding the Project Area include trucks, all-terrain vehicles (ATVs), tractors, and other farming equipment. The adjacent farms produce sound similar to those within the PSA. Table 3 lists the sound level of common agricultural sounds.

Table 3. Decibel Ratings of Common Agricultural Sounds.

Decibel	Sound
30	Crickets, distant frogs, whisper
40	Kitten meowing, songbirds, distant dog bark
50	Refrigerator running, babbling stream, quiet empty barn
60	Average conversation level
70	Chicken coop, busy restaurant. At this level, noise may begin to affect your hearing if exposed over a long period of time.
80	Tractor idling, barn cleaner, conveyors, elevators. These noises can damage hearing if exposed for more than eight continuous hours.
90	Tractor at 50 percent load, blower, compressor, combine. As noise levels increase, the "safe" exposure time decreases, damage can occur in less than eight hours.
100	Tractor at 80 percent load, pig squeal, power tools. Even two hours of exposure can be dangerous. With each 5-decibel increase, the "safe time" is cut in half.
120	Tractor at full load, bad muffler, old chain saw. The danger is immediate.
140	Gunshot, backfire, dynamite blast. Any length of exposure time is dangerous. At this level, the noise may cause pain in the ear.

Source: Texas A&M 2012.

Roadway traffic contributes to noise within the Project Area. Portions of the Project Area are bounded by two-lane roadways that receive local traffic (i.e., cars, trucks, and tractor trucks with trailering equipment). Based on Kentucky Transportation Cabinet traffic count data (accessed February 6, 2025), the average annual daily traffic (AADT) on two sections of KY 135 east of the Project Area ranged from 158 to 244 vehicles in 2021 and 2023, respectively, and on KY 1608 (Maxfield Road) entering the Project Area from the west, the AADT was 15 vehicles. Roadway traffic noise levels typically range from 70 to 80 dBA at approximately 50 feet and peak during normal business hours.

CONSTRUCTION SOUND CONDITIONS

Livingston County does not have a noise ordinance. Mantle Rock is not aware of any solar-specific United States Standards for sound mitigation during project construction or operation. Common practice is to treat solar projects like any other source of sound, applying existing laws that govern noise pollution from all sources in the applicable jurisdiction (MAREC 2021). The following sections describe Project-related noise conditions, their timing and duration, and sound levels at nearby sensitive receptors.

Construction Timing

Construction activity would be limited to the hours of 7am – 7pm, Monday through Saturday, over a period of approximately 8 – 12 months. Construction activities that create a higher level of noise, such as pile driving, will be limited to 8am – 5pm, Monday through Friday. Non-noise-causing and non-construction activities can take place between 6am and 10pm, Monday through Sunday, including field visits, arrival, departure, planning, meetings, mowing, surveying, etc.

Most construction equipment would not operate for the entire construction period, but would be phased in and out according to the progress of construction. Because construction would be limited to daytime hours, there would be no effect on ambient noise levels at night

Equipment and Machinery

Construction would use equipment typical for site development (i.e., backhoes, generators, pile drivers, and flatbed trucks). Equipment would be spread out over the entire site, with some equipment operating along the perimeter of the site while the rest of the equipment may be located from several hundred to several thousand feet from the perimeter.

The U.S. Department of Transportation Federal Highway Administration (FHWA) publishes noise levels for typical construction equipment as shown in the table below.

Table 4. Sound Levels for Common Construction Equipment.

Equipment Type	Typical Sound Level (dBA) at 50 Feet
Backhoe	80
Chainsaw	85-115
Crane (Mobile)	85
Dozer	85
Dump Truck	84
Generator	81
Grader	85
Front End Loader	80-85
Pickup Truck	55
Pile Driver	90-95
Pneumatic Tool	85
Pump	76
Roller	74
Scraper	89
Shovel	82
Spike Driver	77
Tractor	84
Truck (Flatbed)	80-90
Welder/Torch	73

Source: FHWA Construction Noise Handbook, August 2006. Table based on US EPA Report and measured data.

The most common method of installing the support posts for the solar panels is to drive them into the ground. This pile-driving procedure produces a repetitive, metallic impact sound. Individual piles take only a few minutes to be driven into the ground. Pile driving is short-lived and will take approximately six months to complete. This would occur at the earlier stages of construction, typically in the second or third month.

While standard construction pile drivers are estimated to produce between 90 to 95 dBA at a distance of 50 feet, the specialty pile drivers used for solar panel installation produce less noise, and the piles supporting solar panels will be driven primarily into soil. Based on a common type of pile driver used to install solar panel support posts (e.g., Vermeer Pile Driver - PD 10), the anticipated sound level is 84 dBA at 50 feet (Vermeer 2012). The nearest receptor is R-07, which

is approximately 256 feet from the nearest solar panel array. At this distance, temporary and intermittent construction sound levels would be approximately 70 dBA when a pile driver is used to install the piles/posts for the nearest solar panel array tracking system. This sound level is temporary and will decrease within hours as sections of the array are completed and the pile driver moves further away.

Only limited concrete pouring is anticipated for the Project. Base slabs for the inverters and other electrical equipment will be precast and dropped in place. The transformer base at the substation may be poured concrete. During this time, a concrete pump truck will be needed. A concrete pump truck typically generates a sound of approximately 82 dBA at 50 feet. At the nearest receptor (approximately 1,505 feet from the substation), the sound level is estimated to be 52 dBA intermittently for a day or two.

Assembly of Solar Panel Array and Construction of Facilities

Solar panels will be manufactured off site and shipped to the site ready for installation. Assembly of the solar panel array tracking system, the installation of solar panels, inverters and other electrical equipment associated with the solar facility and substation would likely employ typical manual hand tools and power tools. These assembly operations would occur several hundred feet to thousands of feet inside the property boundary. The anticipated duration of the sound generated by power equipment would be short.

Roadway Sound During Construction

During construction, it is anticipated that there would be a temporary increase in traffic volume from commuting construction workers (up to 150 workers during peak phases), the delivery of construction equipment and material, and the delivery of solar panel components and equipment. Worker commutes with passenger vehicles and trucks would occur daily, with traffic peaks in the morning and afternoon, whereas deliveries of equipment would occur on trailers, flatbeds, or other large vehicles periodically throughout the construction process at various times of day. Based upon FHWA sound levels, the sound contributed by construction vehicles such as flatbed trucks, light passenger cars and trucks falls within acceptable ranges because the sound is of short duration.

Construction Noise Summary

Table 5 displays a summary of anticipated maximum on-site construction sound levels at each of the residential and non-residential receptors identified in Figures 3 and 4.

Table 5. Selected Maximum Anticipated Construction Sound Levels at each Receptor.

Receptor ID	Receptor Type	Distance to Nearest Array (feet)	Pile Driving – 84 dBA at 50 feet (dBA)	Distance to Substation (feet)	Concrete Pouring – 82 dBA at 50 feet (dBA)
R-01	Residential	1,306	56	5,925	41
R-02	Residential	1,664	54	7,401	39
R-03	Residential	686	61	4,815	42
R-04	Residential	445	65	4,650	43
R-05	Residential	409	66	4,649	43
R-06	Residential	1,525	54	1,505	52
R-07	Residential	256	70	2,456	48
R-08	Residential	2,018	52	4,162	44
NR-01	Agricultural	2,061	52	6,312	40
NR-02	Church	290	69	2,859	47
NR-03	Cemetery	348	67	2,984	46
NR-04	Cemetery	530	63	2,591	48

OPERATIONAL SOUND CONDITIONS

This section describes the sound conditions during Project operation. Sound power levels for Project equipment were obtained from vendor/manufacturer data and are based on preliminary design.

Solar Panel Array

The solar panel array associated with the Project includes single-axis tracking panels (module) distributed evenly across the site. Tracking systems are driven by small, 24-volt brushless DC motors to track the arc of the sun to maximize energy generation. Panels would turn no more than five degrees every 15 minutes and would operate no more than one minute out of every 15-minute period during daylight hours.

The sound typically produced by panel tracking motors is approximately 56 dBA at 3 feet (DuraTrack or equivalent). At 256 feet (the closest receptor), the anticipated sound level would

be approximately 17 dBA. During the approximately four minutes per hour that tracker motors are operating, the sound generated by the motors is likely to be masked by existing daytime ambient sound sources and inaudible at this distance.

Inverters

Inverters convert the DC power generated by the solar panels to AC power. Inverters generate the highest sound during sunny days. Because they do not operate at night, the sound produced is minimal and typically a result of cooling fans (Kaliski et al. 2020). The Project includes approximately 11 photovoltaic inverters, expected to be Sungrow SG-4400UD-MV-US inverters or similar. The data sheet provided by Sungrow does not identify actual measured levels of sound produced by the specified inverter. Inverter sound levels can vary widely, from 25 dBA to more than 80 dBA. A review of Sungrow inverters indicates that they are designed to operate more quietly compared to other available inverters. Although it is likely to be lower, a conservative estimate of 80 dBA produced by an inverter at 3 feet was determined to be sufficient for this analysis. The sound produced by an inverter is described as a hum and has roughly the same sound level as a household refrigerator. A study of solar power facility acoustics in Massachusetts found that at 150 feet from an inverter pad, sound levels approached background levels (Guldberg 2012). While there are multiple inverters planned for the Project, sound levels were estimated for the nearest inverter to each receptor instead of calculating the average distance and average sound level of all of the inverters, which would likely discount the noise experienced from the nearest inverter.

The nearest inverter is approximately 891 feet from NR-02, which is the Good Hope Baptist Church. The anticipated level of noise at this location from the nearest inverter is approximately 31 dBA, which is lower than the average conversation level of 60 dBA (see Table 3).

Transformer

The main transformer at the substation is anticipated to be a 69kV/34.5kV 40/53/66 MVA transformer. Per National Electronic Manufacturers Association (NEMA) ST-20 standards, it is estimated that the transformer at a substation would generate sound levels of approximately 50 dBA at 3.2 feet (Schneider Electric 2020). Sound from transformers is produced by alternating current flux in the core that causes it to vibrate, and is characterized as a discrete low frequency hum. Because the transformer is relatively quiet and the nearest receptor to the substation is over 1,000 feet away (R-06), it is anticipated that the transformer would not be audible to any receptors. Values in Table 6 are negative because they indicate that the sound would be below the threshold of human hearing.

Battery Energy Storage System

The Battery Energy Storage System (BESS) is anticipated to be the Fluence Gridstack Pro. The operational noise can be assumed to occur continuously for 24 hours a day. A conservative

estimate of the noise generated by a BESS at 3 feet is 85 dBA. Although actual noise may be lower or obscured at certain locations due to vegetation, this estimate provides a worst case scenario to understand the potential for the greatest impacts to receptors.

Operational Noise Summary

Table 6 displays a summary of estimated maximum on-site operational sound levels at each of the residential and non-residential receptors identified in Figures 3 and 4.

Table 6. Maximum Anticipated Operational Sound Levels[1] at each Sensitive Receptor.

Receptor ID	Receptor Type	Distance to Nearest Array (feet)	Panel Tracking Motors – 56 dBA at 3 feet (dBA)	Distance to Nearest Inverter Pad (feet)	Inverters – 80 dBA at 3 feet (dBA)	Distance to Substation (feet)	Substation – 50 dBA at 3 feet (dBA)	Distance to Battery (feet)	Battery – 85 dBA at 3 feet (dBA)
R-01	Residential	1,306	3	1,831	24	5,925	-16	6,561	18
R-02	Residential	1,664	1	2,887	20	7,401	-18	7,948	17
R-03	Residential	686	9	1,357	27	4,815	-14	5,482	20
R-04	Residential	445	13	1,269	27	4,650	-14	5,320	20
R-05	Residential	409	13	1,254	28	4,649	-14	5,321	20
R-06	Residential	1,525	2	1,555	26	1,505	-4	1,973	29
R-07	Residential	256	17	1,540	26	2,456	-8	2,534	26
R-08	Residential	2,018	-0.5	3,055	20	4,162	-13	4,106	22
NR-01	Agricultural	2,061	-1	2,581	21	6,312	-16	6,976	18
NR-02	Church	290	16	891	31	2,859	-9	3,523	24
NR-03	Cemetery	348	15	1,020	29	2,984	-10	3,637	23
NR-04	Cemetery	530	11	1,105	29	2,591	-9	3,248	24

[1] Negative values indicate that sounds are anticipated to be below the threshold of human hearing based on the approximate sound level generated by the equipment and the distance of the receptor.

MAINTENANCE SOUND CONDITIONS

Vehicular Traffic

Traffic associated with project maintenance will include occasional light duty trucks an average of 2 or 3 days per week, for staff responsible for maintaining vegetation or performing maintenance or repairs. For vegetation management, periodic truck traffic will occur to deliver and move sheep as part of solar grazing activities or for transporting mowing equipment.

In addition, work may be conducted at night for up to 50 days a year. While workers are not anticipated onsite on most weekends, it remains a possibility in the event of the need for timely repairs, or groundskeeping dictated by weather. Employees are anticipated to use mid- or full-sized trucks and would have less contribution to traffic noise than a typical single-family home.

Maintenance Activities

Typical maintenance activities include minor repair and maintenance on the solar panels, tracking systems, electrical wiring, or maintenance/inspections of the inverters/transformer. It is anticipated that trimming and mowing would be performed approximately 20-30 times per year, depending on vegetation growth rate. Mowing equipment, if used, would generate temporary sound levels of approximately 78.2 dBA at the nearest receptor. This periodic mowing would produce sound levels comparable to roadway traffic in the surrounding area, although at less frequent intervals. Mantle Rock anticipates primarily using sheep and solar grazing to maintain vegetation. It is anticipated that the Project will generate less noise during vegetation management than the average solar project.

MITIGATION MEASURES

Mantle Rock will implement the following measures during and after the construction phase to reduce and minimize noise impacts.

- Construction activities, processes, and deliveries will be limited to the hours between 7:00 am and 7:00 pm, Monday through Saturday; construction activities that create a higher level of noise, such as pile-driving, will be limited to 8 a.m. to 5 p.m. local time, Monday through Friday. Non-noise-causing and non-construction activities can take place on the site between 6 a.m. and 10 p.m. local time, Monday through Sunday, including field visits, arrival, departure, planning, meetings, mowing, surveying, etc.
- Based on previous experience constructing solar projects, Mantle Rock believes that noise concerns resulting from pile driving activities are most effectively managed through limiting pile driving activities within a certain radius to certain hours during the day to avoid potentially impacting nearby receptors. To this end, Mantle Rock proposes to limit pile driving activities within 1,000 feet of potentially impacted receptors to a reduced period.

- If the pile-driving activity occurs within 1,500 feet of a noise-sensitive receptor, Mantle Rock will implement a construction method that will suppress the noise generated during the pile-driving process (i.e., semi-tractor and canvas method, sound blankets on fencing surrounding the solar site, or any other comparable method). Mantle Rock may forego using noise suppression measures if it employs a panel installation method that does not use pile driving, so long as that method does not create noise levels similar to pile driving.
- Mantle Rock will notify residents and businesses within 2,400 feet of the project boundary about the construction plan, the noise potential, any mitigation plans, and its Complaint Resolution Program, at least one month prior to the start of construction.
- Mantle Rock will place panels, inverters, and substation equipment consistent with the distances to noise receptors to which it has committed in its maps and site plans.

CONCLUSION

The Project would impact sensitive receptors primarily during construction. This includes both residential and non-residential receptors within 2,000 feet of the Project Area. Common sources of construction noise include equipment, such as delivery trucks, backhoes, pile drivers, chain saws, bush hogs, or other large mowers for clearing, that produce maximum sound levels of up to approximately 85 dBA at 50 feet. Construction activities will occur over approximately 8 – 12 months between the hours of 7am and 7pm Monday through Saturday, although activities that create a higher level of noise, such as pile driving, will be limited to 8am – 5pm, Monday through Friday. Construction impacts would be temporary and intermittent, as most equipment would be phased in and out according to the progress of the Project. At times, construction activities will be audible to nearby residences or other sensitive receptors; however, not all equipment will be operating at the same time, and activities will be temporary in duration and spread throughout the Project area.

Pile driving during solar array installation is anticipated to produce the greatest sound level for an extended period (approximately six months). Standard solar pile drivers are estimated to produce 84 dBA at a distance of 50 feet (Vermeer 2012). Pile driving may temporarily generate sound levels of approximately 70 dBA at the nearest receptor, a residence (R-07); however, this would occur for only 1 or 2 days when the closest array is being installed; when other arrays are installed, the sound level would be lower. These sound levels represent a worst-case scenario; actual sound levels would likely be lower due to attenuation from vegetation and topography. Construction sounds at a solar project are comparable to other common construction activities that require pile driving due to their temporary and intermittent nature (MAREC 2021).

Overall, construction-related noise impacts would be temporary and intermittent, and would not contribute to a significant sound increase when compared to sound currently occurring on or near the site (i.e., the operation of farming equipment for agricultural activities and crop harvesting as well as moderate traffic on the nearby roads).

During operation, the ambient sound environment would return to existing levels. The moving parts of the solar panel arrays would produce minimal sound. At the nearest receptor, the inverters would produce sound levels of approximately 31 dBA, which is below typical background sound levels in rural areas. For all receptors, the Project substation transformer would emit noise at levels below the threshold of human hearing (shown as negative values in Table 6). In addition, nighttime operation will result in lower sound emissions, as power will not be generated and therefore the solar inverters and substation transformer will be operating in stand-by mode. The battery storage system is anticipated to generate sound for 24 hours a day; however, the highest anticipated noise level is approximately 29 dBA at the closest receptor (R-06), which is below typical background sound levels for rural areas. Based on these distances and calculations, the impacts from Project operation are anticipated to be minimal to negligible.

Light truck vehicle noise from maintenance employees commuting to the site or driving on the site would be negligible in the context of existing local traffic levels and sounds. Maintenance activities such as periodic mowing of vegetation surrounding the solar panels would produce sound levels comparable to those of agricultural operations in and near the Project Area. Periodic mowing would produce sound levels comparable to roadway traffic in the surrounding area, although at less frequent intervals. The Applicant anticipates primarily using sheep and solar grazing to maintain vegetation and therefore, the Project will generate less noise during vegetation management than the average solar project. As a result, impacts of Project maintenance are anticipated to be negligible.

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Appendix A

Equipment Specifications

FLUENCE
A Siemens and AES Company

Fluence Gridstack Pro™

Built for the next era of utility scale energy storage

GRIDSTACK PRO OVERVIEW

As the industry shifts from MW-sized projects to GW-scale portfolios, storage systems must meet new standards in delivery, performance, and safety. Gridstack Pro provides utilities, developers, and independent power producers with a factory-built, configurable solution that delivers higher site density, easier maintenance, and lower operating costs. With GWh of systems operating, Fluence is trusted by leading power generators to deliver safe systems and reliable grid services on the largest, most complex storage projects.

Next-Level Flexibility

Diversified supply chain and Fluence Battery Management System (BMS) enable the right-fit solution and project delivery assurance

Total Intelligence

Enhanced performance and lower operating costs through improved State of Charge (SOC) accuracy, and pre-integrated Asset Performance Management (APM)

Optimized Design

The right balance of density, speed of installation, and ease of logistics, with uncompromised safety and security

Technical Specifications

BATTERY PACK OPTIONS	2000 SERIES	5000 SERIES	
Battery Cells	3XX Ah	3XX Ah	5XX Ah
Energy Capacity	2436 kWh	4872 - 5016 kWh	5644 kWh
Battery Enclosure Dimensions (H x L x D)	2550 x 7537 x 1734 mm (8.37 x 24.73 x 5.69 ft.)	2896 x 6820 x 2438 mm (9.5 x 22.37 x 8 ft.)	2896 x 6058 x 2438 mm (9.5 x 20 x 8 ft.)
Battery Enclosure Weight without coolant	~ 22,400 kg - 23,300 kg	43,500 kg	45,500 kg
Aux. Peak Load	16.7 kW (2-hr); 9.5 kW (4-hr)	34 kW (2-hr); 17 kW (4-hr)	
Maximum CP Rate	0.5	0.5	0.25
PERFORMANCE & SAFETY SPECS			
Discharge Duration	2 hours - 4 hours - 6 hours - 8 hours		
DC Voltage	Up to 1500V		
System Response Time	150ms		
Round Trip Efficiency	> 87%		
Availability	> 97%		
Grid Frequency	50/60 Hz		
Seismic Rating	Compliant with IEEE693 High, meets International Building Code (IBC), California Building Code (CBC) requirements per Seismic Design Category (SDC) D, Conforms to ASCE 7-10 standard		
Operating Temp. range	-20 °C to +50 °C (-4 °F to +122 °F)		
Certifications	UL/IEC		
Battery enclosure IP Rating	IP55		
Altitude	2,000 meters (without derating)		
Thermal Management	Liquid cooled		
Certifications and Codes	UL1741, UL1741SA/IEEE1547, NFPA68/69/72/855, UL 9540A Cell, Module, Unit		
SOFTWARE			
BMS, System Control and Market Applications	Fluence OS7		
Communication Protocol	Modbus, DNP3, and OPC UA		
Analytics and Optimization platform	Nispera		
Bidding Optimization Software	Mosaic*		

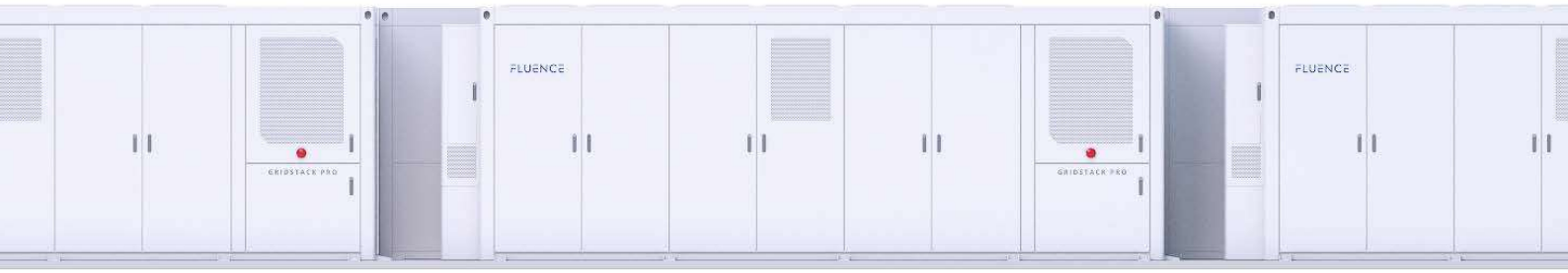
Note: Specifications in the above table are design estimates only and are not guaranteed. Contact Fluence for a project-specific estimate as final values depend on system design, location, and use case.

**Mosaic is an add-on currently available for assets in the NEM, CAISO, and ERCOT*

Next Level Flexibility

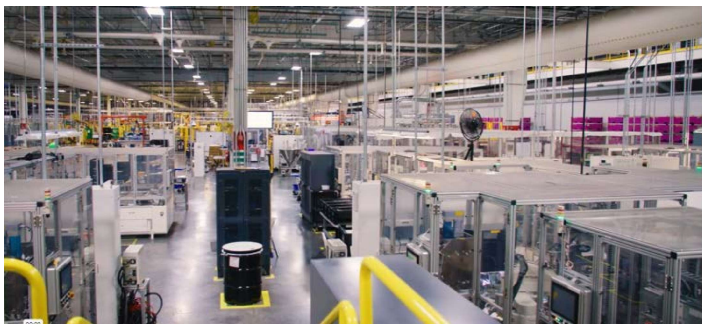
The Fluence-designed Battery Packs combine state-of-the-art battery modules, management systems, and monitoring equipment into a unified product architecture designed to improve operations through advanced thermal and state of charge (SOC) management. The integrated design ensures consistent product performance and safety at the system level while reducing the time it takes to introduce new battery technology from a growing base of global battery manufacturers.

With flexibility and reliability in mind, Gridstack Pro incorporates advanced features allowing for grid forming capabilities. This allows for optimization of sites and systems that operate entirely or partially off-grid, supporting storage, load, solar, and other generators.



Integrated Global Supply Chain

At Fluence we invest heavily in technology, systems engineering, product development, and R&D to strengthen our market leadership and enhance customer value. Gridstack Pro is built with Fluence Module, BMS, electronics, and software, free from components from countries of concern, safeguarding against cybersecurity and mitigating policy issues.

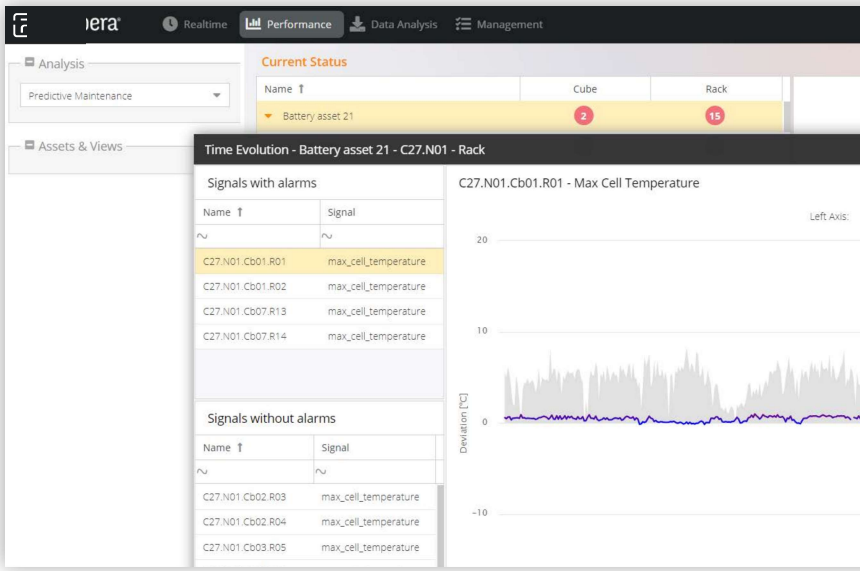


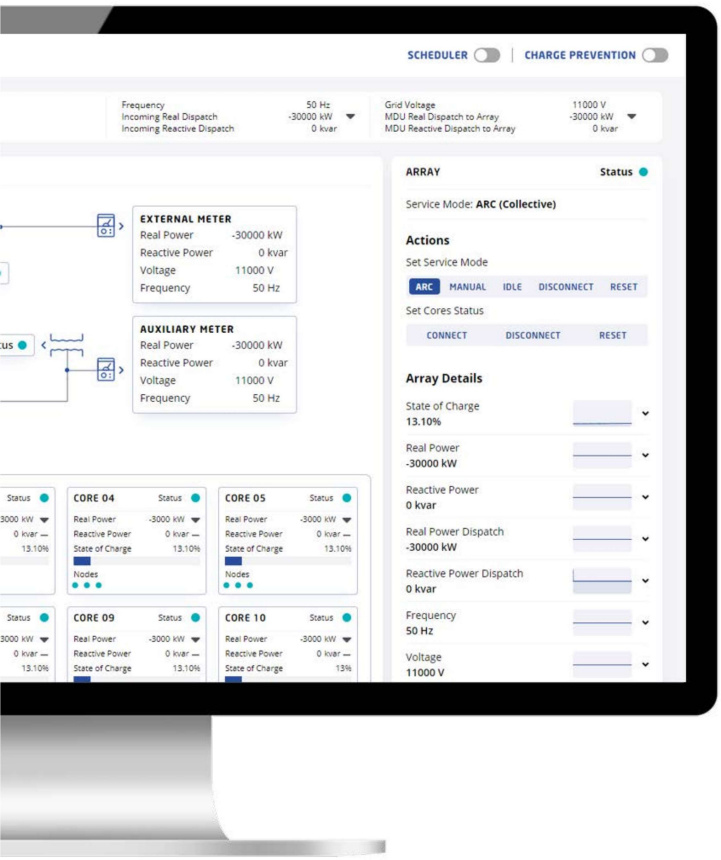
Total Intelligence

Enhanced Performance

Gridstack Pro delivers granular data access and plug- and-play API connectors for our cloud-based software - Nispera.

Pre-integration with Nispera enables customers to drive down costs and increase revenue through advanced asset performance management and predictive maintenance software. With access to the Nispera executive dashboard and real-time insights, alongside predictive maintenance features, customers can gain valuable oversight of their assets, facilitating pro-active decision-making and streamlined operations.





Fluence OS

Fully integrated controls with over 3 million operating hours – standard with all Gridstack Pro systems

SYSTEM CONTROL

Fully integrated controls system, including hardware and software, for the day-to-day management and dispatch of your storage system

SYSTEM MONITORING

Comprehensive data collection at every level of the storage system continuously monitors, detects, and alerts operators to potential anomalies

EXTERNAL INTEGRATION

Integration with external systems (ISO's, customer EMS, historian software, etc.) and 3rd party software applications via APIs and common protocols

ASSET PROTECTION

Enterprise-class network security and firewall capabilities keep critical grid infrastructure secure and support international cybersecurity standards

Optimized Design Balancing Density, Installation, and Maintenance

The right balance of density, speed of installation, and ease of logistics: the Gridstack Pro system is designed to maximize density, enabling more MWh per square foot. Gridstack Pro lowers balance of system costs while maintaining ease of shipping and installation by optimizing systems to reduce connections, inverters, transformers, and associated medium voltage (MV) infrastructure. Additionally, a two-thirds reduction in chillers minimizes preventative maintenance requirements. Gridstack Pro delivers up to 40% improved density for a 100MW, 4hr project, enabling more MWh in less space.

Gridstack Pro is designed for ease of transportation and logistics:

- Standard ISO sized containers for smooth logistics
- Manage of load sizes for ease of transport according to site regulations
- Global procurement and supply chain support throughout the whole logistics process
- Designed for crane transportation allowing easy maneuvering on site

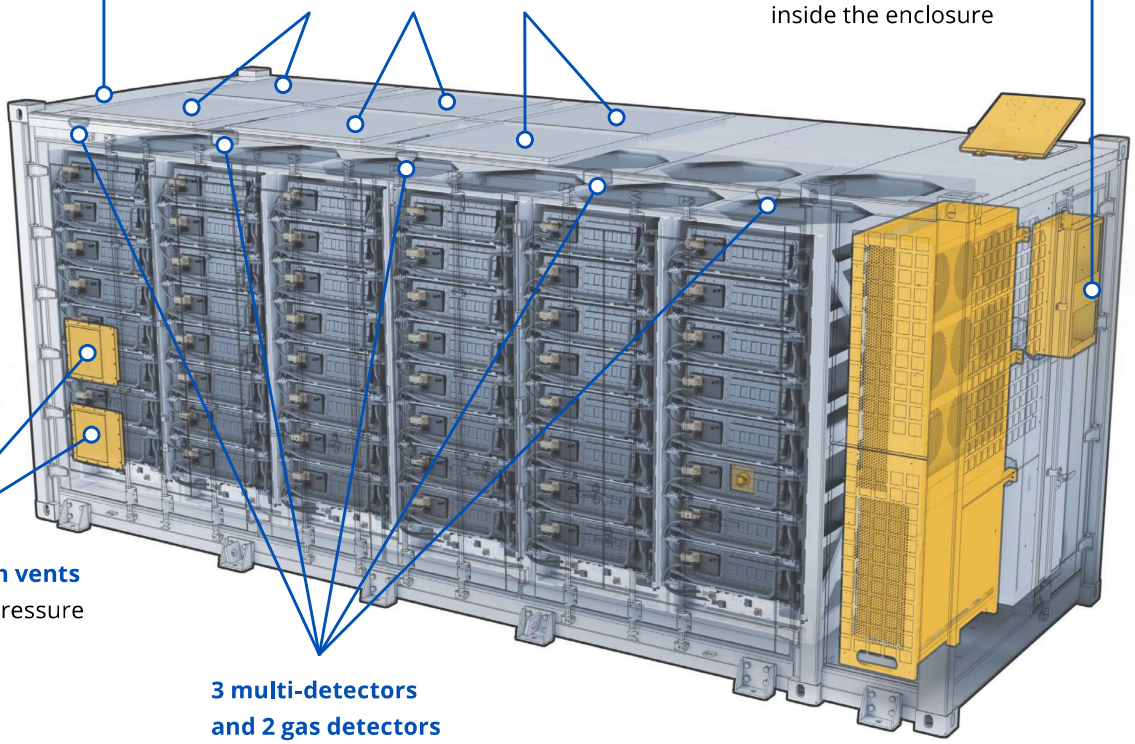
Uncompromising Safety

Gridstack Pro is designed to meet and exceed industry standards in safety certification and fire testing, including UL9540, UL9540A, NFPA-855, large scale burn testing, and more. With more than a decade of experience deploying and operating energy storage systems for our customers globally, the Fluence fleet has more than 2.5 million hours of operation with a strong safety and availability record.

Steel outer structure & **fiberglass insulation** for thermal performance

6 deflagration panels (positioned) for explosion protection per NFPA 68 and large-scale tested

Chiller and HVAC System aids battery cooling and maintains ambient temperature and humidity inside the enclosure



Active ventilation vents create a positive pressure during off gassing

3 multi-detectors and 2 gas detectors for CO/smoke/heat/H2

Fluence Energy, Inc. (Nasdaq: FLNC) is a global market leader delivering intelligent energy storage and optimization software for renewables and storage. Our solutions and operational services are helping to create a more resilient grid and unlock the full potential of renewable portfolios. With gigawatts of projects successfully contracted, deployed, and under management across nearly 50 markets, we are transforming the way we power our world for a more sustainable future.

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BR-042-04-EN

REVISIONS			
NO.	DESCRIPTION	DATE	APPD.
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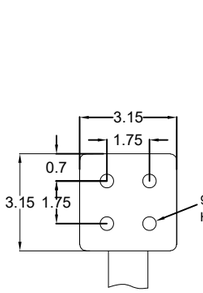
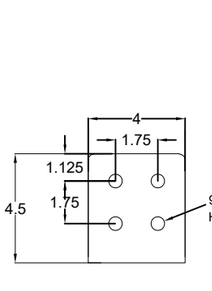
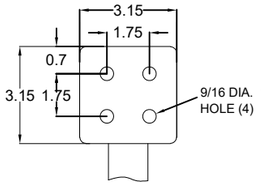
2			



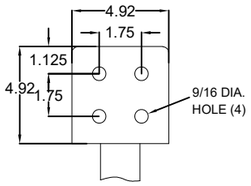
TIN PLATED H.V NEUTRAL PLATE-TYPE DETAIL



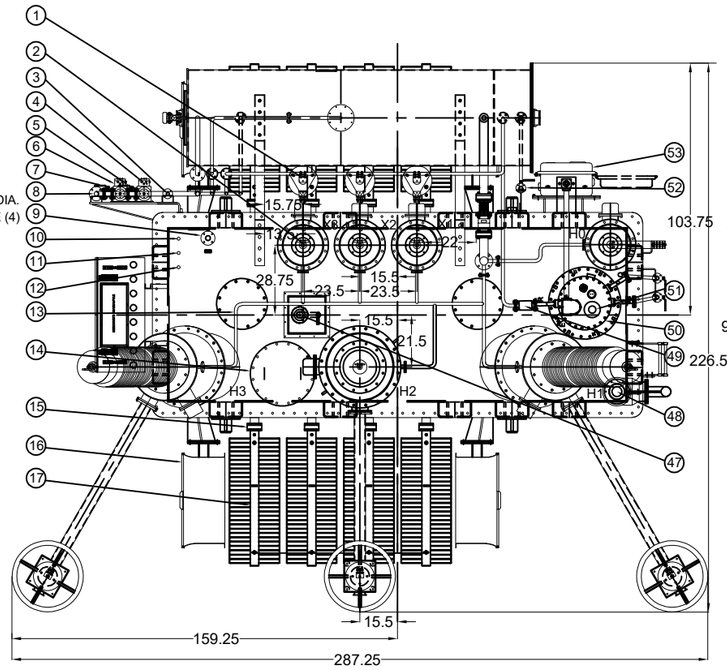
GROUND PAD

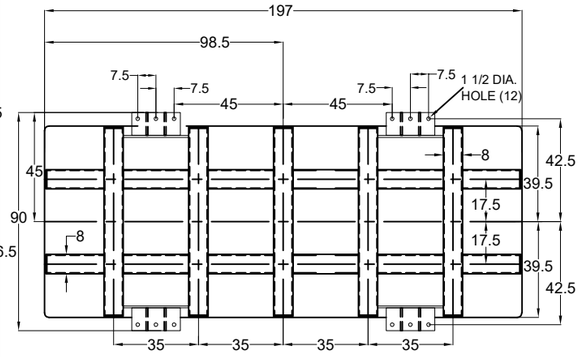


TIN PLATED H.V. PLATE-TYPE DETAIL

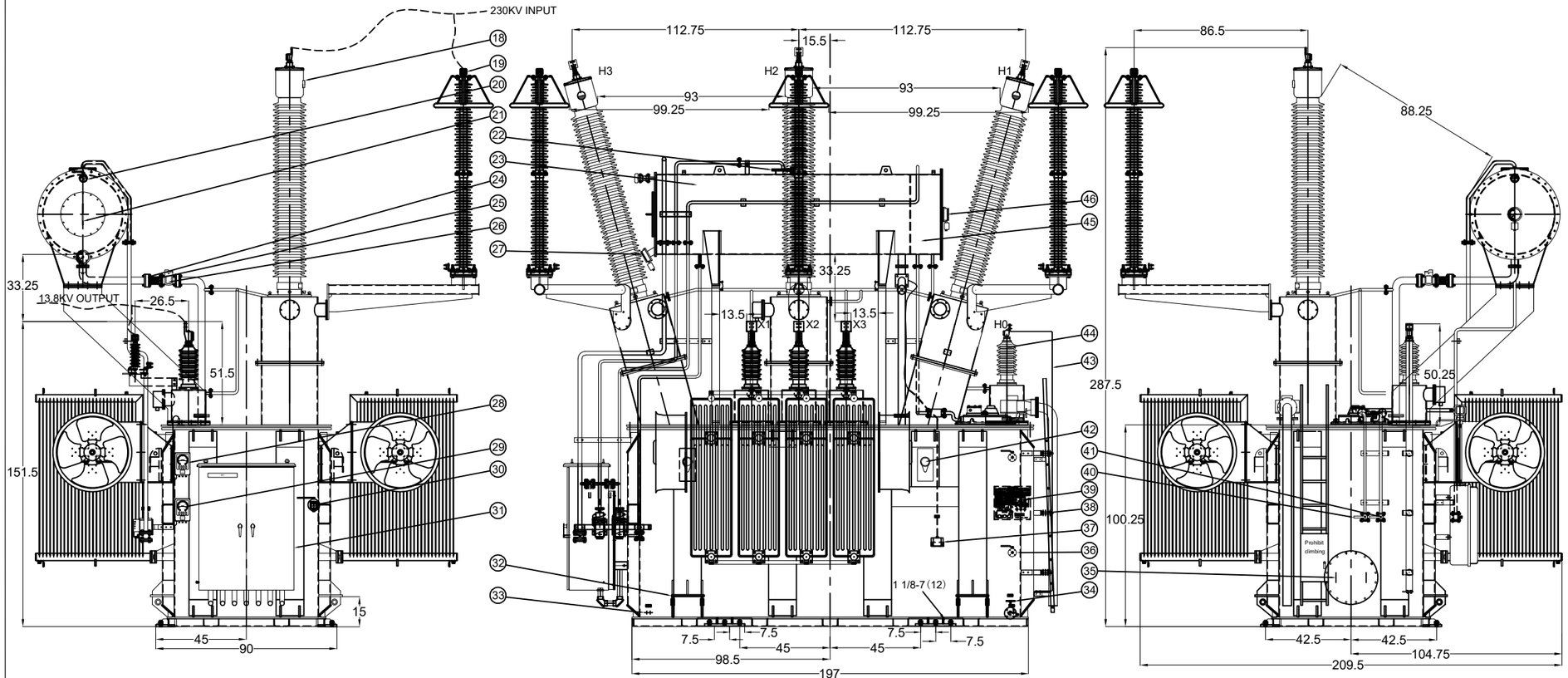


TIN PLATED L.V. PLATE-TYPE DETAIL





VIEW UNDERSIDE OF BASE



BILL OF MATERIAL

ITEM	MODEL	MANUFACTURER	DESCRIPTION	QTY.
1	YH10W-18	JINNIU	L.V. ARRESTER(RATING 18 kV MCOV 15.3 kV rms)	3
2	BFWC-40.5/2000	ZHIDA	L.V. BUSHING (40.5KV CLASS, 200 KV BIL)	8
3	SIZE: 1"	TBEA	DRAINING AND FILLING BALL-TYPE VALVE FOR MAIN CONSERVATOR	1
4	STB000	QUALITROL	DEHYDRATING BREATHER FOR OLTC CONSERVATOR	1
5	SIZE: 1"	TBEA	CONNECT BALL-TYPE VALVE FOR OLTC CONSERVATOR AND RUBBER BLADDER	1
6	STB000	QUALITROL	DEHYDRATING BREATHER FOR MAIN CONSERVATOR	1
7	SIZE: 1"	TBEA	CONNECT BALL-TYPE VALVE FOR MAIN CONSERVATOR AND RUBBER BLADDER	1
8	SIZE: 2"	TBEA	VACUUM BALL-TYPE VALVE FROM CONSERVATOR	1
9	SIZE: 2"	TBEA	FLANGE CONNECTION BALL-TYPE VALVE FOR TOP FILTER	1
10		DAELIM	POCKET FOR WTI ELEMENT	1
11		DAELIM	POCKET FOR OTI ELEMENT	1
12		DAELIM	POCKET FOR SPARE ELEMENT	1
13	SIZE: 1"	DAELIM	PIPING TO CONSERVATOR	1
14	SIZE: 21.25"	DAELIM	MANHOLE (BOLTED AND GASKETED)	1
15	SIZE: 3.15"	TBEA	RADIATOR BUTTERFLY VALVE	16
16	CFZ-9Q-10	ERG	COOLING FANS (SINGLE- PHASE, 60 HERTZ, 240VOLT)	4
17	PCJ2000-30/520	DAELIM	COOLING RADIATORS (REMOVABLE WITH ISOLATION / SHUTOFF VALVES)	8
18	BRLW-252/630-4	ZHIDA	H.V. BUSHING (252 KV CLASS, 1050 KV BIL)	3
19	YH10W-192	JINNIU	H.V. ARRESTER(RATING 192 kV MCOV 152 kV rms)	3
20	050-35E	QUALITROL	PRESSURE/VACUUM GAUGE	1
21	SIZE: 17.715"	DAELIM	MANHOLE FOR CONSERVATOR	1
22		JIANGSHU SIRUI	RUBBER BLADDER FOR CONSERVATOR	1
23	Ø39.365"x126"	DAELIM	MAIN CONSERVATOR SYSTEM	1
24	SIZE: 3.15"	TBEA	ISOLATING VALVE FOR CONSERVATOR	2
25	SIZE: 3.15"	JIANGYINGJIAYU	FLEXIBLE PIPE	1
26	BC-80	EMB	RELAY BUCHHOLZ (WITH ALARM AND TRIP CONTACTS)	1
27	042	QUALITROL	LIQUID LEVEL GAUGE FOR MAIN CONSERVATOR (WITH ALARM CONTACTS)	1
28	AKM34	QUALITROL	OIL TEMPERATURE GAUGE	1
29	AKM35	QUALITROL	WTI TEMPERATURE GAUGE	1
30	900	QUALITROL	SUDDEN PRESSURE RELAY(WITH SEAL-IN RELAY 909)	1
31		DAELIM	STAINLESS STEEL CONTROL TERMINAL BOX	1
32		DAELIM	JACKING PAD	4
33		DAELIM	ANSI 4-HOLE STAINLESS STEEL GROUND PAD	2
34	SIZE: 2"	TBEA	FLANGE CONNECTION GLOBE-TYPE VALVE WITH SAMPLING DEVICE FOR DRAIN	1
35	SIZE: 21.25"	DAELIM	MANHOLE (BOLTED AND GASKETED)	1
36	SIZE: 1"	TBEA	CONNECT BALL-TYPE VALVE FOR DGA (QUALITROL TM8)	2
37		EMB	GAS SAMPLER	1
38	FZ1-10	DAXIN	STAND-OFF INSULATOR FOR H.V NEUTRAL COPPER BAR	3
39		DAELIM	STAINLESS STEEL DIAGRAM NAMEPLATE	1
40	SIZE: 1"	TBEA	DRAINING CONNECT BALL-TYPE VALVE FOR OLTC	1
41	SIZE: 1"	TBEA	FILINING CONNECT BALL-TYPE VALVE FOR OLTC	1
42		DAELIM	LIFTHOOK	4
43	15/64"X3.15"	DAELIM	COPPER BAR FOR H.V NEUTRAL GROUND	1
44	BFWC-40.5/630	ZHIDA	H.V. NEUTRAL BUSHING (40.5KV CLASS, 200 KV BIL)	1
45	Ø39.365"x15.35"	DAELIM	OLTC CONSERVATOR SYSTEM	1
46	032	QUALITROL	LIQUID LEVEL GAUGE FOR OLTC CONSERVATOR (WITH ALARM CONTACTS)	1
47	BJL-10/100	PINXIANG	CORE GROUND BUSHING	1
48	XPRD	QUALITROL	PRESSURE RELIEF DEVICE (WITH ALARM CONTACTS)	1
49	QJ4-25	HUAMING	OLTC PROTECTIVE RELAY	1
50	CVIII2-350Y/72.5	HUAMING	H.V. LOAD TAP CHANGER	1
51		HUAMING	PRESSURE RELIEF DEVICE FOR OLTC (WITH ALARM CONTACTS)	1
52	SIZE: 1"	TBEA	DRAINING AND FILLING BALL-TYPE VALVE FOR OLTC CONSERVATOR	1
53	CMA7	HUAMING	MOTOR DRIVE UNIT	

APPROXIMATE WEIGHTS IN POUNDS:

ITEM	WEIGHT(LBS)
TANK&ACCESORIES WEIGHT	50000
TRANSFORMER ACTIVE PART WEIGHT	54900
TOTAL OIL WEIGHT	42400
TRANSPORTION WEIGHT	112500
TOTAL WEIGHT	147300

TECHNICAL DATA:

MAXIMUM AMBIENT TEMPERATURE	50℃
MINIMUM AMBIENT TEMPERATURE	-25℃
AVERAGE DAILY MAXIMUM TEMPERATURE	25℃
MAXIMUM HEIGHT OF SEA LEVEL	1260m
STANDARD	IEEE Std. C57.12.00
RATED POWER	20/26.6/33.3MVA
TYPE OF COOLING	ONAN/ONAF1/ONAF2
PRIMARY VOLTAGE	230KV
SECONDARY VOLTAGE	13.8KV
FREQUENCY	60Hz
TAP CHANGER IN HV SIDE	±8×0.625%
IMPEDANCE AT 20000 KVA, NOMINAL VOLTAGE	10%
NO-LOAD LOSS AT RATED VOLTAGE	26kW
ON-LOAD LOSS AT RATED VOLTAGE(ONAN 20MVA)	61.5kW
WINDING CONNECTION	YND1
PRIMARY WINDING IMPULSE LEVEL	750KV
PRIMARY NEUTRAL IMPULSE LEVEL	110KV
SECONDARY WINDING IMPULSE LEVEL	110KV
OIL TYPE (ASTM D3487 NO PCB)	MINERAL OIL TYPE II
WINDING MATERIAL	COPPER
COLOR	ANSI 70GRAY

DAELIM BELEFIC
ELECTRIC, WITH AN EDGE

BEIJING DAELIM GREEN EP TECH CO.,LTD

DESCRIPTION:
TRANSFORMER OUTLINE
20/26.6/33.3 MVA - 3PH.- 60 HZ. 65°C- ONAN/ONAF/ONAF

REU ORDER NO:	DRAWING NUMBER:						REV:
	OL12726						7
REU SPEC NO:	SCALE:	BY:	DATE:	CHK:	DATE:		SHEET:
12726	N.T.S	CDS	05-16-2024				1 OF 1

LTC TRANSFORMER
MADE IN CHINA BEIJING DAELIM GREEN EP TECH CO.,LTD

CLASS ONAN/ONAF/ONAF	THREE PHASE	60 HERTZ
20000/26600/33300 KVA AT 65°C RISE		4200 FEET ALTITUDE

H	20000 KVA	26600 KVA	33300 KVA	LOAD TAP CHANGER CVIII2-350Y/72.5-10193W		
VOLTS	AMPS	AMPS	AMPS	POS.	K TO	CONVERTIDOR SELECTOR
241500	47.8	63.6	79.6	1	+	K+
240063	48.1	64.0	80.1	2	+	
238625	48.4	64.4	80.6	3	+	
237188	48.7	64.7	81.1	4	+	
235750	49.0	65.1	81.6	5	+	
234313	49.3	65.5	82.1	6	+	
232875	49.6	65.9	82.6	7	+	
231438	49.9	66.4	83.1	8	+	
230000	50.2	66.8	83.6	9a	+	
230000	50.2	66.8	83.6	9b	K	
230000	50.2	66.8	83.6	9c	-	K-
228563	50.5	67.2	84.1	10	-	
227125	50.8	67.6	84.6	11	-	
225688	51.2	68.0	85.2	12	-	
224250	51.5	68.5	85.7	13	-	
222813	51.8	68.9	86.3	14	-	
221375	52.2	69.4	86.8	15	-	
219938	52.5	69.8	87.4	16	-	
218500	52.8	70.3	88.0	17	-	

X	20000 KVA	26600 KVA	33300 KVA
VOLTS	AMPS	AMPS	AMPS
13800	837	1113	1393

VOLTAGE RATING	WINDING KV. B.I.L. LINE	WINDING KV. B.I.L. NEUT.	COND. MAT'L.	BUSHING KV. B.I.L. LINE	BUSHING KV. B.I.L. NEUT.
230000Y/132790	750	110	CU	1050	200
13800d	110		CU	200	

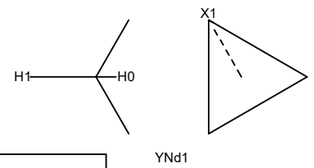
IMPEDANCE	BASE MVA	VOLTAGE RATING
	20	230000V-13800V

NO-LOAD LOSS	KW
RATED LOAD LOSS(BASE 20MVA)	KW

VECTOR GROUPING	YNd1

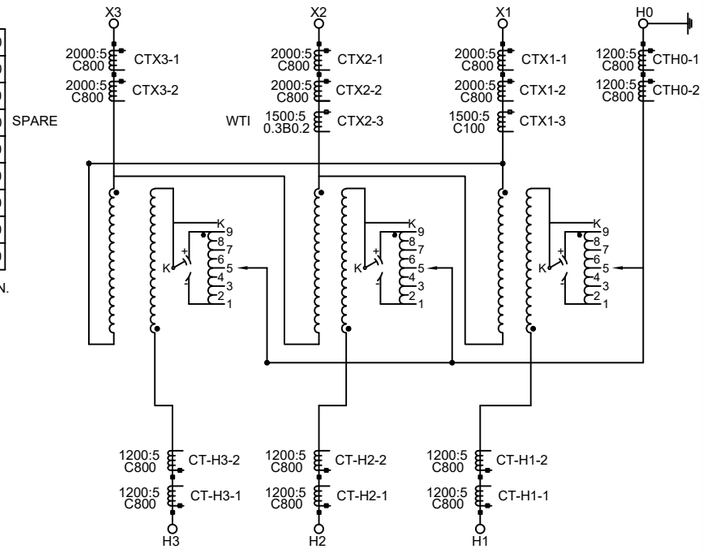
APPROXIMATE WEIGHTS IN POUNDS:

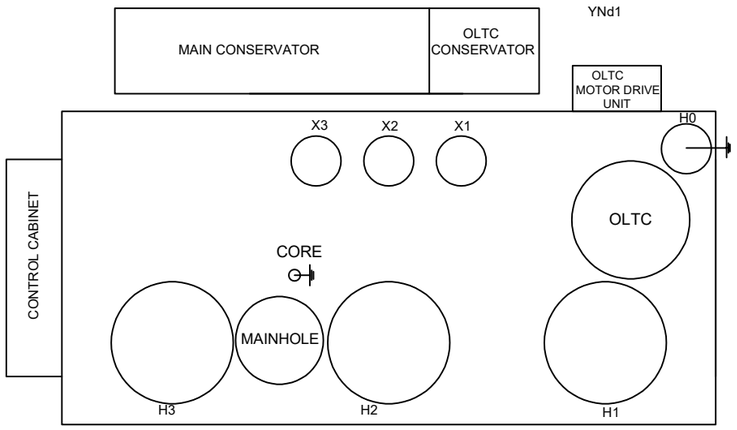
CORE AND COILS				54900
TANK AND FITTINGS				40800
REMOVABLE RADIATORS				9600
AT 25°C	4770 GALS. OF	MINERIAL OIL	IN TANK	35800
AT 25°C	400 GALS. OF	MINERIAL OIL	IN RADS.	3000
AT 25°C	53 GALS. OF	MINERIAL OIL	IN L.T.C.	400
AT 25°C	370 GALS. OF	MINERIAL OIL	IN CON.	2800
TOTAL				147300
WEIGHT OF TRANSPORT(WITH OIL)				112500
RISE OR FALL PER 10°C TEMP. CHANGE				0.75 IN.



FORM OF CONSTRUCTION	CORE	AMBIENT TEMPERATURE MAXIMUM	50° C
OVERLOAD RATING OF OLTC	IEEE C57.131	MANUFACTURE STANDARD	IEEE C57.12.00
DESIGN SEISMIC CAPABILITY	LOW PER IEEE 693-2005		

1200/5 C800 CTH		2000/5 C800 CTX		1500/2.2 1.2B0.5 WTI CTX2-3	
NOMINAL RATIO	LEADS ON	NOMINAL RATIO	LEADS ON	NOMINAL RATIO	LEADS ON
100 : 5	X2-X3	300 : 5	X3-X4	1500 :2.2	X1-X2
200 : 5	X1-X2	400 : 5	X1-X2	1500/5 1.2B0.5 SPARE CTX1-3	
300 : 5	X1-X3	500 : 5	X4-X5	NOMINAL RATIO	LEADS ON
400 : 5	X4-X5	500 : 5	X2-X3	1500 :5	X1-X2
500 : 5	X3-X4	800 : 5	X2-X4		
600 : 5	X2-X4	1100 : 5	X1-X3		
800 : 5	X1-X4	1200 : 5	X1-X4		
900 : 5	X3-X5	1500 : 5	X1-X4		
1000 : 5	X2-X5	1600 : 5	X2-X5		
1200 : 5	X1-X5	2000 : 5	X1-X5		





CAUTION:
1.THE SECONDARY SIDE OF CT MUST NOT BE OPEN CIRCUIT.
2.CORE GROUND BUSHINGS MUST BE GROUNDED.
3.BEFORE INSTALLING OR OPERATING READ INSTRUCTIONS
4.DO NOT OPERATE TRANSFORMER WHEN THE READING OF LIQUID LEVEL GAUGE IS
BELOW THE LOW POINT OF THE SCALE
5.DO NOT OPERATE THE DE-ENERGIZED TAP CHANGER WITH THE TRANSFORMER ENERGIZED

SPEC. NO. 12726 SERIAL NO. MFG. DATE

REVISIONS

NO.	DESCRIPTION	DATE	APPD.
1			
2			

DAELIM BELEFIC
ELECTRIC, WITH AN EDGE

BEIJING DAELIM GREEN EP TECH CO.,LTD

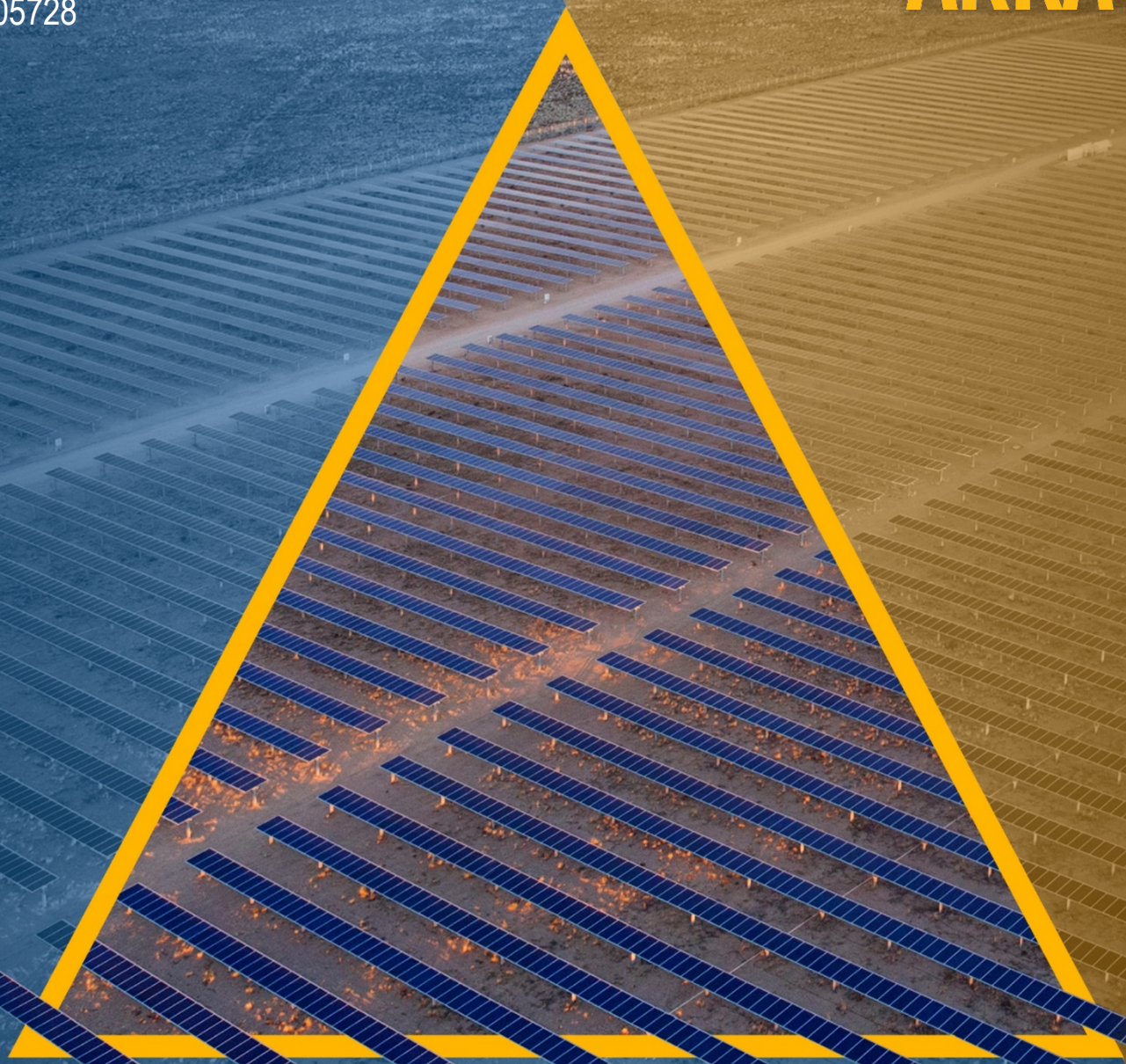
DESCRIPTION: TRANSFORMER NAMEPLATE
20/26.6/33.3 MVA - 3PH.- 60 HZ. 65°C - ONAN/ONAF/ONAF

REU ORDER NO:	DRAWING NUMBER:	REV:
	NP12726	4

REU SPEC NO:	SCALE:	BY:	DATE:	CHK:	DATE:	SHEET:
12726	N.T.S.	CDS	05-16-2024	CDS	05-16-2024	1 OF 1

Overnight-CA-Atlantica-Dura-
ZNShine-90MR
Q-05728

ARRAY



Single-Axis Solar Tracker Quote Package

Array Technologies is a global leader advancing the future of clean energy positioned to deliver renewable solutions for customers around the globe.

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Albuquerque, NW 87109 USA

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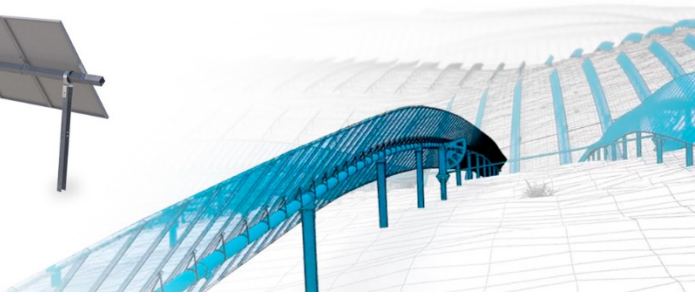

Overnight-CA-Atlantica-Dura-ZNShine-90MR
Quote Number: Q-05728
Total Project MW: 180.0383
Solution(s) of Interest: DuraTrack HZ v3.0 52

Created Date: 04/30/2024
Estimated Project Start Date: 08/01/2025
Contractual Reference:

Pricing Summary

Item	Price	Price Per Watt
Tracker	$14,863,319.80	$0.0826
Tracker Freight (Port or Factory to Site)	$758,858.70	$0.0042
Tracker Total	$15,622,178.50	$0.0868
Foundation	$2,034,207.06	$0.0113
Foundation Freight (Port or Factory to Site:)	$112,875.18	$0.0006
Foundation Total	$2,147,082.25	$0.0119
Tracker & Foundation	$16,897,526.86	$ 0.0939
Tracker & Foundation Freight (Port or Factory to Site)	$871,733.88	$ 0.0048
Tracker & Foundation Total	$17,769,260.75	$ 0.0987
Tracker Construction Spares	$32,729.36	
Foundation Construction Spares	$4,937.24	
Spares Total	$37,666.60	
Services	$0.00	
Services Total	$0.00	
Taxes	$0.00	
Bonds	$0.00	
Quote Grand Total	$17,806,927.35	

Generate energy with integrity when you partner with Array Technologies. Our utility-scale solar tracking solutions are time-proven and engineered to withstand the harshest conditions on the planet. Fewer components, locally-focused sourcing solutions, and an emphasis on ease of installation help Array to deliver the best utility-scale solar tracker solutions in the market.

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Atlantica

Dear Rosemary Sapien,

Thank you for your interest in a solar tracker system from Array. The intent of this quote is to show Array's commitment to supply solar tracking equipment for your project.

There are several elements that can affect the final price for the trackers, primarily the building code, module selection, and final layout. Please review the following considerations:

1. Prices accurate at time quoted. Not binding until locked under a price locked Letter of Intent (LOI) or executed contract.
2. See the attached Specifications for additional product details and inclusions and exclusions applicable to this quote.
3. The tracker design and components are dependent on module manufacturer approval, subject to change.
4. Our standard Terms and Conditions and Warranty documents are available for your review. Please note that these are confidential. Any alterations to the Terms or Warranty may result in price adjustments.
5. Freight per relevant Incoterms.
6. Specifications and site layout contained in this quote are unverified and subject to final Array Engineering review. Changes in the specifications or final review may result in reconfiguration of the product. Array reserves the right to change price if any deviations from the assumed site specifications and layout are made.
7. The accompanying quote is provided for your information and does not constitute an offer for sale.
8. Unless otherwise stated, all pricing is quoted in USD.
9. Prices quoted here reflect duties and tariffs applicable to the current source plan. In the event that there is a change in law which results in an increase to applicable duties or tariffs, prices may change.
10. Supply of foundations is not included in the pricing set forth in this quote unless pricing for provision of foundations is separately and explicitly included in this quote.
11. If this quote includes the HL Radial Slot Bearing products on the Interior tracker rows, these bearing housing assemblies are only compatible with W8 profile wide-flange beams. Therefore, W8 profile foundations are required for Interior tracker rows.
12. If this quote includes the HL Radial Slot Bearing products on the Exterior tracker rows, these bearing housing assemblies are only compatible with W8 profile wide-flange beams. Therefore, W8 profile foundations are required for Exterior tracker rows.
13. If this quote includes a reference to SmarTrack weather strategy software, refer to Service line items and O&M guide, Addendum to 90053-000.
14. Tracker system may include torque tube products with different gauge steel (12ga and 13ga). Torque tube products will be specified for each tracker row configuration in the Approved Drawing Package (ADP) for construction.
15. DuraTrack & OmniTrack may include bearing housings with a coated or mill finish. Sites featuring mill finish bearing housings produce a nominal sound emission of 1) Instantaneous/Maximum Sound Level: 54 dBA at 50 m (Daytime Time-Weighted 39 Leq, dBA), 2) Instantaneous/Maximum Sound Level: 45 dBA at 250 m (Daytime Time-Weighted 30 Leq, dBA). Sound levels are per whole site (not per bearing/row) and are measured from the perimeter bearings/rows.
16. If OmniTrack is quoted, foundation piles must be driven at different heights above grade along each of the tracker rows; laser or string line controls are not sufficient. Customer must use pile driving equipment with GPS capabilities to control variable pile reveal heights based on the z-coordinate from the pile reveal plan.

Thank you for the opportunity to provide you with this quote. We look forward to working with you on your solar tracker project. Please contact us with any questions.

Best Regards,
Josh Avenell
josh.avenell@arraytechinc.com

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Project Details		
Max Angle N/S (°): 4	Product Corrosion: L	Temperature Configuration: Standard
Max Angle E/W (°): 7	Center Structure: GCS	Min - Max Operating Temperature (°C): (-5.00,40.00)
Max Driveline Angle (°): 0	Foundation HDG Thickness ():	Snow Configuration: Building Code
Tracker Design Life (yrs): 30	Foundation Design Life (yrs): 30	Tracker System Certification: UL
File Layout Name: Estimated Counts	Center Structure Foundations: 3,479	Bearing Foundations: 38,269
Design Code: ASCE_7-16	Wind Speed: 90	Ground Snow: 5
Building/ Risk Category: Category I		

Tracker Design Details for Module: ZXM7-UHLDD144 Series					
Module Length (mm)	2,278	**GCR (%)**	35.05	**Clamp - Region A**	400 mm TB
Module Width (mm)	1,134	**Pitch (m)**	6.5	**Clamp - Region B**	400 mm TB
Module Weight (kg)	31.5	**CS Gap Width (in)**	31	**Clamp - Region C**	400 mm HR 10 mm
Module Frame Thickness (mm)	30	**Max Tracker Height (ft)**	6	**Clamp - Region D**	400 mm HR 10 mm
Module Wattage	575	**Module Quantity**	313,110	**Number of Strings**	10,437
String Size	30	**MW of this Module**	180.0383	**Bearing Finish**	Uncoated
Allowable Foundation Profile – Exterior		**Allowable Foundation Profile – Interior**		**Bearing Housing Material**	Steel

Tracker Row

ZXM7-UHLDD144 Series								
Modules Per Row (MR)	Position	Module Split	Damper Qty	Exposure Qty	Foundation Qty	Row Qty	Unit Price	Extended Price
90	Exterior	41N/49S	3	2	12	279	$3,967.5482	$1,106,945.95
90	Interior	41N/49S	3	2	12	3,200	$3,967.5482	$12,696,154.24

Sitewide Components

Description	Unit Price	Quantity	Extended Price
ASSY, DRVLN, ALUM, Tube, 5861mm	$89.0076	3354	$298,531.49
Kit,U-Joint,Drvln,Aluminum,Single Slot	$89.1739	3354	$299,089.26

ASSY,Site Data Ctrl,V3,100-240V,Maint Sw	$1,451.4341	1	$1,451.43
ASSY, GPS	$277.1646	1	$ 277.16
WLDMNT, SKT, 28.5mm, .500 SQ Drive THK	$43.5592	10	$ 435.59
ASSY, 6X MTR CTRL, 100-240V	$1,400.4841	21	$29,410.17
ASSY, Jig, UJ SPCR	$12.5296	2	$ 25.06
ASSY,Alignment Jig,2285mm,Max Module Len	$468.1630	50	$23,408.15
Kit, MTR ASSY, GCS	$150.1643	125	$18,770.54
Kit,MTR ASSY,6.3A,GCS,BON,H,UL,AttaBox	$2,555.3168	125	$319,414.60
Wire, 6 COND 18 AWG Direct Burial 600V	$0.6498	62500	$40,612.50
Tool, Spacer, Module Gap, Plastic, 10mm	$1.1336	50	$ 56.68
O&M Spares	$28,736.9740	1	$28,736.97

Tracker Pricing Summary	Price	Price per Watt
Tracker	$14,863,319.80	$0.0826
Tracker Freight (Port or Factory to Site)	$758,858.70	$0.0042
Taxes	$0.00	
Bonds	$0.00	
Tracker Total	$15,622,178.50	$0.0868

Tracker Construction Spares

The below quote for recommended optional tracker construction spares is valid only if purchased at the time of project order. Prices are inclusive of freight.

Description	Product Quantity	Unit Price	Extended Price
Hardware Construction Spares	1	$2,186.6981	$2,186.70
Row Construction Spares	7	$4,180.7804	$29,265.46
Drivelines Construction Spares	1	$1,277.1948	$1,277.19
		Tracker Construction Spares Total:	**$32,729.35**

Foundations

If foundations are ordered, the following notes apply:

Pile reveal height is 6" lower than the tracker height. Foundation design is based on current Geotech data provided to Array Technologies.

Final foundation designs are to be confirmed with Foundation Design Engineer on Record. Foundation counts are preliminary until final foundation requirements are defined.

ZXM7-UHLDD144 Series

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Type	Row Position	Row Length	Profile Size	Length	Embedment	Design Zone	Qty	Total Weight	Unit Price per Pound	Extended Price
CS	Full Ext Row	90	W6X7	5.83	5	1	279	11,385.99	$0.8290	$9,438.99
BH	Full Int Row	90	W6X7	8.63	5	1	35200	2,126,432.00	$0.8290	$1,762,812.13
CS	Full Int Row	90	W6X7	5.83	5	1	3200	130,592.00	$0.8290	$108,260.77
BH	Full Ext Row	90	W6X7	8.63	5	1	3069	185,398.29	$0.8290	$153,695.18

Total Foundation Quantity: 41,748.00
Total Weight (lbs): 2,453,808.28

Foundation Pricing Summary	Price	Price per Watt
Foundation	$2,034,207.06	$0.0113
Foundation Freight (Port or Factory to Site:)	$112,875.18	$0.0006
Foundation Total	$2,147,082.25	$0.0119

Foundation Construction Spares

The below quote for recommended, optional foundation construction spares is valid only if purchased at the time of project order. Prices are inclusive of freight.

Product Description	Embedment	Qty	Pounds	Unit Price	Extended Price
Foundations Construction Spares		1		$4,937.2400	$4,937.24

Foundation Construction Spares Total: $4,937.24

Additional Services

Description	Unit Price	Quantity	Extended Price
10/5 Global Limited Product Warranty	$0.0000	1	$ 0.00

Services Total: $0.00

Type Test Approbal	**21192-TTA**
Applicant	Gamesa Electric S.A.U. Calle Mar Mediterráneo 16. 28830. San Fernando de Henares, Madrid. Spain.
Series	PV 3X Series Stor PCS 3X Series
Models	See page 2
Type of generating unit	Three-phase Solar Inverter Three-phase bidirectional converter
Technical Data	See pages 2 to 5
Network connection code	**IEEE 519-2014.** IEEE Recommended Practice and Requirements for Harmonic Control in Electric Power Systems. Current Harmonics.

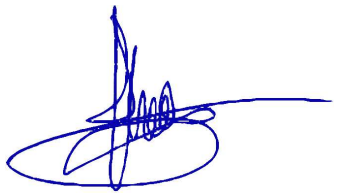
The above-mentioned generating unit complies with the requirements of the:

IEEE 519-2014. IEEE Recommended Practice and Requirements for Harmonic Control in Electric Power Systems. Current Harmonics.

The harmonics measurement are shown in the Annex of this document.

This Type Test Approval cancels and supersedes the document 21180-TTA-E1 issued on November 12, 2021

Madrid, April 22, 2022



Alberto Martin
Technical Manager

Models

PV 3X			
PV3400 STD PV3600 STD PV3750 STD PV3900 STD	PV3400 HTD PV3600 HTD PV3750 HTD PV3900 HTD	PV3800 AEP PV4000 AEP PV4200 AEP PV4400 AEP	PV4100 UEP PV4300 UEP PV4500 UEP PV4700 UEP

Stor PCS 3X	
Stor PCS 3830 AEP Stor PCS 4000 AEP Stor PCS 4220 AEP Stor PCS 4400 AEP	Stor PCS 4100 UEP Stor PCS 4300 UEP Stor PCS 4500 UEP Stor PCS 4700 UEP

Technical characteristics

PV 3X

	PV3400 STD	PV3600 STD	PV3750 STD	PV3900 STD
DC INPUT				
Max. DC Current @25ºC	2 x 2100 A			
Max. DC Current @40ºC	2 x 2030 A			
Max. DC Current @45ºC	2 x 2010 A			
Max. DC Current @50ºC	2 x 1990 A			
Max. DC Current @55ºC	2 x 995 A			
Max. DC Current @60ºC	--			
DC Voltage range	835 - 1500 V	875 - 1500 V	915 - 1500 V	955 - 1500 V
DC Voltage Range MPPT	835 - 1300 V	875 - 1300 V	915 - 1300 V	955 - 1300 V
Nr of DC ports	max 24 fuse +/- monitored max 36 fuse + monitored			
Max. short-circuit current. Isc PV	Up to 9000 A			
MPPT	1			
AC OUTPUT				
Max. AC Current @25ºC	3409 kVA	3579 kVA	3750 kVA	3920 kVA
Max. AC Current @40ºC	3327 kVA	3493 kVA	3660 kVA	3826 kVA
Max. AC Current @45ºC	3300 kVA	3465 kVA	3630 kVA	3795 kVA
Max. AC Current @50ºC	3273 kVA	3436 kVA	3600 kVA	3764 kVA
Max. AC Current @55ºC	1636 kVA	1718 kVA	1800 kVA	1882 kVA
Max. AC Current @60ºC	0 kVA	0 kVA	0 kVA	0 kVA
Maximum output current	3280 Arms			
Nominal AC Voltage	600 Vrms (±15%)	630 Vrms (±15%)	660 Vrms (±15%)	690 Vrms (±15%)
Maximum output fault current (time)	5,1 kA (<1 ms)			
AC power frequency	50/60 Hz (± 6%)			

	PV3400 HTD	PV3600 HTD	PV3750 HTD	PV3900 HTD
DC INPUT				
Max. DC Current @25ºC	2 x 2100 A			
Max. DC Current @40ºC	2 x 2100 A			
Max. DC Current @45ºC	2 x 2100 A			
Max. DC Current @50ºC	2 x 2100 A			
Max. DC Current @55ºC	2 x 2100 A			
Max. DC Current @60ºC	2 x 1050 A			
DC Voltage range	835 - 1500 V	875 - 1500 V	915 - 1500 V	955 - 1500 V
DC Voltage Range MPPT	835 - 1300 V	875 - 1300 V	915 - 1300 V	955 - 1300 V
Nr of DC ports	max 24 fuse +/- monitored max 36 fuse + monitored			
Max. short-circuit current. Isc PV	Up to 9000 A			
MPPT	1			
AC OUTPUT				
Max. AC Current @25ºC	3409 kVA	3579 kVA	3750 kVA	3920 kVA
Max. AC Current @40ºC	3409 kVA	3579 kVA	3750 kVA	3920 kVA
Max. AC Current @45ºC	3409 kVA	3579 kVA	3750 kVA	3920 kVA
Max. AC Current @50ºC	3409 kVA	3579 kVA	3750 kVA	3920 kVA
Max. AC Current @55ºC	3409 kVA	3579 kVA	3750 kVA	3920 kVA
Max. AC Current @60ºC	1704 kVA	1789 kVA	1875 kVA	1959 kVA
Maximum output current	3280 Arms			
Nominal AC Voltage	600 Vrms (±15%)	630 Vrms (±15%)	660 Vrms (±15%)	690 Vrms (±15%)
Maximum output fault current (time)	5,1 kA (<1 ms)			
AC power frequency	50/60 Hz (± 6%)			

	PV 3800 AEP	PV 4000 AEP	PV 4200 AEP	PV 4400 AEP
DC INPUT				
Max. DC Current @25ºC	2 x 2362 A			
Max. DC Current @40ºC	2 x 2100 A			
Max. DC Current @45ºC	2 x 2100 A			
Max. DC Current @50ºC	2 x 2100 A			
Max. DC Current @55ºC	2 x 2100 A			
Max. DC Current @60ºC	2 x 1050 A			
DC Voltage range	835 - 1500 V	875 - 1500 V	915 - 1500 V	955 - 1500 V
DC Voltage Range MPPT	835 - 1300 V	875 - 1300 V	915 - 1300 V	955 - 1300 V
Nr of DC ports	max 24 fuse +/- monitored max 36 fuse + monitored			
Max. short-circuit current. Isc PV	Up to 9000 A			
MPPT	1			
AC OUTPUT				
Max. AC Current @25ºC	3837 kVA	4029 kVA	4221 kVA	4412 kVA
Max. AC Current @40ºC	3409 kVA	3579 kVA	3750 kVA	3920 kVA
Max. AC Current @45ºC	3409 kVA	3579 kVA	3750 kVA	3920 kVA
Max. AC Current @50ºC	3409 kVA	3579 kVA	3750 kVA	3920 kVA
Max. AC Current @55ºC	3409 kVA	3579 kVA	3750 kVA	3920 kVA
Max. AC Current @60ºC	1704 kVA	1789 kVA	1875 kVA	1959 kVA
Maximum output current	3692 Arms			
Nominal AC Voltage	600 Vrms (±15%)	630 Vrms (±15%)	660 Vrms (±15%)	690 Vrms (±15%)
Maximum output fault current (time)	5,8 kA (<1 ms)			
AC power frequency	50/60 Hz (± 6%)			

	PV 4100 UEP	PV 4300 UEP	PV 4500 UEP	PV 4700 UEP
DC INPUT				
Max. DC Current @25ºC	2 x 2500 A			
Max. DC Current @40ºC	2 x 2500 A			
Max. DC Current @45ºC	2 x 2400 A			
Max. DC Current @50ºC	2 x 2310 A			
Max. DC Current @55ºC	2 x 2220 A			
Max. DC Current @60ºC	2 x 1110 A			
DC Voltage range	835 - 1500 V	875 - 1500 V	915 - 1500 V	955 - 1500 V
DC Voltage Range MPPT	835 - 1300 V	875 - 1300 V	915 - 1300 V	955 - 1300 V
Nr of DC ports	max 24 fuse +/- monitored max 36 fuse + monitored			
Max. short-circuit current. Isc PV	Up to 9000 A			
MPPT	1			
AC OUTPUT				
Max. AC Current @25ºC	4095 kVA	4299 kVA	4504 kVA	4709 kVA
Max. AC Current @40ºC	4095 kVA	4299 kVA	4504 kVA	4709 kVA
Max. AC Current @45ºC	3942 kVA	4139 kVA	4336 kVA	4534 kVA
Max. AC Current @50ºC	3790 kVA	3979 kVA	4169 kVA	4538 kVA
Max. AC Current @55ºC	3637 kVA	3819 kVA	4001 kVA	4183 kVA
Max. AC Current @60ºC	1819 kVA	1910 kVA	2001 kVa	2091 kVA
Maximum output current	3940 Arms			
Nominal AC Voltage	600 Vrms (± 15%)	630 Vrms (± 15%)	660 Vrms (± 15%)	690 Vrms (± 15%)
Maximum output fault current (time)	6,2 kA (<1 ms)			
AC power frequency	50/60 Hz (± 6%)			

Stor PCS 3X

	Stor PCS 3830 AEP	Stor PCS 4000 AEP	Stor PCS 4220 AEP	Stor PCS 4400 AEP
DC INPUT				
Max. DC Current @25ºC	2 x 2362 A			
Max. DC Current @40ºC	2 x 2100 A			
Max. DC Current @45ºC	2 x 2100 A			
Max. DC Current @50ºC	2 x 2100 A			
Max. DC Current @55ºC	2 x 2100 A			
Max. DC Current @60ºC	2 x 1050 A			
DC Voltage range (with derating)	835 - 1500 V	875 - 1500 V	915 - 1500 V	955 - 1500 V
DC Voltage range (w/o derating)	835 - 1300 V	875 - 1300 V	915 - 1300 V	955 - 1300 V
Number of fused DC inputs per Power/module/total	Up to 3+ & 3- / 6+ & 6-			
AC OUTPUT				
Max. AC Current @25ºC	3836 kVA	4029 kVA	4220 kVA	4412 kVA
Max. AC Current @40ºC	3408 kVA	3579 kVA	3749 kVA	3920 kVA
Max. AC Current @45ºC	3408 kVA	3579 kVA	3749 kVA	3920 kVA
Max. AC Current @50ºC	3408 kVA	3579 kVA	3749 kVA	3920 kVA
Max. AC Current @55ºC	3408 kVA	3579 kVA	3749 kVA	3920 kVA
Max. AC Current @60ºC	1703 kVA	1789 kVA	1873 kVa	1959 kVA
Maximum AC current per Power module/Total @25ºC	1846 / 3962 Arms			
Nominal AC Voltage	600 Vrms (± 10%)	630 Vrms (± 10%)	660 Vrms (± 10%)	690 Vrms (± 10%)
AC power frequency	47,5 – 53/57 – 63 Hz			

	Stor PCS 4100 UEP	Stor PCS 4300 UEP	Stor PCS 4500 UEP	Stor PCS 4700 UEP
DC INPUT				
Max. DC Current @40ºC	2 x 2500 A			
Max. DC Current @45ºC	2 x 2407 A			
Max. DC Current @50ºC	2 x 2313 A			
Max. DC Current @55ºC	2 x 2220 A			
Max. DC Current @60ºC	2 x 1110 A			
DC Voltage range (with derating)	835 - 1500 V	875 - 1500 V	915 - 1500 V	955 - 1500 V
DC Voltage range (w/o derating)	835 - 1300 V	875 - 1300 V	915 - 1300 V	955 - 1300 V
Number of fused DC inputs per Power/module/total	Up to 3+ & 3- / 6+ & 6-			
AC OUTPUT				
Max. AC Current @40ºC	4095 kVA	4299 kVA	4504 kVA	4709 kVA
Max. AC Current @45ºC	3942 kVA	4139 kVA	4336 kVA	4534 kVA
Max. AC Current @50ºC	3790 kVA	3979 kVA	4169 kVA	4358 kVA
Max. AC Current @55ºC	3637 kVA	3819 kVA	4001 kVA	4183 kVA
Max. AC Current @60ºC	1819 kVA	1910 kVA	2001 kVa	2091 kVA
Maximum AC current per Power module/Total @25ºC	1970 / 3940 Arms			
Nominal AC Voltage	600 Vrms (± 10%)	630 Vrms (± 10%)	660 Vrms (± 10%)	690 Vrms (± 10%)
AC power frequency	47,5 – 53/57 – 63 Hz			

RECORD OF CHANGES

Revision	Modification / Changes	Date
0	New Temperatures added by client request.	22/04/2022

Measurement results Annex

Models:
- PV3400STD (600Vac), PV3600STD (630Vac), PV3750STD (660Vac), PV3900STD (690Vac)
- PV3400HTD (600Vac), PV3600HTD (630Vac), PV3750HTD (660Vac), PV3900HTD (690Vac)

Harmonic 60Hz	% of nominal In			Limits (% of nominal)	Harmonic 60Hz	% of nominal In			Limits (% of nominal)
Power levels (%Pn)	33%	66%	100%	--	Power levels (%Pn)	33%	66%	100%	--
2	0,02%	0,03%	0,03%	1,00%	3	0,02%	0,02%	0,03%	4,00%
4	0,02%	0,02%	0,02%	1,00%	5	0,14%	0,26%	0,42%	4,00%
6	0,01%	0,01%	0,01%	1,00%	7	0,14%	0,27%	0,47%	4,00%
8	0,01%	0,02%	0,02%	1,00%	9	0,01%	0,02%	0,02%	4,00%
10	0,01%	0,01%	0,01%	1,00%	11	0,22%	0,04%	0,22%	2,00%
12	0,02%	0,01%	0,02%	0,50%	13	0,13%	0,06%	0,18%	2,00%
14	0,01%	0,01%	0,01%	0,50%	15	0,02%	0,02%	0,03%	2,00%
16	0,02%	0,02%	0,02%	0,50%	17	0,27%	0,15%	0,12%	1,50%
18	0,03%	0,03%	0,03%	0,38%	19	0,06%	0,05%	0,05%	1,50%
20	0,03%	0,03%	0,03%	0,38%	21	0,03%	0,03%	0,03%	1,50%
22	0,02%	0,02%	0,02%	0,38%	23	0,04%	0,04%	0,07%	0,60%
24	0,03%	0,03%	0,02%	0,15%	25	0,03%	0,03%	0,03%	0,60%
26	0,03%	0,03%	0,03%	0,15%	27	0,03%	0,03%	0,03%	0,60%
28	0,02%	0,02%	0,02%	0,15%	29	0,04%	0,05%	0,05%	0,60%
30	0,03%	0,03%	0,03%	0,15%	31	0,04%	0,03%	0,05%	0,60%
32	0,03%	0,03%	0,03%	0,15%	33	0,04%	0,03%	0,03%	0,60%
34	0,02%	0,02%	0,02%	0,15%	35	0,04%	0,03%	0,03%	0,30%
36	0,03%	0,03%	0,03%	0,08%	37	0,05%	0,05%	0,06%	0,30%
38	0,03%	0,03%	0,02%	0,08%	39	0,05%	0,04%	0,04%	0,30%
40	0,02%	0,02%	0,02%	0,08%	41	0,04%	0,03%	0,03%	0,30%
42	0,02%	0,03%	0,02%	0,08%	43	0,03%	0,05%	0,05%	0,30%
44	0,02%	0,02%	0,02%	0,08%	45	0,04%	0,04%	0,04%	0,30%
46	0,01%	0,01%	0,02%	0,08%	47	0,03%	0,03%	0,04%	0,30%
48	0,02%	0,02%	0,02%	0,08%	49	0,03%	0,03%	0,03%	0,30%
50	0,01%	0,02%	0,02%	0,08%	--	--	--	--	--
THD	0,46%	0,45%	0,73%	5,00%	--	--	--	--	--

Models:
- PV3800 AEP (600Vac), PV4000 AEP (630Vac), PV4200 AEP (660Vac), PV4400 AEP (690Vac)

Harmonic 60Hz	% of nominal In			Limits (% of nominal)	Harmonic 60Hz	% of nominal In			Limits (% of nominal)
Power levels (%Pn)	33%	66%	100%	--	Power levels (%Pn)	33%	66%	100%	--
2	0,09%	0,06%	0,04%	1,00%	3	0,08%	0,08%	0,14%	4,00%
4	0,04%	0,03%	0,03%	1,00%	5	0,04%	0,08%	0,14%	4,00%
6	0,03%	0,03%	0,03%	1,00%	7	0,04%	0,08%	0,13%	4,00%
8	0,03%	0,03%	0,03%	1,00%	9	0,04%	0,04%	0,03%	4,00%
10	0,02%	0,02%	0,02%	1,00%	11	0,16%	0,05%	0,24%	2,00%
12	0,02%	0,02%	0,02%	0,50%	13	0,08%	0,10%	0,16%	2,00%
14	0,04%	0,04%	0,03%	0,50%	15	0,05%	0,06%	0,04%	2,00%
16	0,04%	0,04%	0,04%	0,50%	17	0,25%	0,16%	0,13%	1,50%
18	0,03%	0,03%	0,02%	0,38%	19	0,05%	0,06%	0,05%	1,50%
20	0,03%	0,03%	0,03%	0,38%	21	0,05%	0,05%	0,05%	1,50%
22	0,03%	0,03%	0,03%	0,38%	23	0,04%	0,06%	0,06%	0,60%
24	0,02%	0,02%	0,02%	0,15%	25	0,04%	0,05%	0,03%	0,60%
26	0,02%	0,02%	0,02%	0,15%	27	0,05%	0,04%	0,04%	0,60%
28	0,03%	0,02%	0,02%	0,15%	29	0,04%	0,05%	0,04%	0,60%
30	0,02%	0,02%	0,02%	0,15%	31	0,05%	0,06%	0,06%	0,60%
32	0,03%	0,03%	0,03%	0,15%	33	0,06%	0,05%	0,04%	0,60%
34	0,03%	0,03%	0,03%	0,15%	35	0,04%	0,05%	0,06%	0,30%
36	0,02%	0,02%	0,02%	0,08%	37	0,06%	0,05%	0,04%	0,30%
38	0,04%	0,03%	0,04%	0,08%	39	0,06%	0,05%	0,05%	0,30%
40	0,03%	0,03%	0,03%	0,08%	41	0,03%	0,04%	0,04%	0,30%
42	0,02%	0,02%	0,02%	0,08%	43	0,05%	0,03%	0,04%	0,30%
44	0,03%	0,02%	0,03%	0,08%	45	0,05%	0,04%	0,06%	0,30%
46	0,03%	0,03%	0,03%	0,08%	47	0,02%	0,03%	0,02%	0,30%
48	0,01%	0,02%	0,02%	0,08%	49	0,02%	0,04%	0,04%	0,30%
50	0,02%	0,02%	0,02%	0,08%	--	--	--	--	--
THD	0,40%	0,33%	0,45%	5,00%	--	--	--	--	--

Models:
- PV4100 UEP (600Vac), PV4300 UEP (630Vac), PV4500 UEP (660Vac), PV4700 UEP (690Vac)

Harmonic 60Hz	% of nominal In			Limits (% of nominal)	Harmonic 60Hz	% of nominal In			Limits (% of nominal)
Power levels (%Pn)	33%	66%	100%	--	Power levels (%Pn)	33%	66%	100%	--
2	0,07%	0,06%	0,06%	1,00%	3	0,07%	0,07%	0,15%	4,00%
4	0,03%	0,03%	0,04%	1,00%	5	0,03%	0,08%	0,14%	4,00%
6	0,02%	0,03%	0,05%	1,00%	7	0,04%	0,08%	0,13%	4,00%
8	0,03%	0,03%	0,03%	1,00%	9	0,04%	0,03%	0,04%	4,00%
10	0,02%	0,02%	0,03%	1,00%	11	0,14%	0,07%	0,23%	2,00%
12	0,01%	0,02%	0,03%	0,50%	13	0,06%	0,10%	0,16%	2,00%
14	0,03%	0,03%	0,04%	0,50%	15	0,05%	0,05%	0,06%	2,00%
16	0,04%	0,04%	0,04%	0,50%	17	0,24%	0,13%	0,16%	1,50%
18	0,03%	0,02%	0,03%	0,38%	19	0,05%	0,05%	0,05%	1,50%
20	0,03%	0,03%	0,03%	0,38%	21	0,05%	0,05%	0,05%	1,50%
22	0,02%	0,03%	0,03%	0,38%	23	0,03%	0,05%	0,05%	0,60%
24	0,02%	0,02%	0,02%	0,15%	25	0,04%	0,04%	0,02%	0,60%
26	0,02%	0,02%	0,02%	0,15%	27	0,05%	0,04%	0,04%	0,60%
28	0,03%	0,02%	0,02%	0,15%	29	0,03%	0,04%	0,05%	0,60%
30	0,02%	0,02%	0,02%	0,15%	31	0,05%	0,05%	0,05%	0,60%
32	0,03%	0,03%	0,03%	0,15%	33	0,06%	0,05%	0,04%	0,60%
34	0,03%	0,02%	0,03%	0,15%	35	0,04%	0,04%	0,06%	0,30%
36	0,02%	0,02%	0,02%	0,08%	37	0,06%	0,05%	0,05%	0,30%
38	0,04%	0,04%	0,04%	0,08%	39	0,06%	0,06%	0,04%	0,30%
40	0,03%	0,03%	0,03%	0,08%	41	0,03%	0,04%	0,04%	0,30%
42	0,02%	0,02%	0,02%	0,08%	43	0,05%	0,03%	0,04%	0,30%
44	0,03%	0,02%	0,03%	0,08%	45	0,05%	0,04%	0,05%	0,30%
46	0,03%	0,03%	0,03%	0,08%	47	0,02%	0,03%	0,03%	0,30%
48	0,02%	0,02%	0,02%	0,08%	49	0,02%	0,03%	0,04%	0,30%
50	0,02%	0,02%	0,02%	0,08%	--	--	--	--	--
THD	0,37%	0,31%	0,46%	5,00%	--	--	--	--	--

Models:
- PV3400STD (600Vac), PV3600STD (630Vac), PV3750STD (660Vac), PV3900STD (690Vac)
- PV3400HTD (600Vac), PV3600HTD (630Vac), PV3750HTD (660Vac), PV3900HTD (690Vac)

Harmonic 50Hz	% of nominal In			Limits (% of nominal)	Harmonic 50Hz	% of nominal In			Limits (% of nominal)
Power levels (%Pn)	33%	66%	100%	--	Power levels (%Pn)	33%	66%	100%	--
2	0,03%	0,03%	0,03%	1,00%	3	0,03%	0,04%	0,05%	4,00%
4	0,03%	0,04%	0,05%	1,00%	5	0,03%	0,06%	0,09%	4,00%
6	0,03%	0,04%	0,05%	1,00%	7	0,04%	0,07%	0,11%	4,00%
8	0,03%	0,03%	0,04%	1,00%	9	0,01%	0,02%	0,02%	4,00%
10	0,02%	0,02%	0,03%	1,00%	11	0,25%	0,03%	0,16%	2,00%
12	0,03%	0,03%	0,04%	0,50%	13	0,15%	0,05%	0,14%	2,00%
14	0,03%	0,03%	0,03%	0,50%	15	0,01%	0,01%	0,01%	2,00%
16	0,02%	0,02%	0,04%	0,50%	17	0,17%	0,07%	0,13%	1,50%
18	0,04%	0,04%	0,05%	0,38%	19	0,11%	0,04%	0,04%	1,50%
20	0,04%	0,04%	0,04%	0,38%	21	0,01%	0,01%	0,02%	1,50%
22	0,03%	0,03%	0,04%	0,38%	23	0,08%	0,12%	0,04%	0,60%
24	0,04%	0,04%	0,04%	0,15%	25	0,02%	0,05%	0,04%	0,60%
26	0,04%	0,05%	0,05%	0,15%	27	0,01%	0,01%	0,01%	0,60%
28	0,02%	0,02%	0,03%	0,15%	29	0,05%	0,04%	0,05%	0,60%
30	0,04%	0,04%	0,04%	0,15%	31	0,03%	0,01%	0,02%	0,60%
32	0,04%	0,04%	0,05%	0,15%	33	0,01%	0,01%	0,01%	0,60%
34	0,02%	0,02%	0,03%	0,15%	35	0,05%	0,04%	0,02%	0,30%
36	0,04%	0,04%	0,05%	0,08%	37	0,03%	0,02%	0,02%	0,30%
38	0,05%	0,05%	0,05%	0,08%	39	0,01%	0,01%	0,01%	0,30%
40	0,02%	0,02%	0,03%	0,08%	41	0,03%	0,04%	0,03%	0,30%
42	0,05%	0,04%	0,05%	0,08%	43	0,02%	0,02%	0,02%	0,30%
44	0,05%	0,06%	0,06%	0,08%	45	0,01%	0,01%	0,01%	0,30%
46	0,02%	0,02%	0,03%	0,08%	47	0,03%	0,03%	0,05%	0,30%
48	0,05%	0,05%	0,05%	0,08%	49	0,02%	0,02%	0,02%	0,30%
50	0,06%	0,06%	0,06%	0,08%	--				--
THD	0,43%	0,29%	0,38%		--				--

Models:
- PV3800 AEP (600Vac), PV4000 AEP (630Vac), PV4200 AEP (660Vac), PV4400 AEP (690Vac)

Harmonic 50Hz	% of nominal In			Limits (% of nominal)	Harmonic 50Hz	% of nominal In			Limits (% of nominal)
Power levels (%Pn)	33%	66%	100%	--	Power levels (%Pn)	33%	66%	100%	--
2	0,07%	0,09%	0,08%	1,00%	3	0,03%	0,06%	0,08%	4,00%
4	0,04%	0,07%	0,14%	1,00%	5	0,02%	0,08%	0,12%	4,00%
6	0,05%	0,07%	0,10%	1,00%	7	0,04%	0,08%	0,10%	4,00%
8	0,03%	0,05%	0,06%	1,00%	9	0,02%	0,02%	0,03%	4,00%
10	0,03%	0,03%	0,04%	1,00%	11	0,22%	0,05%	0,17%	2,00%
12	0,04%	0,05%	0,06%	0,50%	13	0,14%	0,08%	0,16%	2,00%
14	0,03%	0,03%	0,05%	0,50%	15	0,01%	0,01%	0,02%	2,00%
16	0,03%	0,03%	0,04%	0,50%	17	0,16%	0,06%	0,13%	1,50%
18	0,05%	0,05%	0,07%	0,38%	19	0,10%	0,02%	0,08%	1,50%
20	0,05%	0,04%	0,06%	0,38%	21	0,01%	0,02%	0,03%	1,50%
22	0,03%	0,04%	0,04%	0,38%	23	0,07%	0,07%	0,06%	0,60%
24	0,05%	0,05%	0,04%	0,15%	25	0,02%	0,05%	0,02%	0,60%
26	0,05%	0,05%	0,05%	0,15%	27	0,01%	0,01%	0,01%	0,60%
28	0,03%	0,03%	0,03%	0,15%	29	0,04%	0,05%	0,04%	0,60%
30	0,04%	0,05%	0,04%	0,15%	31	0,03%	0,02%	0,02%	0,60%
32	0,05%	0,05%	0,05%	0,15%	33	0,01%	0,01%	0,01%	0,60%
34	0,03%	0,03%	0,03%	0,15%	35	0,04%	0,04%	0,02%	0,30%
36	0,05%	0,05%	0,04%	0,08%	37	0,03%	0,02%	0,02%	0,30%
38	0,05%	0,05%	0,05%	0,08%	39	0,01%	0,01%	0,01%	0,30%
40	0,03%	0,03%	0,03%	0,08%	41	0,03%	0,03%	0,04%	0,30%
42	0,05%	0,05%	0,05%	0,08%	43	0,02%	0,03%	0,02%	0,30%
44	0,06%	0,05%	0,06%	0,08%	45	0,01%	0,01%	0,01%	0,30%
46	0,03%	0,03%	0,03%	0,08%	47	0,03%	0,03%	0,04%	0,30%
48	0,06%	0,06%	0,05%	0,08%	49	0,02%	0,03%	0,02%	0,30%
50	0,06%	0,06%	0,06%	0,08%	--				--
THD	0,41%	0,33%	0,46%		--				--

Models:
- PV4100 UEP (600Vac), PV4300 UEP (630Vac), PV4500 UEP (660Vac), PV4700 UEP (690Vac)

Harmonic 50Hz	% of nominal In			Limits (% of nominal)	Harmonic 50Hz	% of nominal In			Limits (% of nominal)
Power levels (%Pn)	33%	66%	100%	--	Power levels (%Pn)	33%	66%	100%	--
2	0,09%	0,10%	0,18%	1,00%	3	0,04%	0,06%	0,16%	4,00%
4	0,04%	0,07%	0,23%	1,00%	5	0,02%	0,08%	0,17%	4,00%
6	0,04%	0,07%	0,15%	1,00%	7	0,03%	0,08%	0,12%	4,00%
8	0,03%	0,04%	0,06%	1,00%	9	0,01%	0,02%	0,04%	4,00%
10	0,02%	0,03%	0,03%	1,00%	11	0,19%	0,07%	0,21%	2,00%
12	0,04%	0,04%	0,04%	0,50%	13	0,11%	0,09%	0,19%	2,00%
14	0,03%	0,03%	0,04%	0,50%	15	0,01%	0,01%	0,03%	2,00%
16	0,03%	0,02%	0,03%	0,50%	17	0,14%	0,07%	0,13%	1,50%
18	0,05%	0,04%	0,04%	0,38%	19	0,09%	0,03%	0,12%	1,50%
20	0,04%	0,05%	0,05%	0,38%	21	0,01%	0,02%	0,03%	1,50%
22	0,03%	0,03%	0,03%	0,38%	23	0,07%	0,05%	0,07%	0,60%
24	0,04%	0,04%	0,04%	0,15%	25	0,02%	0,04%	0,02%	0,60%
26	0,04%	0,04%	0,04%	0,15%	27	0,01%	0,01%	0,01%	0,60%
28	0,02%	0,03%	0,03%	0,15%	29	0,03%	0,05%	0,03%	0,60%
30	0,04%	0,04%	0,04%	0,15%	31	0,02%	0,02%	0,02%	0,60%
32	0,04%	0,04%	0,05%	0,15%	33	0,01%	0,01%	0,01%	0,60%
34	0,02%	0,03%	0,03%	0,15%	35	0,04%	0,04%	0,03%	0,30%
36	0,04%	0,05%	0,04%	0,08%	37	0,03%	0,01%	0,02%	0,30%
38	0,05%	0,04%	0,05%	0,08%	39	0,01%	0,01%	0,01%	0,30%
40	0,02%	0,03%	0,03%	0,08%	41	0,03%	0,03%	0,04%	0,30%
42	0,05%	0,05%	0,05%	0,08%	43	0,02%	0,03%	0,03%	0,30%
44	0,05%	0,05%	0,05%	0,08%	45	0,01%	0,01%	0,01%	0,30%
46	0,03%	0,03%	0,03%	0,08%	47	0,02%	0,03%	0,03%	0,30%
48	0,05%	0,05%	0,05%	0,08%	49	0,02%	0,03%	0,02%	0,30%
50	0,05%	0,05%	0,05%	0,08%	--				--
THD	0,36%	0,32%	0,58%		--				--

Models:

- Stor PCS 3830 AEP (600Vac), Stor PCS 4000 AEP (630Vac), Stor PCS 4220 AEP (660Vac), Stor PCS 4400 AEP (690Vac),

Harmonic 60Hz	% of nominal In			Limits (% of nominal)	Harmonic 60Hz	% of nominal In			Limits (% of nominal)
Power levels (%Pn)	33%	66%	100%	--	Power levels (%Pn)	33%	66%	100%	--
2	0,10%	0,12%	0,23%	1,00%	3	0,05%	0,07%	0,27%	4,00%
4	0,03%	0,04%	0,11%	1,00%	5	0,13%	0,31%	0,61%	4,00%
6	0,02%	0,02%	0,05%	1,00%	7	0,09%	0,26%	0,40%	4,00%
8	0,03%	0,02%	0,03%	1,00%	9	0,03%	0,04%	0,04%	4,00%
10	0,02%	0,02%	0,02%	1,00%	11	0,05%	0,13%	0,20%	2,00%
12	0,02%	0,02%	0,02%	0,50%	13	0,05%	0,08%	0,14%	2,00%
14	0,02%	0,02%	0,02%	0,50%	15	0,03%	0,03%	0,03%	2,00%
16	0,02%	0,02%	0,02%	0,50%	17	0,05%	0,08%	0,09%	1,50%
18	0,02%	0,01%	0,02%	0,38%	19	0,05%	0,03%	0,04%	1,50%
20	0,02%	0,01%	0,02%	0,38%	21	0,03%	0,03%	0,04%	1,50%
22	0,02%	0,02%	0,02%	0,38%	23	0,04%	0,04%	0,04%	0,60%
24	0,02%	0,02%	0,02%	0,15%	25	0,03%	0,04%	0,04%	0,60%
26	0,02%	0,03%	0,02%	0,15%	27	0,03%	0,05%	0,02%	0,60%
28	0,02%	0,03%	0,02%	0,15%	29	0,04%	0,03%	0,04%	0,60%
30	0,02%	0,02%	0,02%	0,15%	31	0,02%	0,03%	0,04%	0,60%
32	0,02%	0,02%	0,03%	0,15%	33	0,03%	0,04%	0,05%	0,60%
34	0,02%	0,02%	0,03%	0,15%	35	0,04%	0,04%	0,04%	0,30%
36	0,02%	0,02%	0,02%	0,08%	37	0,04%	0,02%	0,04%	0,30%
38	0,03%	0,02%	0,02%	0,08%	39	0,05%	0,04%	0,03%	0,30%
40	0,04%	0,02%	0,02%	0,08%	41	0,03%	0,03%	0,04%	0,30%
42	0,03%	0,03%	0,02%	0,08%	43	0,07%	0,07%	0,05%	0,30%
44	0,05%	0,04%	0,03%	0,08%	45	0,07%	0,06%	0,07%	0,30%
46	0,04%	0,04%	0,04%	0,08%	47	0,03%	0,03%	0,03%	0,30%
48	0,03%	0,03%	0,02%	0,08%	49	0,07%	0,06%	0,04%	0,30%
50	0,04%	0,03%	0,02%	0,08%	--				--
THD	0,31%	0,50%	0,88%		--				--

Models:

- Stor PCS 4100 UEP (600Vac), Stor PCS 4300 UEP (630Vac), Stor PCS 4500 UEP (660Vac), Stor PCS 4700 UEP (690Vac),

Harmonic 60Hz	% of nominal In			Limits (% of nominal)	Harmonic 60Hz	% of nominal In			Limits (% of nominal)
Power levels (%Pn)	33%	66%	100%	--	Power levels (%Pn)	33%	66%	100%	--
2	0,13%	0,15%	0,19%	1,00%	3	0,06%	0,08%	0,37%	4,00%
4	0,03%	0,05%	0,08%	1,00%	5	0,13%	0,30%	0,68%	4,00%
6	0,02%	0,02%	0,05%	1,00%	7	0,11%	0,25%	0,40%	4,00%
8	0,02%	0,02%	0,03%	1,00%	9	0,03%	0,03%	0,04%	4,00%
10	0,02%	0,02%	0,03%	1,00%	11	0,04%	0,14%	0,21%	2,00%
12	0,02%	0,02%	0,03%	0,50%	13	0,04%	0,09%	0,13%	2,00%
14	0,03%	0,02%	0,02%	0,50%	15	0,04%	0,03%	0,03%	2,00%
16	0,02%	0,02%	0,02%	0,50%	17	0,04%	0,08%	0,07%	1,50%
18	0,02%	0,01%	0,02%	0,38%	19	0,04%	0,03%	0,03%	1,50%
20	0,03%	0,01%	0,02%	0,38%	21	0,04%	0,03%	0,03%	1,50%
22	0,03%	0,01%	0,02%	0,38%	23	0,04%	0,05%	0,04%	0,60%
24	0,02%	0,01%	0,02%	0,15%	25	0,03%	0,03%	0,05%	0,60%
26	0,02%	0,02%	0,02%	0,15%	27	0,03%	0,04%	0,04%	0,60%
28	0,02%	0,02%	0,02%	0,15%	29	0,03%	0,02%	0,03%	0,60%
30	0,01%	0,02%	0,02%	0,15%	31	0,01%	0,04%	0,04%	0,60%
32	0,01%	0,03%	0,02%	0,15%	33	0,02%	0,04%	0,04%	0,60%
34	0,01%	0,03%	0,02%	0,15%	35	0,03%	0,04%	0,03%	0,30%
36	0,02%	0,02%	0,02%	0,08%	37	0,02%	0,03%	0,05%	0,30%
38	0,02%	0,02%	0,03%	0,08%	39	0,04%	0,03%	0,05%	0,30%
40	0,03%	0,02%	0,03%	0,08%	41	0,03%	0,04%	0,04%	0,30%
42	0,03%	0,02%	0,02%	0,08%	43	0,06%	0,05%	0,04%	0,30%
44	0,04%	0,03%	0,03%	0,08%	45	0,06%	0,05%	0,05%	0,30%
46	0,04%	0,03%	0,03%	0,08%	47	0,03%	0,03%	0,02%	0,30%
48	0,03%	0,02%	0,02%	0,08%	49	0,07%	0,06%	0,04%	0,30%
50	0,04%	0,03%	0,03%	0,08%	--				--
THD	0,31%	0,51%	0,95%		--				--