

TECHNICAL SPECIFICATIONS FOR IMPLEMENTING OP

1. OP Features

Compact type:

OP Will be accommodated in three 20' Modified shipping containers. Footprint of each container will be 20'X8'.

Two of the Containers can be staked one above the other, this means only 2 containers will be placed on the platform.

A stand-alone office cum storage modified shipping container will be supplied along with other three containers

The OP system can also be installed in 40' modified shipping container

Easy to transport:

Equipment in each container will not weigh more than 3 Tons, this means the gross weight of the container will be less than 6 Tons.

Containers are light enough to be moved or lifted using any pick and carry cranes, Flatbed trucks can be used to transport containers.

Installation:

Containers will be placed on concrete platforms. Equipment inside the containers will be pre-assembled and ready for plug and plug.

All the equipment inside the container will be pre-wired, containers will be provided with industrial connectors for the main power supply. All water and plumbing connections will be provided with Quick-Lock couplings.

Dismantling:

Easily dismantlable as removable connectors and couplings will be provided for all plumbing and electrical connections to the container.

Containerised Units:

Four 20' Modified shipping containers will house the equipment's or One 40' Modified shipping container and two 20' modified shipping container can be provided based on ease of transportation in Lebanon

2. Treated Outputs

Treated Solids

Solids generated by the process pass through a thermal digester where solids remain heated for 4hours at 70°C making it class A biosolids.

Treated solids can directly be used as a soil amendment. Treated Solids are bagged and sold for land application.

Treated Liquid

Wastewater treatment of filtrate obtained from dewatering involves aeration in which aeration is induced by an air blower and aerobic bacteria results in biological decomposition of organic matter. media inside the aeration zone increases the surface area forming a bio-film layer which enhances the removal of organic fractions

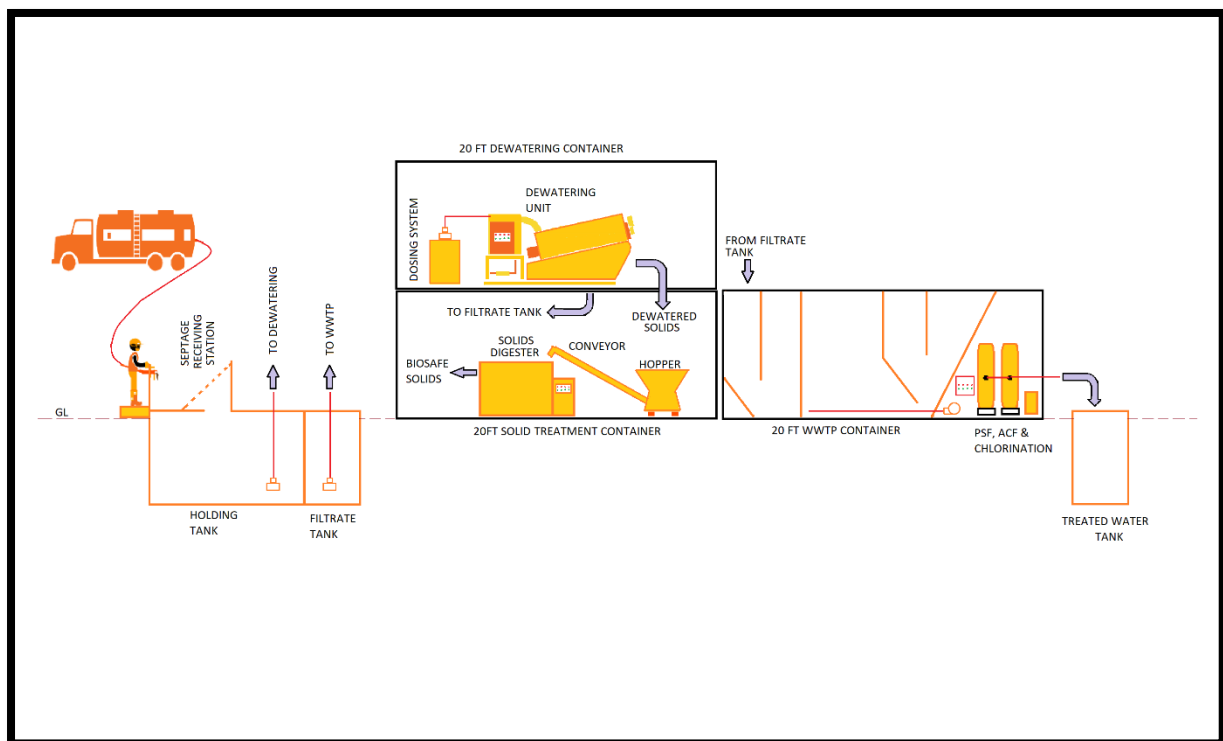
Tertiary treatment reduces suspended solids, color and odor the filtrate is passed through a pressure sand filter and activated carbon filter.

Disinfection methods like Ozonation or UV light can be used to destroy and render harmless disease-causing organisms, such as bacteria, viruses, etc.

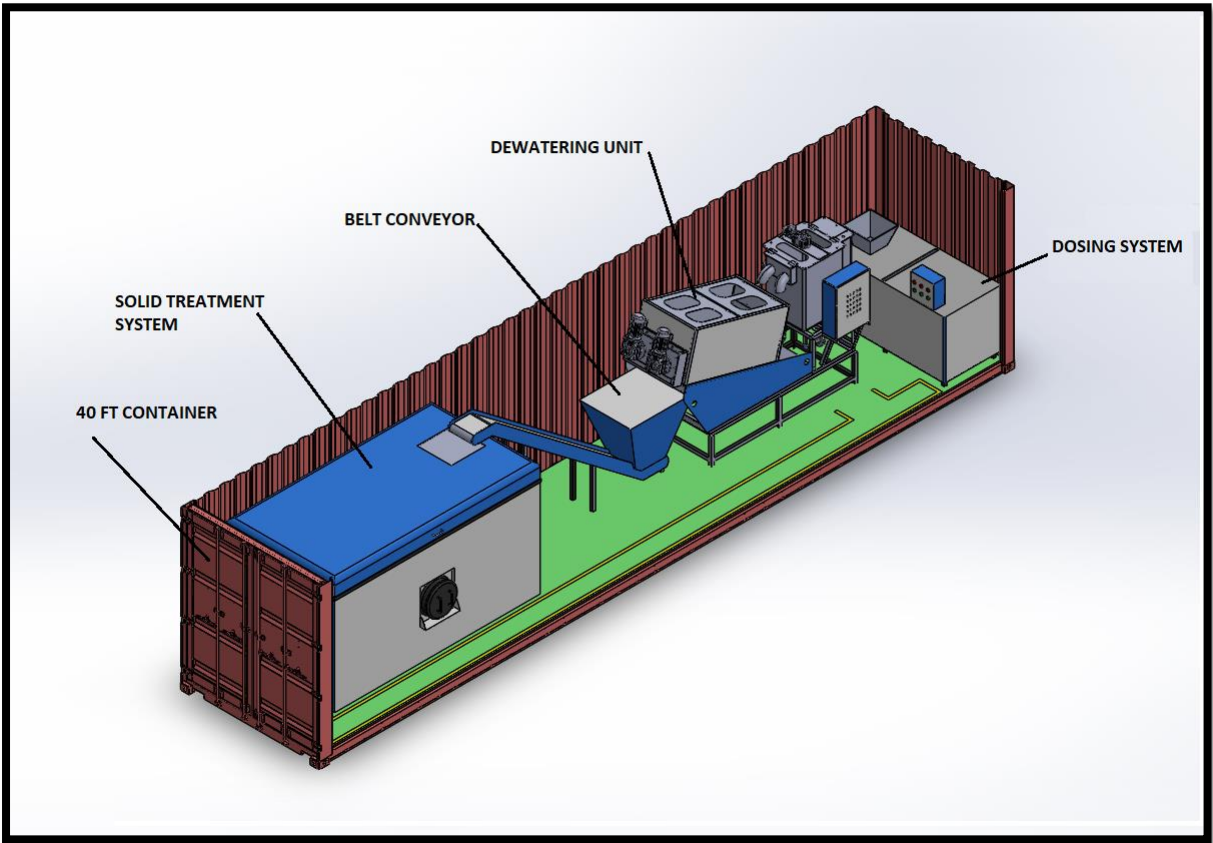
Treated water will be safe enough for release into inland water bodies or urban greenery.

Treated water will be in the Lebanon's Ministry of Environment (MoE) effluent criteria for safe disposal in surface water and/or to drinking water levels.

Process that will be adopted for treatment of Septage:

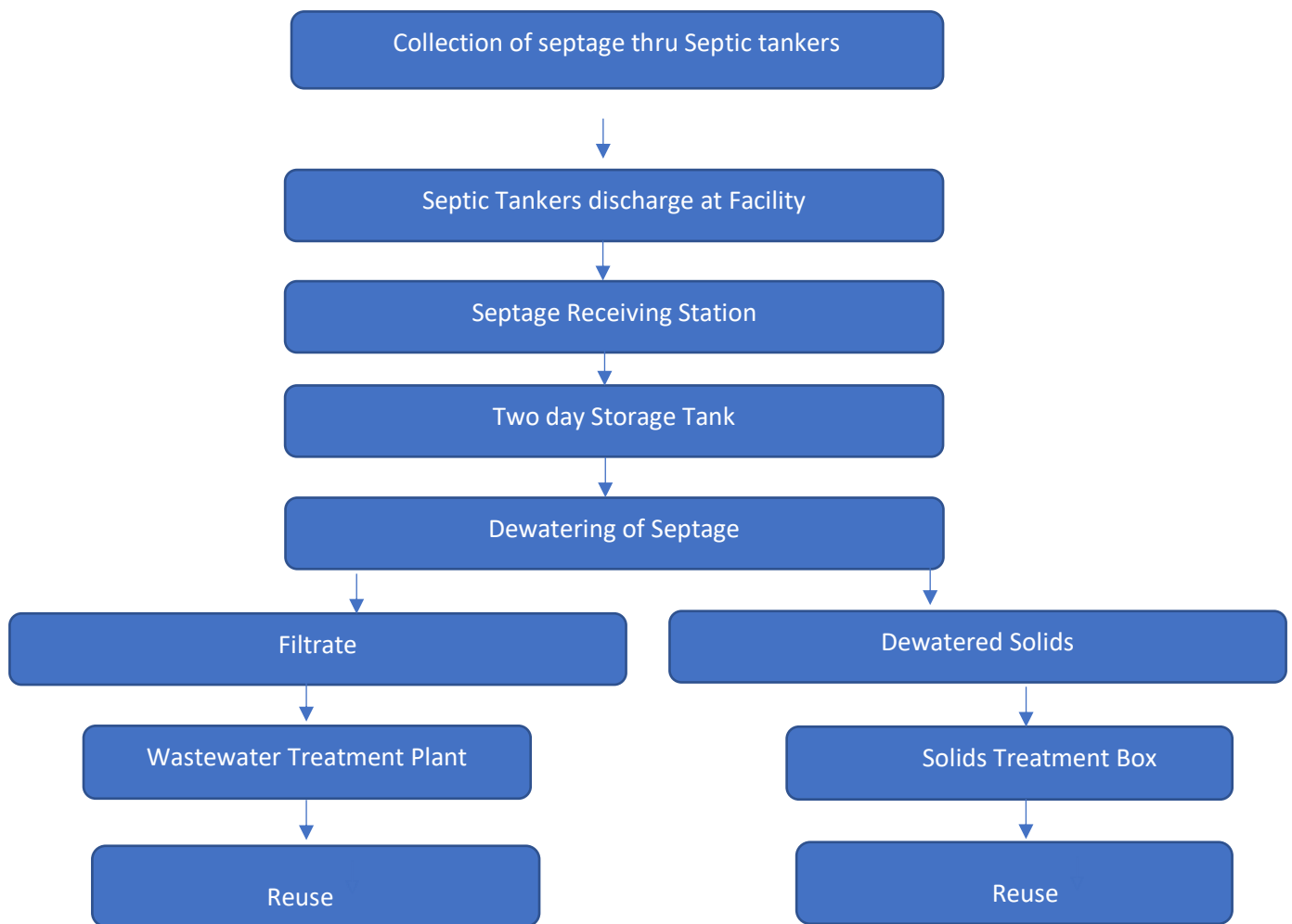


Process Flow Diagram



Dewatering Unit and Solid treatment in a 40' Modified Container

The design flow of the proposed system is given below.



The overall working process flow of the above scheme is described below:

Step 1: The septage is received in the septage receiving station via screen, where the floatables are separated from the septage. The grit settles in the SRS, and the septage flows to the storage tank.

Step 2: The septage storage tank. The 2-day retention time in the storage tank is designed to address the incoming fresh septage from community toilets and public toilets too.

Step 3: Submersible sludge pumps are placed in the storage tank, to pump the septage from the storage tank to the Dewatering unit. Two pumps are placed in the storage tank, and one pump as backup pump.

Step 4: The sludge from the sludge holding tank is pumped to the dewatering unit. The dewatering unit consists of:

- a. Polymer dosing system

b. Dewatering unit

Step 5: The dewatered solids fall into the Wet end Hopper placed on the ground and is feed into Biosafe where Dewatered Sludge would be heated up to 70 degrees for biosafety using external energy and then bagged.

The filtrate from the dewatering flows to filtrate tank and then pumped in controlled flowrate to wastewater treatment plant.

Step 6: The filtrate from dewatering is treated in the wastewater treatment plant, and post the tertiary treatment, stored for Reuse in the plant area or urban greenery.

The overall turn-around time for septage is 1-2 days, from the day of receipt into the FSTP.

Electricity:

Sl. No	Equipment	Connected Load	Operational hours/day	Unit consumption/day
1	Pumping system	3.0	8	24.0
2	Dewatering system	3.8	8	30.4
3	Solids treatment system	15.5	2	31.0
4	Wastewater treatment	1.8	24	43.2
5	Utility	1.0	4	4.0
<i>Total in kW per day</i>				132.6

***30 Kw of Solar power can be installed as an alternative.**

O&M:

SI No	Particulars	UOM	Quantity/month
1	Electricity	Units	4000
2	Polymer	Kg	45
3	Operator	Person	2

Sustainability Plan:

O&M:

SI No	Particulars	UOM	Quantity/month	Estimated Unit Rate(\$)	Amount per month (\$)
1	Electricity	Units	4000	0.14	571.43
2	Polymer	Kg	45	5.00	225.00
3	Operator	Person	2	357.14	714.29
Total					1510.71

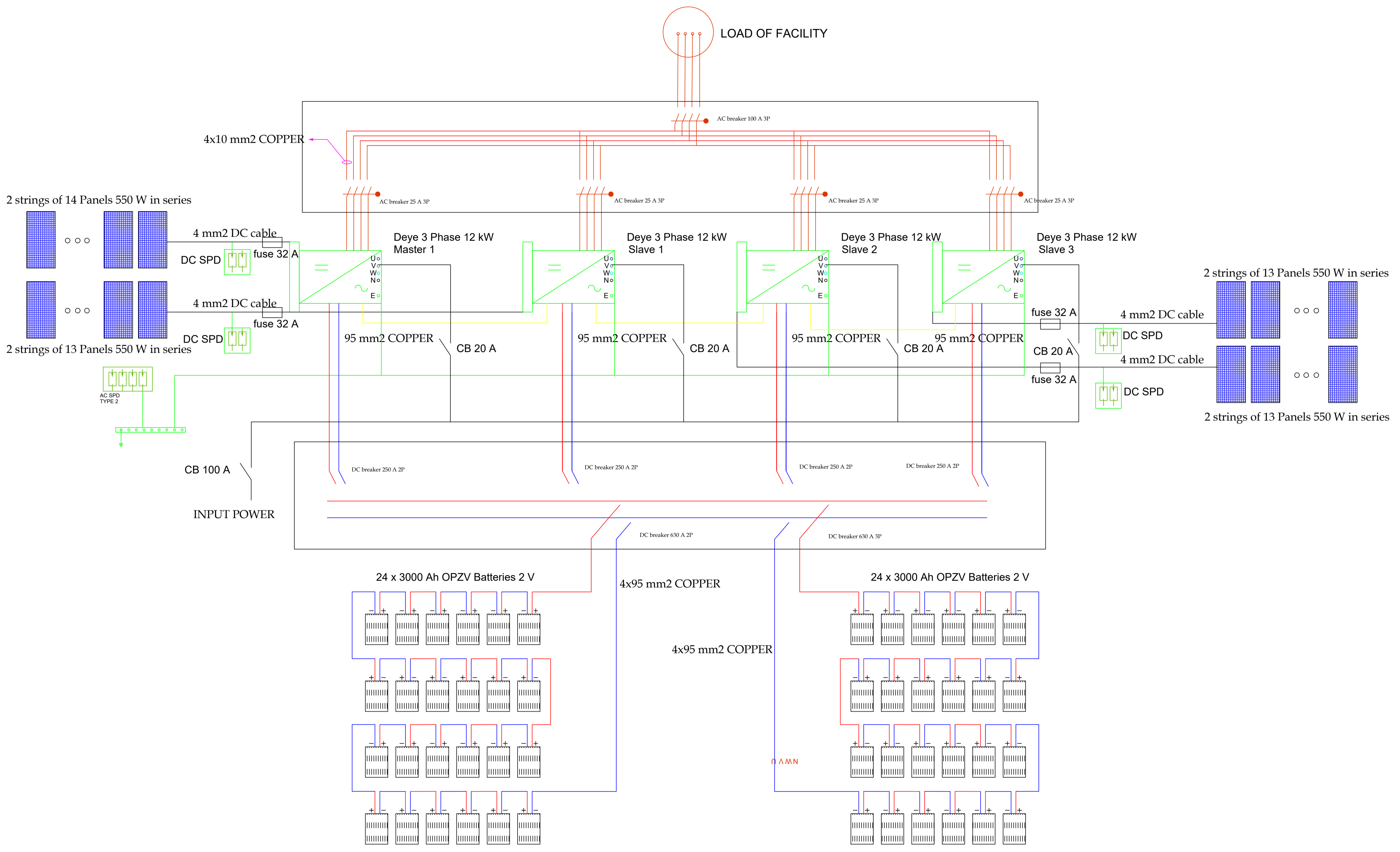
Total expenditure incurred during O&M period will be \$1510

Revenue from treated Sludge

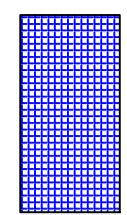
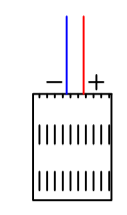
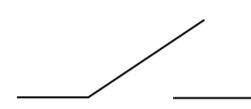
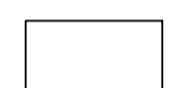
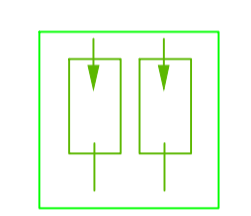
SI No	Particulars	UOM	Quantity/month	Estimated Unit Rate (\$)	Amount per month (\$)
1	Treated Solids	Kg	22500	0.029	642.86

Revenue from Treated solids will be \$642.86. So, additionally \$867 shall be spent monthly. From this half of the O&M Cost will be recovered by selling of treated solids.

If solar power is installed, then electricity cost can be saved on entirety.



Legend:

-  SOLAR MODULE 550 W
-  OPZV BATTERY 3000 AH
-  CIRCUIT BREAKER
-  DC FUSES
-  SURGE PROTECTION DEVICE

Shop Drawing

No.	Revision	Date
05		
04		
03		
02		
01		

FUNDED BY:



CONTRACTOR:



CONSULTANT:



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CONSTRUCTION SUBCONTRACTOR:

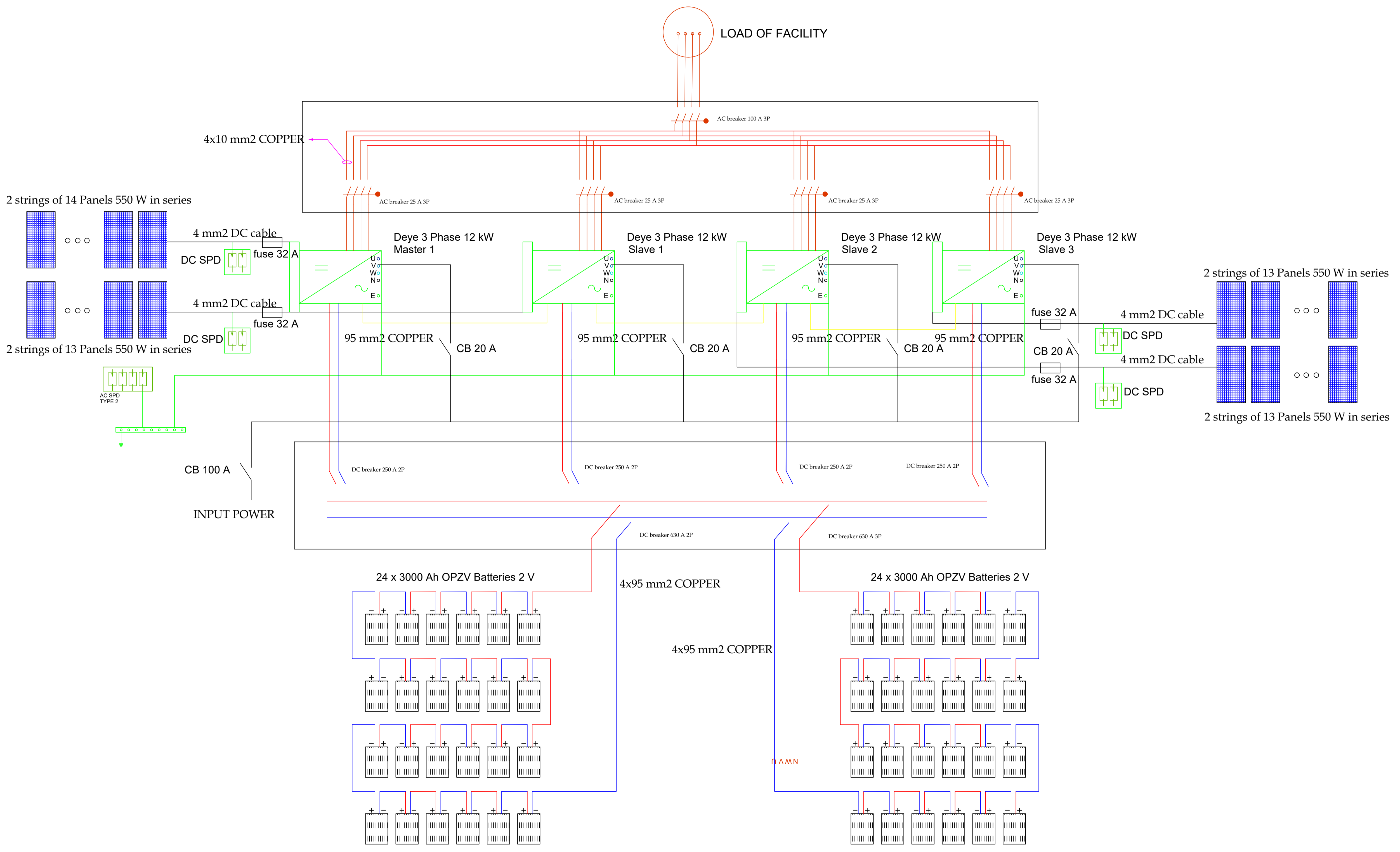
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PROJECT NUMBER:

DRAWING TITLE: SINGLE LINE DIAGRAM

DRAWN: K.E.	DESIGNED: K.E.	CHECKED: M.S.	APPROVED: J.H.
DATE: JAN 2023	SCALE: AS SHOWN	FORMAT: A1	

DRAWING No.: SSD-07 REV. : 0



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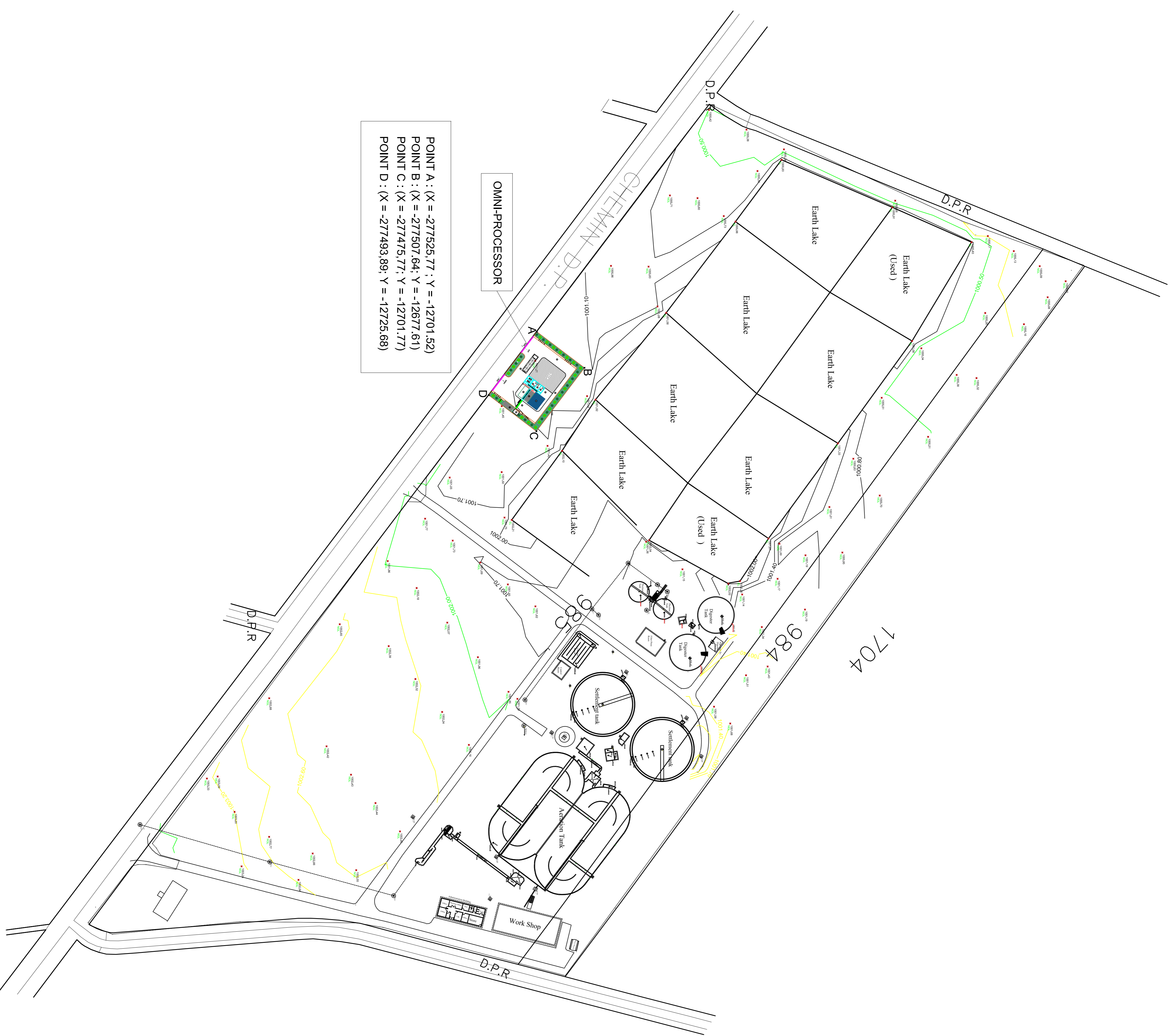
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NOTES:



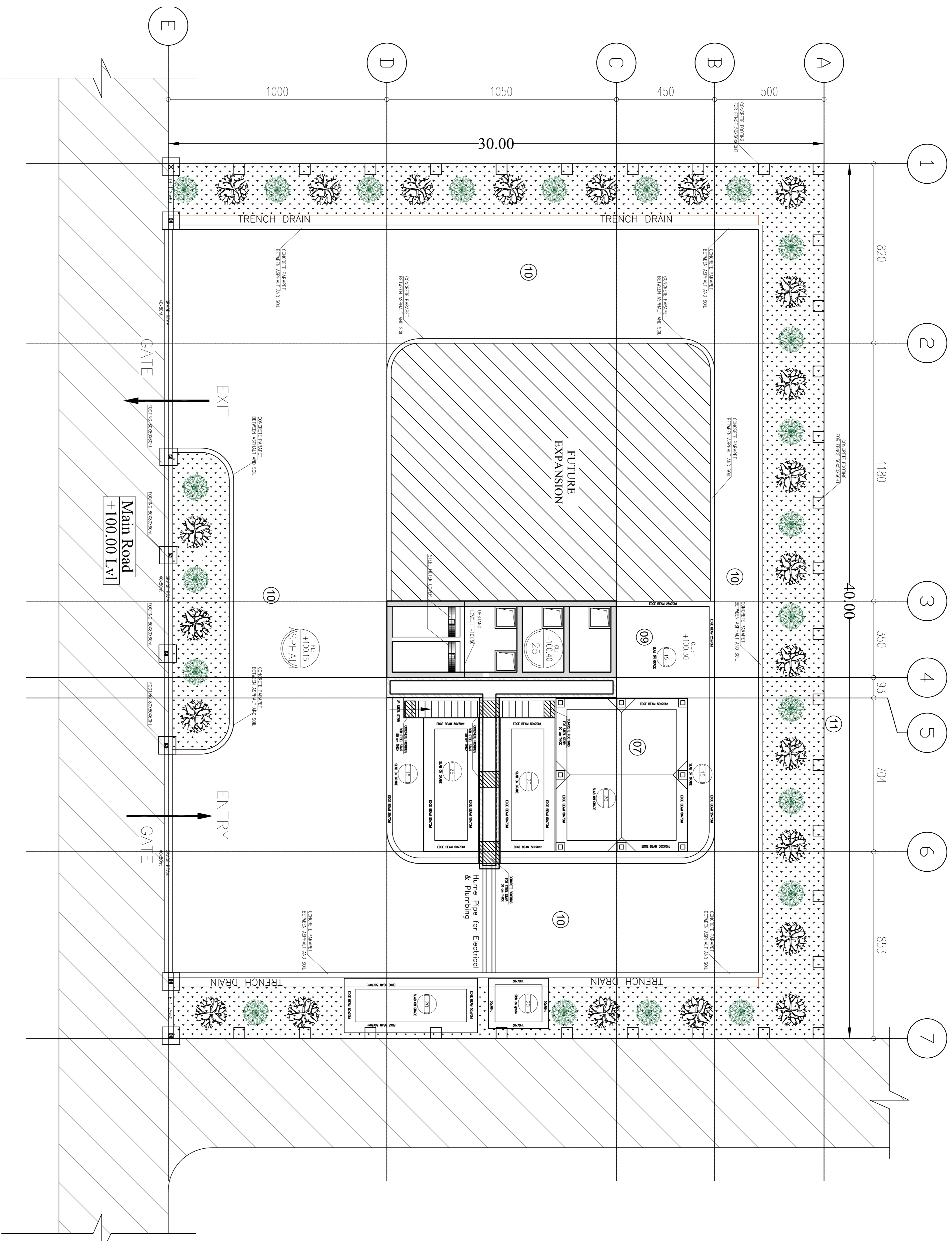
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 POINT B : (X = -277507.64; Y = -12677.61)
 POINT C : (X = -277475.77; Y = -12701.77)
 POINT D : (X = -277493.89; Y = -12725.68)

OMNI-PROCESSOR

			
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CIVIL WORKS FOR THE INSTALLATION OF THE OMNI PROCESSOR AT LAAT WWTP			
LAAT WASTEWATER TREATMENT PLANT		SITE LOCATION	
FILE OMN-LAAT	DESIGNED BY J.Y.	DRAWN BY R.CH.	CHECKED BY W.M.
DATE MARCH 2021	SCALE NOT TO SCALE	SHEET No. 1	DRAWING No. STR 01

No	Date	Desgn	Drawn	M.N.	CHK'd	Z.S.
00	30/03/2021	J.Y.	R.CH.			Appr'd
Rev.						

REPUBLIC OF LEBANON



LIST OF COMPONENTS:-

1	Septage Receiving Station
2	Holding Tank 45kl Capacity
3	Filtrate Tank
4	Treated Water Tank
5	Plant Building (G+1)
6	Waste Water Treatment
7	Material Storage Shed
8	Office Container
9	Plant Building Platform
10	Road
11	Compound Wall
12	Toilet

NO	Date	J.Y.	Desgn	R.CH.	D.wrt	M.M.	CHK'd	Z.S.
00	30/03/2021	J.Y.		R.CH.		M.M.		Z.S.
Rev.								Appr'd

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CIVIL WORKS FOR THE INSTALLATION
 OF THE OMNI PROCESSOR AT IAAT WTP

IAAT WASTEWATER TREATMENT PLANT	KEY PLAN
---------------------------------------	----------

FILE	DESIGNED BY	DRAWN BY	CHECKED BY
OMN-IAAT	J.Y.	R.CH.	W.M.

DATE	SCALE	SHEET No.	DRAWING No.
MARCH 2021	1/100	1	STR 02

UNICEF

Installing Solar Energy for IAAT OMNI PROCESSOR Plant

OPERATION AND MAINTENANCE FILE



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UAE
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5th Round About
Abu Dhabi - United Arab Emirates

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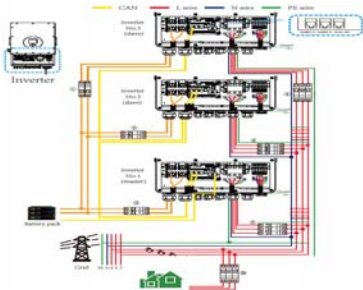
Introduction

The system shall consist of a 58 kWp off-grid PV system to be installed at the premises of the Waste Water Plant at IAAT. The PV generator shall be installed in the described land adjacent to the OMNI processing unit on mounting structures with optimal orientation to ensure highest yields. PV inverters shall be installed to convert the DC PV power into usable AC currents while ensuring the charging and discharging of the dedicated battery bank that shall provide supportive power during solar irradiation hours and act as complete back up power during hours of no solar yield.

The system shall be capable of operating in complete off-grid mode when no other sources are available to feed the loads, however should also be capable to connect to auxiliary energy sources case available for charging purposes. The system shall use solar power as the primary source of energy for feeding the loads and battery charging where any available auxiliary power is used only as back up. The system shall perform the below basic functions:

- Solar generation and load supply
- Battery charging and discharging
- Connectivity to auxiliary sources for feed in and charging
- Generation of both active and reactive power
- Remote monitoring over the internet

Schematic Diagram



Load Consumption

Omni Processor Load Profile

Source	Equipment	Powering	Control	Operation	Usage	Operation	Usage	Operation	Usage
Production	1	Indigam	Indigam 200	13	1	24h/24h	1	24h/24h	1
	2	Boiling water	Indigam 200	11	3	24h/24h	3	24h/24h	3
	3	Generator 400	Indigam 200	11	1	24h/24h	1	24h/24h	1
	4	Water pump	Indigam 200	11	3	24h/24h	3	24h/24h	3
	5	Water pump	Indigam 200	11	1	24h/24h	1	24h/24h	1
	6	Water pump	Indigam 200	11	3	24h/24h	3	24h/24h	3
	7	Water pump	Indigam 200	11	1	24h/24h	1	24h/24h	1
	8	Indigam	Indigam 200	11	1	24h/24h	1	24h/24h	1
	9	Water	Indigam 200	11	3	24h/24h	3	24h/24h	3
	10	AC	Indigam 200	11	1	24h/24h	1	24h/24h	1
Production	11	Water	Indigam 200	11	3	24h/24h	3	24h/24h	3
	12	Water	Indigam 200	11	3	24h/24h	3	24h/24h	3
	13	Water	Indigam 200	11	3	24h/24h	3	24h/24h	3
	14	Water	Indigam 200	11	3	24h/24h	3	24h/24h	3
	15	Water	Indigam 200	11	3	24h/24h	3	24h/24h	3
	16	Water	Indigam 200	11	3	24h/24h	3	24h/24h	3
	17	Water	Indigam 200	11	3	24h/24h	3	24h/24h	3
	18	Water	Indigam 200	11	3	24h/24h	3	24h/24h	3
	19	Water	Indigam 200	11	3	24h/24h	3	24h/24h	3
	20	Water	Indigam 200	11	3	24h/24h	3	24h/24h	3

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Safety concerns

Employers should consider these unique safety concerns when developing procedures for working safely with PV installations.

Electric shock

Electric shock is the primary hazard for firefighters. An array of multiple panels can produce direct current and voltages above 600 volts. Firefighters may come in contact with damaged panels or energized exposed wiring during firefighting or ventilation operations.

Battery storage areas are another potential source of electric shock.

Arcing fault

A PV system generates direct current. An arcing fault from direct current is more intense and sustained than that from alternating current. An arcing fault is a high power discharge that could result from the unexpected contact of electrical components. In addition, the value of arcing fault current may be too low for the required circuit protective devices to operate. This creates additional fire hazards unique to these systems.

Other hazards

Solar PV systems add additional weight to the roof of a building, which may pose a structural concern. This may require alternative ventilation tactics, particularly where roof joists have been compromised by fire.

Power cables and PV panels pose trip and slip hazards for roof operations.

PV panels exposed to fire can produce toxic and carcinogenic combustion products. Battery storage areas can generate corrosive/explosive gases when exposed to fire.

5

Introduction

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Fire fighting safety precautions

When developing procedures for dealing with fires in buildings with solar PV systems, employers should consider the following:

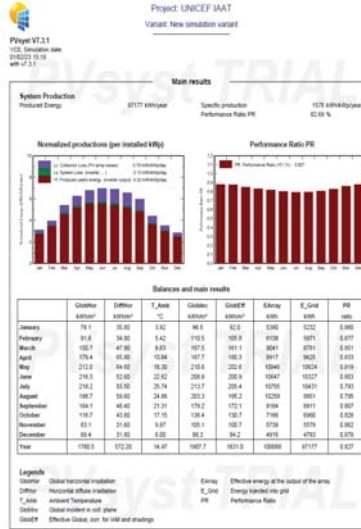
- assume the solar PV array is energized at all times
- inform the incident commander immediately upon identifying the presence of a solar PV system
- remember that securing the main electrical panel, inverter and PV's "Utility Disconnect" switch will not shut down the solar PV system—when exposed to sufficient light, electricity will continue to be generated by the PV system
- stay away from the panels and conduit
- do not cut into, remove, or walk on the solar PV system
- wear appropriate personal protective equipment including self-contained breathing apparatus
- contact the local utility provider to assist with cutting power sources

Omni Processor Daily Energy Need

Daily Energy Need of Omni Processor				Solar Production (Omni Processor)					
#	kWh	Load	No. of Operations	kWh/Day	Month	kWh/Day	kWh/Day Needed	kWh / Day Difference	% from Solar
1	1.9	1	1	1.9	January	175	176	1	41%
2	1.1	1	1	1.1	February	199	176	227	53%
3	1.4	1	1	1.4	March	255	176	83	78%
4	1.1	1	1	1.1	April	321	176	145	85%
5	1.1	1	1	1.1	May	354	176	178	94%
6	1.1	1	1	1.1	June	344	176	168	92%
7	1.1	1	1	1.1	July	348	176	172	92%
8	1.1	1	1	1.1	August	312	176	136	88%
9	0.8	1	1	0.8	September	287	176	111	79%
10	0.7	1	1	0.7	October	242	176	64	62%
11	1.1	1	1	1.1	November	198	176	22	69%
12	1.1	1	1	1.1	December	176	176	0	62%
TOTAL kWh				176					

6

Solar Estimated Production



Operation and Maintenance Procedure

OPERATION AND MAINTENANCE FOR SOLAR OFF GRID PROJECT

Prior to performing any maintenance, follow shut down procedures as specified in your system manual.

The typical SPS will include:

- PV array of modules;
- Battery bank;
- Balance of system (BOS) equipment—including inverter, regulator(s), system wiring;

These sections cover the maintenance requirements for these components which includes the complete system integrity.

A. Array Maintenance

For activities involving working around or touching modules the array should be disabled by covering modules or opening the array disconnect.

General Activities:

- PV Module inspection
- Module Cleaning
- Debris removal
- Shade control / soiling

✓ PV module inspection

Inspect PV modules for defects that can appear in the form of burn marks, discoloration, delamination, or broken glass

✓ Module Cleaning

Module cleaning is a simple but important task. It can produce significant and immediate benefits in terms of energy yield. The frequency of module cleaning will depend on local site conditions and the time of the year.

Washing Modules:

- De-ionized water is preferred to prevent spotting and calcium build-up.
- Normal water pressure of 30 to 70 pounds per square inch is recommended; do not use high pressure washers.
- If high pressure washers are necessary, hold the pressure source far enough away from the modules to prevent damage. As a rule of thumb, if the stream is too strong to comfortably hold one's hand in, it is too much pressure for the modules.
- Spray the modules with water.
- Use a soft-bristled brush to get stubborn dirt off.
- If needed, use a non-damaging soap.
- If needed, squeeze modules dry.

Note: it is preferable to wash the module at the early morning.

✓ Debris Removal

Any leaves, trash or other debris that collects around PV arrays should be removed during routine maintenance.

These materials can present a fire hazard, as well as a problem for proper drainage and can lead to mildew and insect problems that can ultimately lead to degradation of wiring systems or other components.

✓ Shade control / soiling

Because of relatively small amount of shading can significantly reduce array output, any conditions that contribute to increased shading of PV arrays should be evaluated during routine maintenance. Trees and vegetation present ongoing shading concerns and may require trimming and maintenance to prevent excessive array shading

Perform Corrective Actions:

- Replace faulty components
- Defective modules
- Frayed wires
- Blown fuses
- Locate and repair ground faults
- Locate and repair line to line faults
- Mitigate negative local conditions
- Clean arrays, heat sinks, and other equipment
- Seal compromised weatherproofing systems
- Clean and replace system labelling

Verify Corrective Actions:

- Reset system operations, electrical parameters, and environmental conditions
- Compare pre- to post-maintenance values
- Retest weatherproofing system
- Re-orient customer to system

B. Electrical Equipment Maintenance

✓ Verify Inverter Servicing

Generally, inverter faults are the most common cause of system downtime in PV power plants.

Therefore, a scheduled maintenance schedule of inverters will be treated as centrally important part of the O&M plan.

The annual preventive maintenance for an inverter should include:

- Visual inspections.
- Cleaning/replacing cooling fan filters.
- Removal of dust from electronic components.
- Perform a visual inspection of the interior and exterior of the inverter. Look for signs of water, rodent, or dust intrusion into the inverter.
- Tightening of any loose connections. Manufacturer-Specific Inverter Inspection
- Record and validate all voltages and production values from the inverter.
- Record last logged system error.
- Clean filters.
- Check gasket seal.
- Clean the inside of the cabinet.
- Check breakers
- Check torque on terminations.
- Check continuity of system ground and equipment grounding.
- Confirm warning labels are in place.
- Look for discoloration from excessive heat build-up.
- Check integrity of lightning arrestors.
- Check mechanical connection of the inverter to the wall or ground.
- Check internal disconnect operation.
- Contact installer and/or manufacturer about any issues found.

✓ Verify Combiner Box Servicing

- All junction boxes or string combiner boxes should be checked periodically for water ingress, dirt or dust accumulation and integrity of the connections within the boxes. Loose connections could affect the overall performance of the PV plant. Any accumulation of water, dirt or dust could cause corrosion or short circuit within the junction box.
- Open combiner boxes and check for torque of the connections. Look for debris inside the boxes and any evidence of damaging water intrusion. Look for discoloration on the terminals, boards, and fuse holders.

✓ Verify Equipment Grounding

Check for ground erosion near the footings of a ground mount system

- Inspect Wiring Connections
- Ensure that the module wiring is secure and not resting on the roof, hanging loose and exposed to potential damage, bent to an unapproved radius, or stretched across sharp or abrasive surfaces
- Confirm proper system signage is in place;
- Confirm electrical enclosures are only accessible to authorized personnel, are secured with padlocks or combination locks, and have restricted access signage;
- Check for loose hanging wires in the array

✓ Structural Integrity

- Confirm appropriate expansion joints are used where needed in long cable trays
- Inspect cable trays for proper support, bushings, and connection joints, where needed.
- Check the integrity of the roof penetrations
- Check Inspect Inverter Mounting Structural Integrity
- Check for corrosion on the outside of enclosures and the racking system
- Ensure roof drainage is adequate, roof drains are not clogged, and confirm that there are no signs of water pooling in the vicinity of the array

Unscheduled Maintenance

Unscheduled maintenance is carried out in response to failures. As such, the key parameter when considering unscheduled maintenance is diagnosis, speed of response and repair time. Common unscheduled maintenance requirements include:

- Tightening cable connections that have loosened.
- Replacing blown fuses.
- Rectifying SCADA faults.
- Repairing mounting structure faults.
- Rectifying tracking system faults.

System Troubleshooting

Troubleshooting a PV system usually means:

- A load does not operate properly or not at all;
- The inverter does not operate properly or not at all; or
- The array has low or no voltage or current.

A qualified electrician should check and correct electrical problems in a PV system, since homeowners are unlikely to be qualified to perform such work.

Load Problem

The first step is to check all switches. Are they turned off, or in the wrong position? If so, turn them on or put them in the correct position. Also check to see that the load is plugged in. With a voltmeter, check to see that the proper voltage is present at the load's connection. Next check the fuses and circuit breakers. Are there blown fuses or tripped breakers? If so, locate the cause and fix or replace the faulty component. If there are no blown fuses or tripped breakers and the load is a motor, an internal thermal breaker may be tripped or there may be an open circuit in the motor. Plug in another load and note its operation.

Check for broken wires and any loose connections. Clean all dirty connections and replace all bad wiring. With the power off, check for and repair any ground faults. Replace the fuses and reset the switches. If they blow or trip again, there is a problem short, which must be located and repaired. If the load does not operate properly, check the system's voltage at the load's connection. Low voltage could mean that the wire feeding the circuit is too small and too long and needs to be upgraded to reduce the voltage drop. The load also could be too large for the wire size in the circuit. Reduce the load on the circuit or run larger wire that is sized for the current load.

Inverter Problem

A lack of power output from the inverter could be caused by a blown fuse, tripped breaker, a broken wire, a ground fault, or any of the inverter's internal disconnects (high and low voltage and current).

The load on the inverter may have too high of a current demand. Reduce the loads or replace the inverter with one with a larger output. With the power off, check for and repair any ground faults before starting the inverter again. The utility's voltage and frequency are sensed by the inverter, which normally produces AC electricity at the same voltage and frequency. The AC current output from the inverter fluctuates with the level of solar insolation on the array. Low or high utility voltage sensed by the internal disconnects will cause the inverter to shut down. Contact the utility to correct the problem on its side. Inverter problems could also be caused by a problem on the array side of inverter that trips one of the internal disconnects.

Array Problem

Prior to getting on the roof, check and record the inverter's input voltage and current level from the array. If the array is not producing DC electricity, check all switches, fuses, and circuit breakers. Replace blown fuses and reset the breakers and switches. A spurious surge may have passed through, tripping or blowing the protective devices. Check for broken wires and loose or dirty connections in the inverter. Replace all damaged wires and clean and tighten all connections. Visually check the array for obvious damage to the modules and wiring. Repair as needed and replace all damaged wiring. Remove the fuses and then check and record the open-circuit voltage and current reading for each circuit string. Defective blocking or bypass diodes in the modules may need to be replaced. Low voltage also could be caused by the wrong wiring connecting the modules in the string to the junction box or combiner box or the inverter. The wiring could be either sized too small or the wire run is too long for the string's output current level. Upgrading the wire size for the current level should correct this problem. Low current output could be caused by cloudy conditions, a defective blocking or bypass diode, a damaged module, one or more parallel connections between modules in the string is broken, loose, or dirty, or some parallel connections the module are broken, loose, or dirty. Replace a damaged module or one with internal parallel connection problems. Replace defective diodes and clean and tighten all connections. Some of the array may be shaded, significantly reducing the array's current output. Remove the shade source to regain the string's full current output.

Maintenance Plan

Task	As Required	Quarterly	Semi-annually
Inspect modules for damage			✓
Address shading issues	✓		
Remove debris	✓		
Inspect mounting system			✓
Check inverter		✓	
Inspect/clean electrical equip.		✓	
Monitor system volts & amps	✓		

Maintenance of battery banks

Before you start

Before you start with your maintenance, ensure all safety equipment is at hand and ready to use. Listed below is typical equipment you will need for these maintenance tasks safely and correctly.

Safety equipment:

- Container with clean distilled water to rinse hydrometer and thermometer.
- Handheld voltmeter or multimeter – for checking battery voltage.

Checking your batteries

As part of regular maintenance, a thorough visual inspection of the battery bank is required. This inspection should include:

- Cleanliness of batteries;
- Level of electrolyte,
- Condition of battery terminals;
- Battery voltage level.
- Condition of battery containers

Checking the voltage

The table below lists typical voltage levels that indicate whether the state of charge is good or bad for the battery bank. This table is valid when the batteries are at rest, (i.e. no charge or discharge is occurring). This table should only be used as a guide and for accurate charge levels the specific gravity of each cell should be tested, where available. The table below is typical of flooded wet cell batteries at 25°C. At higher or lower temperatures, correction should be made using temperature correction factors from your battery specifications. If you have gel cell batteries, you can only check the battery specifications from the manufacturer for an indication of state of charge for various voltage levels.

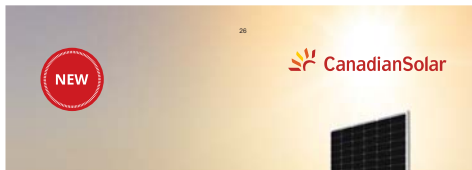
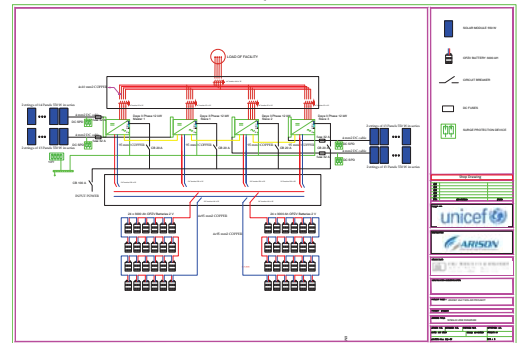
Nominal Voltage	Bad	Time to start economizing or using backup charger	Good	Caution (depending on battery - see notes)
2V	<13.8	3-9:20	22.2	>22.4
12V	<13.4	33-4:32	12.13-2	>14.4
24V	<26.8	22-8:24	24.26-4	>28.8
48V	<53.6	45-8:48	48.52-8	>57.6

Note: Some batteries have an equalization or boost charge of 2.5V per 2V cell.

Battery bank log sheet

	Date	Date	Date
Name			
Battery voltage			
Ambient temperature			
Cell 1			
S/G			
Electrolyte temperature			
Corrected SOC			
Cell volts			
Water used in litres			
Cell n			
S/G			
Electrolyte temperature			
Corrected SG			
Cell volts			
Water used in litres			
Interconnections OK?			
Battery cases OK?			

Single Line Diagram



Technical Proposal for Solar panel (CANADIAN PANEL 550 W)

HiKu6 Mono PERC
525 W ~ 550 W
CS6W-525 | S30 | S35 | S40 | S45 | S50MS

MORE POWER

- Module power up to 550 W
- Module efficiency up to 21.5%
- Up to 4.5% lower LCOE
- Up to 5.4% lower system cost
- Comprehensive LID / LATE mitigation technology, up to 50% lower degradation
- Compatible with mainstream trackers, cost effective product for utility power plant
- Better shading tolerance

MORE RELIABLE

- Minimizes micro-crack impacts
- Heavy snow load up to 5400 Pa, wind load up to 2400 Pa*

12 Enhanced Product Warranty on Materials and Workmanship*

25 Year Power Performance Warranty**

** year power degradation no more than 2% Subsequent annual power degradation no more than 0.55%

*According to the applicable Canadian Solar Limited Warranty Statement.

MANAGEMENT SYSTEM CERTIFICATES*

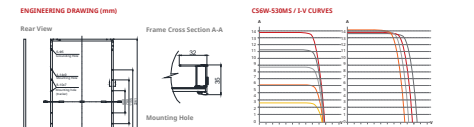
- ISO 9001:2015 / Quality management system
- ISO 14001:2015 / Standards for environmental management system
- ISO 45001:2018 / Standards for occupational health & safety

PRODUCT CERTIFICATES**

- IEC 61215 / IEC 61730 / IEC 62109
- IEC 61730 / IEC 62109
- UN977 Hazards Free Class 1 Take-away

* The specific certificates applicable to different models apply to modules only, and therefore not all of the certifications listed below will automatically apply to the product line as a whole. Please contact your local Canadian Solar sales representative to obtain the specific certificates available for your Product and applicable in the regions in which the products will be used.

** CSI Solar Co., Ltd. is committed to providing high quality solar products, solar system solutions and services to customers around the world. Canadian Solar was recognized as the No. 1 module supplier for quality and performance ratio in the IHS Module Customer Insight Survey, and is a leading PV project developer and manufacturer of solar modules, with over 50 GW deployed around the world since 2001.



Electrical Data STC*	Electrical Data NIMPT*	Mechanical Data	Temperature Characteristics
CSW	CSW	Specification	Specification
Nominal Max. Power (Pmax)	392 W 396 W 400 W 403 W 411 W	Cell Type	Mono-crystalline
Opt. Operating Voltage (Vmp)	38.2 V 38.4 V 38.6 V 38.8 V 39.0 V	Cell Arrangement	144 (2x12x18)
Opt. Operating Current (Imp)	10.33 A 10.37 A 10.42 A 10.45 A 10.48 A 10.5 A	Dimensions	2261 x 1134 x 35 mm
Open Circuit Voltage (Voc)	48.8 V 48.9 V 49.2 V 49.4 V 49.5 V	Weight	22.9 (16.1 LBS)
Short Circuit Current (Isc)	11.07 A 11.1 A 11.13 A 11.15 A 11.18 A 11.2 A	Front Cover	3.2 mm tempered glass
Module Efficiency	20.5% 20.7% 20.9% 21.1% 21.3% 21.5%	Frame	Anodized aluminum alloy
Operating Temperature	-40°C ~ +45°C	i-Box	IP68, 3 bypass diodes
Max. System Voltage	1500V (IEC61683) or 1000V (IEC61730)	Cable	4 mm² (IEC), 12 AWG (UL)
Module Fire Performance	TYPE 1 (UL 61730) or TYPE 2 (UL 61730)	Cable Length	450 mm (16.1811") ± 20mm (1.14") (Including Connector Pin) or customized length*
Max. Series Fuse Rating	25 A	Connector	15 series or 144 IPE or 144 EVO2
Application Classification	Class A	Per Panel	30 pieces
Power Tolerance	0 ~ +10 W	Per Connector (40°) 600 pieces	
			* For detailed information, please contact your local Canadian Solar sales and technical representative.

Electrical Data STC*	Electrical Data NIMPT*	Mechanical Data	Temperature Characteristics
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Nominal Max. Power (Pmax)	392 W 396 W 400 W 403 W 411 W	Cell Type	Mono-crystalline
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Module Efficiency	20.5% 20.7% 20.9% 21.1% 21.3% 21.5%	Frame	Anodized aluminum alloy
Operating Temperature	-40°C ~ +45°C	i-Box	IP68, 3 bypass diodes
Max. System Voltage	1500V (IEC61683) or 1000V (IEC61730)	Cable	4 mm² (IEC), 12 AWG (UL)
Module Fire Performance	TYPE 1 (UL 61730) or TYPE 2 (UL 61730)	Cable Length	450 mm (16.1811") ± 20mm (1.14") (Including Connector Pin) or customized length*
Max. Series Fuse Rating	25 A	Connector	15 series or 144 IPE or 144 EVO2
Application Classification	Class A	Per Panel	30 pieces
Power Tolerance	0 ~ +10 W	Per Connector (40°) 600 pieces	
			* For detailed information, please contact your local Canadian Solar sales and technical representative.



LIMITED WARRANTY STATEMENT PHOTOVOLTAIC HDM MODULE PRODUCTS

Effective January 1st, 2020

This Limited Warranty Statement applies only to Canadian Solar Inc. ("Canadian Solar") HDM (Including HDM) module products ("Products").

This Limited Warranty Statement does not apply to Products sold and installed in Australia, Japan, and P.R. China.

FIFTEEN (15) YEAR LIMITED PRODUCT WARRANTY

Subject to the exclusions contained herein, Canadian Solar warrants to the original buyer (the "Buyer") of the Products that the Products shall be free from defects in materials and workmanship which have an effect on Products functionality under normal application, installation, use, and service conditions as specified in Canadian Solar's standard product documentation such as the installation manual and/or annexes.

Claims under this warranty will only be accepted if the Buyer can prove that the malfunctioning or non-conformity of the Products results exclusively from defects in materials and/or workmanship under normal application, installation, use and service conditions specified in Canadian Solar's standard product documentation. This Limited Product Warranty does not warrant a specific power output of the Products, which shall be exclusively covered under the Limited Performance Warranty elaborated below.

TWENTY-FIVE (25) YEAR LIMITED PERFORMANCE WARRANTY

Canadian Solar warrants that for a period of twenty-five years the Products will maintain a level of performance as set forth below:

- During the first year, Canadian Solar warrants the actual power output of the Products will be no less than 93.5% of the labeled power output.
- From year 1 to year 25, the actual annual power decline will be no more than 0.6% by the end of year 25, the actual power output will be no less than 83.1% of the labeled power output.

The actual power output of the Products shall be determined for verification using Standard Testing Conditions only. The actual power output measurement is either carried out by a Canadian Solar facility or by a Canadian Solar recognized third-party testing institute. Testing equipment uncertainty will be applied to all actual power output measurements.

WARRANTY EFFECTIVE DATE

The effective date of the warranties provided herein shall be the date of installation or ninety (90) days after delivery by Canadian Solar to the Buyer, whichever date is earlier.

EXCEPTIONS

The limited warranties set forth herein **DO NOT** apply to any Products: 1) for which Canadian Solar has not received all or part of the due payments from the Buyer; 2) which have been subject to negligent or intentional transportation, handling, storage or use; 3) which have been repaired without Canadian Solar's authorization or in any way tampered with; 4) which have been subject to extraordinary salt or chemical exposure; 5) which have been subject to improper installation, application, alteration, unauthorized service, or improper system design which caused constant shading to the Products; 6) which have been subject to power failure or surges, flood, fire, direct or indirect lightning strikes, or other acts of nature; 7) which have been subject to accidental breakage, vandalism, explosions, acts of war, or other events outside Canadian Solar's control; or 8) which have been moved from its original installation location.

In addition, the limited warranties do not apply to any deterioration in the appearance of the Products (including, without limitation, any scratches, stains, rust, discoloration, or mold) or any other changes to the Products in appearance stemming from the normal wear and tear over time of product materials. Also, no warranty claim may be made if the product label, type or serial number of the applicable Products has been altered, removed or made illegible.

REMEDIES

In respect of the Fifteen (15) Year Limited Product Warranty, if Canadian Solar verifies in its reasonable judgment that the Products fail to conform to the terms of the Limited Product Warranty set forth herein, Canadian Solar, at its option, will provide one of the following remedies: 1) repair the Products; 2) replace the Products with new products whose labeled power wattages equal to or exceed the Warranted Wattages of replaced Products; the Warranted Wattages is defined as the contracted power wattages of the Products minus the permissible accumulated degradation; or 3) provide a refund of the fair market value of the Products assessed based on the Warranted Wattages at the time of claim.

In respect of the Twenty-Five (25) Year Limited Performance Warranty, if Canadian Solar verifies in its reasonable judgment that the Products fail to conform to the terms of the Limited Performance Warranty set forth herein, Canadian Solar, at its option, will provide one of the following remedies: 1) repair the Products; 2) replace the Products with new products whose labeled power wattages equal to or exceed the Warranted Wattages of replaced Products; 3) provide additional Products to make up the wattage difference between the actual measured power output wattages of the Products and the Warranted Wattages; or 4) provide a refund of the fair market value of the wattage difference between the actual measured power output wattages and the Warranted Wattages.

All remedies under this limited warranty statement shall be calculated based upon the Warranted Wattages of the Products at the time of first reporting of the warranty claim.

Canadian Solar will not accept any return of Products without Canadian Solar's prior authorization. Once accepted, Canadian Solar will cover reasonable transportation costs (except for insurance, any taxes, duties, demurrage, or any other costs and expenses related to custom clearance or Buyer's failure to cooperate) for shipping the Products under a claim back from the Buyer to a designated location of Canadian Solar, and for shipping the additional, repaired or replacement Products to the original installation location. If Canadian Solar opts for repair as the remedy, Canadian Solar shall cover reasonable material and labor costs related to the repair. In any event, the costs and expenses for the removal, installation, and/or reinstallation of the Products, including fees, taxes, or other financial duties due in relation to any applicable electronic waste disposal regulation, shall remain with the Buyer, unless otherwise agreed to by Canadian Solar in a signed writing. Canadian Solar will not pay any cost of any fees, taxes, or other financial duties imposed on the remedies implemented by Canadian Solar or imposed on the Products subject to such remedies, that are due to regulatory, government or judicial decisions not existing at the time of purchase of the affected Products.

Any repair or replacement of the affected Products shall not increase the applicable warranty period. The warranty period for replaced or repaired Products is the remainder of the warranty for the affected Products. Canadian Solar

reserves the right to deliver a similar product (of similar size, color, shape, and/or power output) in replacement of the affected Products if production of the affected Products is discontinued or such product is otherwise unavailable. Unless instructed by Canadian Solar otherwise, Buyer shall dispose of Products in accordance with all local applicable regulations on electronic waste treatment and disposal at its own cost. Products having been replaced shall not be sold, reworked or resold in any way, unless expressly authorized by Canadian Solar.

EXCEPT AS OTHERWISE PROVIDED BY APPLICABLE LAW, THE FOREGOING REMEDIES STATE CANADIAN SOLAR'S SOLE AND EXCLUSIVE OBLIGATION AND THE BUYER'S SOLE AND EXCLUSIVE REMEDY FOR A BREACH OF THE FOREGOING LIMITED WARRANTIES.

CLAIM PROCESS

If the Buyer believes that it has a justified claim covered by the limited warranties set forth above, then the Buyer shall submit such claim in writing without undue delay, with supporting information including but not limited to the claimed quantity, serial numbers, purchasing invoices and profit, to Canadian Solar within the applicable warranty period specified above to the following address, or such future address as Canadian Solar may provide from time to time:

Asia Pacific
 Canadian Solar Inc.
 Customer Service Department
 199 Luchan Road, Suzhou New District Jangsu
 China, 215129
 Tel: +86 512 6998088
 E-mail: service.asia@canadiansolar.com

Americas
 Canadian Solar Inc.
 Customer Service Department
 3000 Oak Road, Ste. 400 Walnut Creek, CA 94597
 Tel: +1 855 315 8915
 E-mail: service.ca@canadiansolar.com

Europe, Middle East & Africa
 Canadian Solar PMS GmbH
 Customer Service Department
 Landshöher Strasse 94, 80339 Munich, Germany
 Tel: +49 89 5193689 0
 E-mail: service.emea@canadiansolar.com

Upon receipt of such written claim, Canadian Solar may seek further verification of the Buyer's claim of a breach of one of the foregoing limited warranties.

WARRANTY ASSIGNMENT

This Limited Warranty is transferable to a party taking legal title to the Products, provided that the Products remain installed in their original installation location.

DISPUTE RESOLUTION

In case of any dispute related to warranty claims, such dispute shall be referred to and finally resolved pursuant to the governing law clauses and dispute resolution procedures under the purchase agreement between the Buyer and Canadian Solar.

NOT INDEPENDENT WARRANTIES

The Buyer has the right to pursue claims under each of the warranties set forth above, provided that if claims arise under multiple limited warranties from a single defect, then if Canadian Solar determines that defects as set forth above, Canadian Solar shall be deemed to have resolved all applicable warranty claims arising from that defect.

DISCLAIMERS

THE LIMITED WARRANTIES SET FORTH HEREIN ARE IN LIEU OF AND EXCLUDE ALL OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR APPLICATION, AND ALL OTHER OBLIGATIONS ON THE PART OF CANADIAN SOLAR UNLESS SUCH OTHER WARRANTIES AND OBLIGATIONS ARE AGREED TO IN WRITING BY CANADIAN SOLAR. SOME JURISDICTIONS LIMIT OR DO NOT PERMIT DISCLAIMERS OF WARRANTY, SO THIS PROVISION MAY NOT APPLY TO THE BUYER IN SUCH JURISDICTIONS.

LIMITATION OF LIABILITY

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, CANADIAN SOLAR HEREBY DISCLAIMS, AND SHALL HAVE NO RESPONSIBILITY OR LIABILITY WHATSOEVER, FOR DAMAGE OR INJURY TO PERSONS OR PROPERTY OR FOR OTHER LOSS OR INJURY RESULTING FROM ANY CAUSE WHATSOEVER ARISING OUT OF OR RELATED TO ANY OF ITS PRODUCTS OR THEIR USE TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW UNDER NO CIRCUMSTANCES SHALL CANADIAN SOLAR BE LIABLE TO THE BUYER, OR TO ANY THIRD PARTY CLAIMING THROUGH OR UNDER THE BUYER, FOR ANY LOST PROFITS, LOSS OF USE, OR EQUIPMENT DOWNTIME, OR FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND, HOWSOEVER ARISING, RELATED TO THE PRODUCTS, EVEN IF CANADIAN SOLAR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, CANADIAN SOLAR'S AGGREGATE LIABILITY, IF ANY, IN DAMAGES OR OTHERWISE, SHALL NOT EXCEED THE PURCHASE PRICE PAID TO CANADIAN SOLAR BY THE BUYER FOR THE PRODUCT IN THE CASE OF A WARRANTY CLAIM.

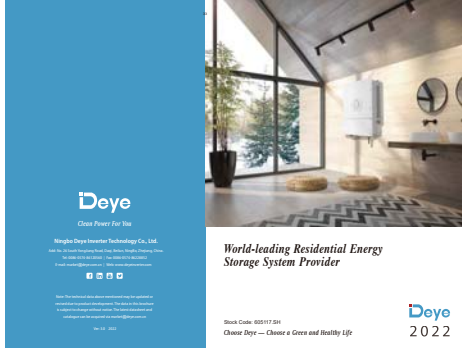
THE BUYER ACKNOWLEDGES THAT THE FOREGOING LIMITATIONS OF LIABILITY ARE AN ESSENTIAL ELEMENT OF THE AGREEMENT BETWEEN THE PARTIES AND THAT IN THE ABSENCE OF SUCH LIMITATIONS THE PURCHASE PRICE OF THE PRODUCTS WOULD BE SUBSTANTIALLY DIFFERENT. SOME JURISDICTIONS LIMIT OR DO NOT PERMIT DISCLAIMERS OF LIABILITY, SO THIS PROVISION MAY NOT APPLY TO THE BUYER IN SUCH JURISDICTIONS. SOME JURISDICTIONS DO NOT ALLOW LIMITATIONS ON THE EXCLUSION OF DAMAGES SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO THE BUYER IN SUCH JURISDICTIONS.

YOU MAY HAVE SPECIFIC LEGAL RIGHTS OUTSIDE THIS WARRANTY, AND YOU MAY ALSO HAVE OTHER RIGHTS THAT VARY FROM STATE TO STATE OR COUNTRY TO COUNTRY. THIS LIMITED WARRANTY DOES NOT AFFECT ANY ADDITIONAL RIGHTS YOU HAVE UNDER LAWS IN YOUR JURISDICTION GOVERNING THE SALE OF CONSUMER GOODS. SOME STATES OR COUNTRIES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE LIMITATIONS OR EXCLUSIONS IN THIS LIMITED WARRANTY STATEMENT MAY NOT APPLY TO YOU IN THOSE AREAS.

NOTE

In the event of any inconsistency among different language versions of this warranty statement, the English version shall prevail. For Products covered by Canadian Solar's limited warranty, please refer to our product lists published on our website at: <https://www.canadiansolar.com/downloads>, as such list is updated from time to time. The installation and handling of PV Products requires professional skills and should only be performed by qualified professionals. Please read the safety and installation instructions before using the Products.

Technical Proposal for ON/OFF Solar Inverter (Deye Brand)



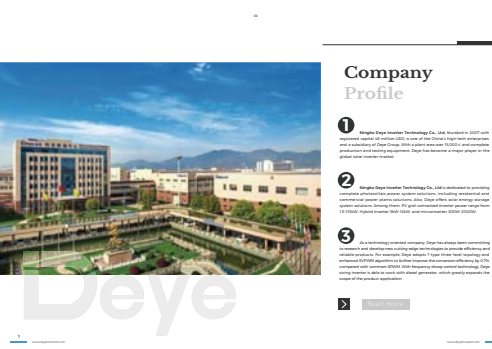
Deye
Clean Power for You

Hingde Deye Inverter Technology Co., Ltd.
 No. 368, Deyuan Road, Deyuan Town, Suzhou City, Jiangsu Province, P.R. China
 215129
 Tel: +86 512 6998088
 E-mail: service.asia@canadiansolar.com

World-leading Residential Energy Storage System Provider

Stock Code: 002173.HK
 China Deye - Clean & Core and Healthy Life

Deye
2022



Company Profile

- Hingde Deye Inverter Technology Co., Ltd. (hereinafter "Deye") was established in 2007 with registered capital of 100 million RMB, one of the China's top 1000 enterprises, and a subsidiary of Hingde Solar Energy Science and Technology Co., Ltd. (hereinafter "Hingde Solar") which is a public company listed on the Shanghai Stock Exchange.
- Hingde Deye Inverter Technology Co., Ltd. is dedicated to providing comprehensive energy storage solutions, including residential energy storage systems, industrial energy storage systems, and power generation systems. Deye has established a complete product line and a mature sales network.
- All technology-related consulting Deye has always been committed to providing comprehensive services to customers. Deye adheres to "User-oriented, innovation, and continuous improvement" as its corporate philosophy, and has established a mature R&D system and a complete IPMA. We have always been committed to providing high-quality products and services.



Milestones

- 2021: Deye's gross sales remarkably exceed 1 billion in 2021, break down 881.72M.
- 30,000 pcs +: 4 core patents for battery charging/discharging.
- 2017: Deye has launched first generation Hybrid Inverter and attracted 100+ of different size generation Hybrid Inverter, High Voltage, High Current technology and better DC/DC topology etc.
- 2007: Founded in 2007 with registered capital of 40 million RMB.

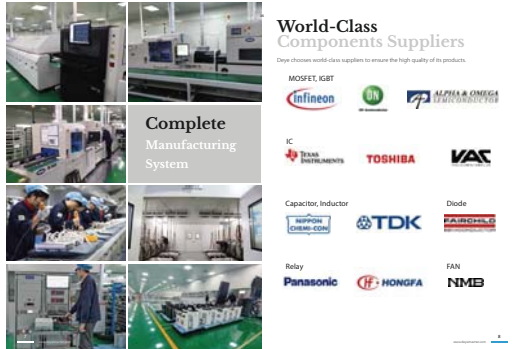


Core Technology

Deye hybrid inverter 3-50kW with 208/230/240/400Vdc

- 4 Automatic switching time limits
- 6 Core patents for battery charging/discharging
- 16 V/F deceleration, Max. Regen in parallel
- 24 Successively output generated to charge battery directly including system energy supply 7/24hrs
- 95.5 Max. generation efficiency of 95.5%
- 240 Max. battery charge efficiency of 95.5%
- 240 Max. charging/discharging current of 240A

Complete | Designer | User-friendly | Safety



World-Class Components Suppliers

Deye chooses world-class suppliers to ensure the high quality of its products.

Complete Manufacturing System

Capacitor, Inductor, Diode, Resistor, MOSFET, IGBT, Infineon, TOSHIBA, VAC, Panasonic, HONGFA, NMB

Deye Inverter Portfolio



Three Phase Hybrid Inverter

SUN-5/6/8/10/12K-SG04LP3-EU



- 1. With intelligent color LED status. More detailed in MPPT controller.
- 2. On-grid and AC load can be directly online.
- 3. Main can operate in on-grid and off-grid. Support backup generator connection.
- 4. Max. charging efficiency control of 20kV.
- 5. MPPT charging battery, 6-battery connection design.
- 6. Support parallel for battery charging/sharing.
- 7. Support parallel charging from other generator.

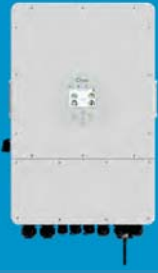
Model	SUN-5K-SG04LP3-EU	SUN-6K-SG04LP3-EU	SUN-8K-SG04LP3-EU	SUN-10K-SG04LP3-EU	SUN-12K-SG04LP3-EU
Power	5000W	6000W	8000W	10000W	12000W
DC Input Voltage	150V	150V	150V	150V	150V
DC Input Current	33.3A	40A	53.3A	66.7A	80A
DC Input Power	5000W	6000W	8000W	10000W	12000W
DC Input Voltage Range	100V~150V	100V~150V	100V~150V	100V~150V	100V~150V
DC Input Current Range	0~33.3A	0~40A	0~53.3A	0~66.7A	0~80A
DC Input Power Range	0~5000W	0~6000W	0~8000W	0~10000W	0~12000W
DC Input Voltage Regulation	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
DC Input Current Regulation	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
DC Input Power Regulation	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
DC Input Voltage Protection	Over-voltage protection	Over-voltage protection	Over-voltage protection	Over-voltage protection	Over-voltage protection
DC Input Current Protection	Over-current protection	Over-current protection	Over-current protection	Over-current protection	Over-current protection
DC Input Power Protection	Over-power protection	Over-power protection	Over-power protection	Over-power protection	Over-power protection
DC Input Voltage Regulation	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
DC Input Current Regulation	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
DC Input Power Regulation	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
DC Input Voltage Protection	Over-voltage protection	Over-voltage protection	Over-voltage protection	Over-voltage protection	Over-voltage protection
DC Input Current Protection	Over-current protection	Over-current protection	Over-current protection	Over-current protection	Over-current protection
DC Input Power Protection	Over-power protection	Over-power protection	Over-power protection	Over-power protection	Over-power protection
DC Input Voltage Regulation	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
DC Input Current Regulation	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
DC Input Power Regulation	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
DC Input Voltage Protection	Over-voltage protection	Over-voltage protection	Over-voltage protection	Over-voltage protection	Over-voltage protection
DC Input Current Protection	Over-current protection	Over-current protection	Over-current protection	Over-current protection	Over-current protection
DC Input Power Protection	Over-power protection	Over-power protection	Over-power protection	Over-power protection	Over-power protection



Hybrid Inverter

- SUN-5K-SG04LP3-EU
- SUN-6K-SG04LP3-EU
- SUN-8K-SG04LP3-EU
- SUN-10K-SG04LP3-EU
- SUN-12K-SG04LP3-EU

User Manual



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About This Manual

The manual mainly describes the product information, guidelines for installation, operation and maintenance. The manual cannot include complete information about the photovoltaic (PV) system.

How to Use This Manual

Read the manual and other related documents before performing any operation on the inverter. Documents must be stored carefully and be available at all times. Contents may be periodically updated or revised due to product development. The information in this manual is subject to change without notice. The latest manual can be acquired via service@deye.com.cn

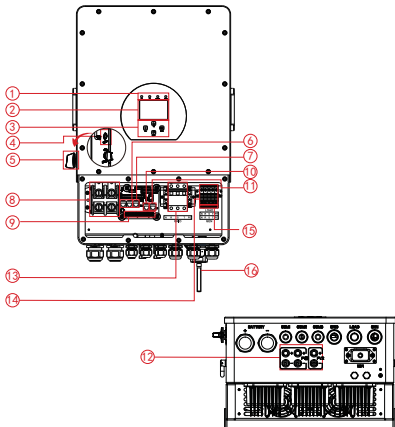
1. Safety Introductions

- This chapter contains important safety and operating instructions. Read and keep this manual for future reference.
- Before using the inverter, please read the instructions and warning signs of the battery and corresponding sections in the instruction manual.
- Do not disassemble the inverter. If you need maintenance or repair, take it to a professional service center.
- Improper reassembly may result in electric shock or fire.
- To reduce risk of electric shock, disconnect all wires before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
- Caution: Only qualified personnel can install this device with battery.
- Never charge a frozen battery.
- For optimum operation of this inverter, please follow required specification to select appropriate cable size. It is very important to correctly operate this inverter.
- Be very cautious when working with metal tools on or around batteries. Dropping a tool may cause a spark or short circuit in batteries or other electrical parts, even cause an explosion.
- Please strictly follow installation procedure when you want to disconnect AC or DC terminals. Please refer to "Installation" section of this manual for the details.
- Grounding instructions - this inverter should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this inverter.
- Never cause AC output and DC input short circuit. Do not connect to the mains when DC input short circuits.

2. Product Introduction

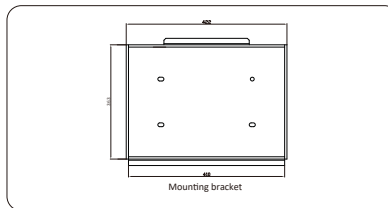
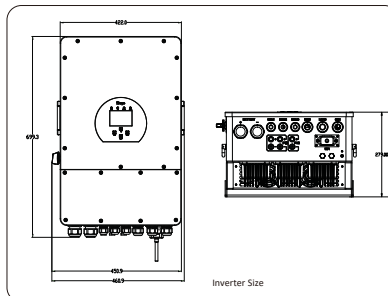
This is a multifunctional inverter, combining functions of inverter, solar charger and battery charger to offer uninterrupted power support with portable size. Its comprehensive LCD display offers user configurable and easy accessible button operation such as battery charging, AC/solar charging, and acceptable input voltage based on different applications.

2.1 Product Overview



- | | | |
|------------------------|-----------------------------|---------------------|
| 1: Inverter indicators | 7: Meter-48S port | 13: Grid |
| 2: LCD display | 8: Battery input connectors | 14: Load |
| 3: Function buttons | 9: Function port | 15: Generator input |
| 4: Power on/off button | 10: ModeBUS port | 16: WIFI interface |
| 5: DC switch | 11: BMS port | |
| 6: Parallel port | 12: PV input with two MPPT | |

2.2 Product Size



2.3 Product Features

- 230V/400V Three phase Pure sine wave inverter.
- Self-consumption and feed-in to the grid.
- Auto restart while AC is recovering.
- Programmable supply priority for battery or grid.
- Programmable multiple operation modes: On-grid, off-grid and UPS.
- Configurable battery charging current/voltage based on applications by LCD setting.
- Configurable AC/Solar/Generator Charger priority by LCD setting.
- Compatible with mains voltage or generator power.
- Overload/over temperature/short circuit protection.
- Smart battery charger design for optimized battery performance
- With limit function, prevent excess power overflow to the grid.
- Supporting WIFI monitoring and built-in 2 strings for 1 MPP tracker, 1 string for 1 MPP tracker.
- Smart settable three stages MPPT charging for optimized battery performance.
- Time of use function.
- Smart Load Function.

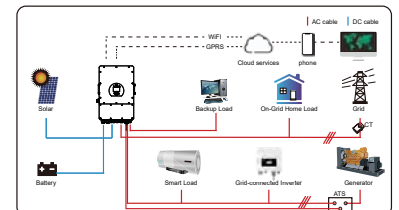
2.4 Basic System Architecture

The following illustration shows basic application of this inverter. It also includes following devices to have a Complete running system.

- Generator or Utility
- PV modules

Consult with your system integrator for other possible system architectures depending on your requirements.

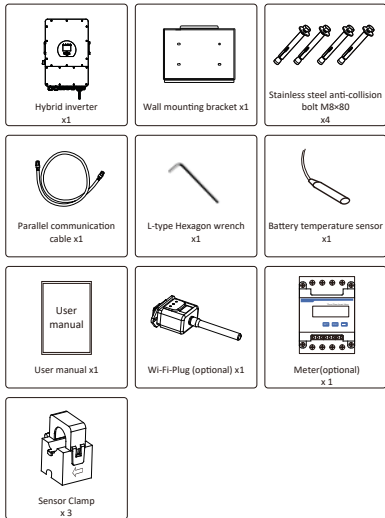
This inverter can power all kinds of appliances in home or office environment, including motor type appliances such as refrigerator and air conditioner.



3. Installation

3.1 Parts List

Check the equipment before installation. Please make sure nothing is damaged in the package. You should have received the items in the following package:



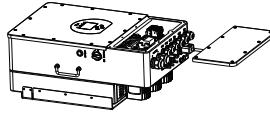
3.2 Mounting instructions

Installation Precaution

This Hybrid inverter is designed for outdoor use(IP65). Please make sure the installation site meets below conditions:

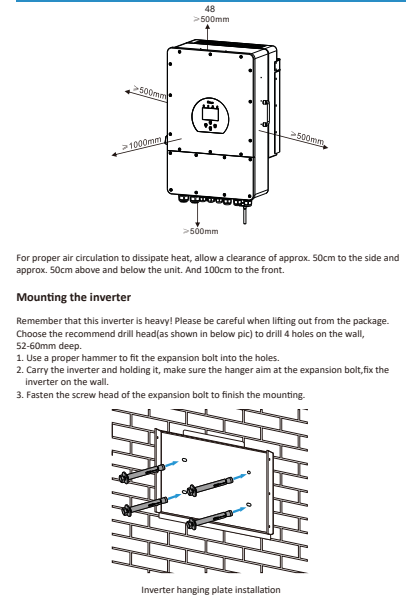
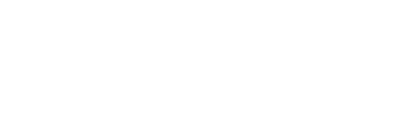
- Not in direct sunlight
- Not in areas where highly flammable materials are stored.
- Not in potential explosive areas.
- Not in the cool air directly.
- Not near the television Antenna or antenna cable.
- Not higher than altitude of about 2000 meters above sea level.
- Not in environment of precipitation or humidity(>95%)

Please AVOID direct sunlight, rain exposure, snow laying up during installation and operation. Before connecting all wires, please take off the metal cover by removing screws as shown below:



Considering the following points before selecting where to install:

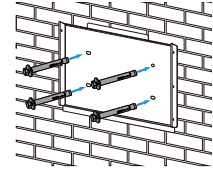
- Please select a vertical wall with load-bearing capacity for installation, suitable for installation on concrete or other non-flammable surfaces, installation is shown below.
- Install this inverter at eye level in order to allow the LCD display to be read at all times.
- The ambient temperature should be between -25~60 °C to ensure optimal operation.
- Be sure to keep other objects and surfaces as shown in the diagram to guarantee sufficient heat dissipation and have enough space for removing wires.



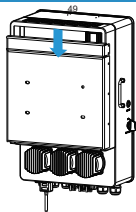
For proper air circulation to dissipate heat, allow a clearance of approx. 50cm to the side and approx. 50cm above and below the unit. And 100cm to the front.

Mounting the inverter

- Remember that this inverter is heavy! Please be careful when lifting out from the package. Choose the recommend drill head(as shown in below pic) to drill 4 holes on the wall, 52-60mm deep.
1. Use a proper hammer to fit the expansion bolt into the holes.
 2. Carry the inverter and holding it, make sure the hanger aim at the expansion bolt, fix the inverter on the wall.
 3. Fasten the screw head of the expansion bolt to finish the mounting.



Inverter hanging plate installation



3.3 Battery connection

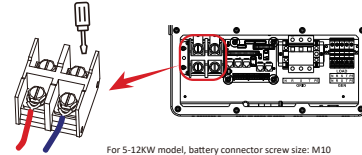
For safe operation and compliance, a separate DC over-current protector or disconnect device is required between the battery and the inverter. In some applications, switching devices may not be required but over-current protectors are still required. Refer to the typical amperage in the table below for the required fuse or circuit breaker size.

Model	Wire Size	Cable(mm ²)	Torque value(max)
5Kw	2AWG	35	24.5Nm
6Kw	1AWG	40	24.5Nm
8Kw	1AWG	40	24.5Nm
10Kw	1/0AWG	60	24.5Nm
12Kw	1/0AWG	60	24.5Nm

Chart 3-2 Cable size

- ⚠ All wiring must be performed by a professional person.
- ⚠ Connecting the battery with a suitable cable is important for safe and efficient operation of the system. To reduce the risk of injury, refer to Chart 3-2 for recommended cables.

- Please follow below steps to implement battery connection:
1. Please choose a suitable battery cable with correct connector which can well fit into the battery terminals.
 2. Use a suitable screwdriver to unscrew the bolts and fit the battery connectors in, then fasten the bolt by the screwdriver, make sure the bolts are tightened with torque of 24.5 N.M in clockwise direction.
 3. Make sure polarity at both the battery and inverter is correctly connected.



For 5-12Kw model, battery connector screw size: M10

3. In case of children touch or insects go into the inverter, Please make sure the inverter connector is fasten to waterproof position by twist it clockwise.

- ⚠ Installation must be performed with care.
- ⚠ Before making the final DC connection or closing DC breaker/disconnect, be sure positive(+) must be connect to positive(+) and negative(-) must be connected to negative(-). Reverse polarity connection on battery will damage the inverter.

3.3.2 Function port definition

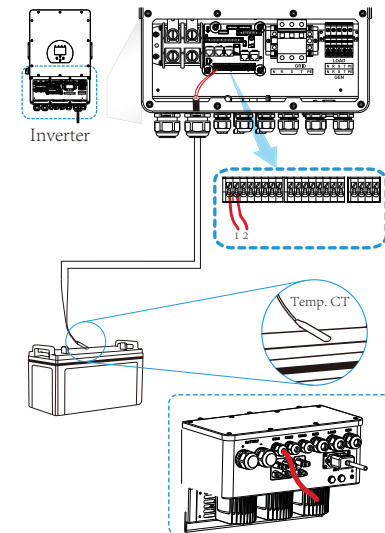
Parallel A: Parallel communication port 1 (CAN interface).
Parallel B: Parallel communication port 2 (CAN interface).
Meter_485: for energy meter communication.
ModeBUS: Reserved.
BMS: BMS port for battery communication(CAN/RS485).

CN1:
TEMP (1,2): battery temperature sensor for lead acid battery.
CT-L1 (3,4): current transformer (CT1) for zero export to CT mode clamps on L1 when in three phase system.
CT-L2 (5,6): current transformer (CT2) for zero export to CT mode clamps on L2 when in three phase system.
CT-L3 (7,8): current transformer (CT3) for zero export to CT mode clamps on L3 when in three phase system.

CN2:
G-start (1,2): dry contact signal for startup the diesel generator.
When the "GEN signal" is active, the open contact (GS) will switch on (no voltage output).
G-valve (3,4): reserved.
Grid_Ry (5,6):
RSD (7,8): When battery is connected and the inverter is in "ON" status, it will provide 12Vdc.

coil relay
G1 S
GS (diesel generator startup signal)

3.3.3 Temperature sensor connection for lead-acid battery



3.4 Grid connection and backup load Connection

- Before connecting to grid, please install a separate AC breaker between inverter and grid. Also, it is recommended that installs an AC breaker between backup load and inverter. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current. The recommended of AC breaker for the load port is 20A for 8kw, 32A for 10kw and 32A for 12kw. The recommended of AC breaker for the grid port is 63A for 8kw, 63A for 10kw and 63A for 12kw.
- There are three terminal blocks with "Grid" "Load" and "GEN" markings. Please do not misconnect input and output connectors.

- ⚠ All wiring must be performed by a qualified personnel. It is very important for system safety and efficient operation to use appropriate cable for AC input connection. To reduce risk of injury, please use the proper recommended cable as below.

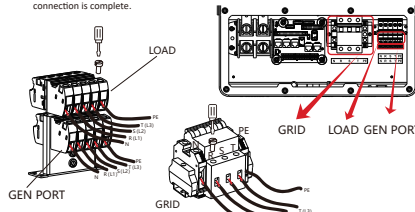
backup load connection			
Model	Wire Size	Cable(mm ²)	Torque value(max)
5/6/8/10/12Kw	10AWG	4	1.2Nm

Grid connection			
Model	Wire Size	Cable(mm ²)	Torque value(max)
5/6/8/10/12Kw	10AWG	6	1.2Nm

Chart 3-3 Recommended Size for AC wires

Please follow below steps to implement Grid, load and Gen port connection:

1. Before making Grid, load and Gen port connection, be sure to turn off AC breaker or disconnecter first.
2. Remove insulation sleeve 10mm length, unscrew the bolts, insert the wires according to polarities indicated on the terminal block and tighten the terminal screws. Make sure the connection is complete.



- ⚠ Be sure that AC power source is disconnected before attempting to wire it to the unit.
3. Then, insert AC output wires according to polarities indicated on the terminal block and tighten terminal. Be sure to connect corresponding N wires and PE wires to related terminals as well.
 4. Make sure the wires are securely connected.
 5. Appliances such as air conditioner are required at least 2-3 minutes to restart because it is required to have enough time to balance refrigerant gas inside of circuit. If a power shortage occurs and recovers in short time, it will cause damage to your connected appliances. To prevent this kind of damage, please check manufacturer of air conditioner if it is equipped with time-delay function before installation. Otherwise, this inverter will trigger overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

3.5 PV Connection

Before connecting to PV modules, please install a separately DC circuit breaker between inverter and PV modules. It is very important for system safety and efficient operation to use appropriate cable for PV module connection. To reduce risk of injury, please use the proper recommended cable size as below.

Model	Wire Size	Cable(mm ²)
5/6/8/10/12Kw	12AWG	4

Chart 3-4 Cable size

- ⚠ To avoid any malfunction, do not connect any PV modules with possible current leakage to the inverter. For example, grounded PV modules will cause current leakage to the inverter. When using PV modules, please be sure NO grounding.
- ⚠ It is requested to use PV junction box with surge protection. Otherwise, it will cause damage on inverter when lightning occurs on PV modules.

3.5.1 PV Module Selection:

When selecting proper PV modules, please be sure to consider below parameters:
 1) Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.
 2) Open circuit Voltage (Voc) of PV modules should be higher than min. start voltage.

Inverter Model	5KW	6KW	8KW	10KW	12KW
PV Input Voltage	550V (160V~800V)				
PV Array MPPT Voltage Range	200V-650V				
No. of MPP Trackers	2				
No. of Strings per MPP Tracker	1+1	1+1	1+1	2+1	2+1

Chart 3-5

3.5.2 PV Module Wire Connection:

1. Switch the Grid Supply Main Switch(AC)OFF.
2. Switch the DC Isolator OFF.
3. Assemble PV input connector to the inverter.

Safety Hint: Please don't connect PV array positive or negative pole to the ground, it could cause serious damages to the inverter.

Safety Hint: Before connection, please make sure the polarity of the output voltage of PV array matches the "DC+" and "DC-" symbols.

Safety Hint: Before connecting inverter, please make sure the PV array open circuit voltage is within the 1000V of the inverter.



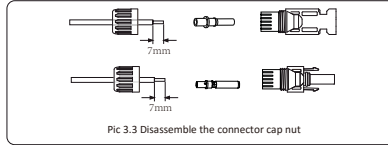
Pic 5.1 DC+ male connector (MC4) Pic 5.2 DC- female connector (MC4)

Safety Hint: Please use approved DC cable for PV system.

Cable type	Cross section (mm ²)	
	Range	Recommended value
Industry generic PV cable (model: PV1-F)	4.0*6.0 (12~10AWG)	4.0(12AWG)

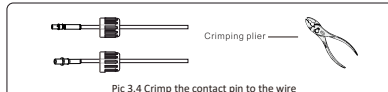
Chart 3-6

The steps to assemble the DC connectors are listed as follows:
 a) Strip off the DC wire about 7mm, disassemble the connector cap nut (see picture 5.3).



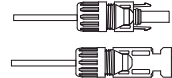
Pic 3.3 Disassemble the connector cap nut

b) Crimping metal terminals with crimping pliers as shown in picture 5.4.



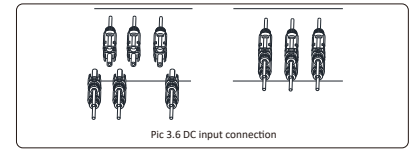
Pic 3.4 Crimp the contact pin to the wire

c) Insert the contact pin to the top part of the connector and screw up the cap nut to the top part of the connector. (as shown in picture 5.5).



Pic 3.5 connector with cap nut screwed on

d) Finally insert the DC connector into the positive and negative input of the inverter, shown as picture 5.6

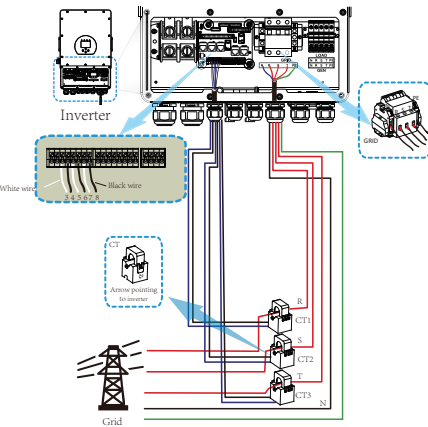


Pic 3.6 DC input connection

Warning: Sunlight shines on the panel will generate voltage, high voltage in series may cause danger to life. Therefore, before connecting the DC input line, the solar panel needs to be blocked by the opaque material and the DC switch should be "OFF", otherwise, the high voltage of the inverter may lead to life-threatening conditions.

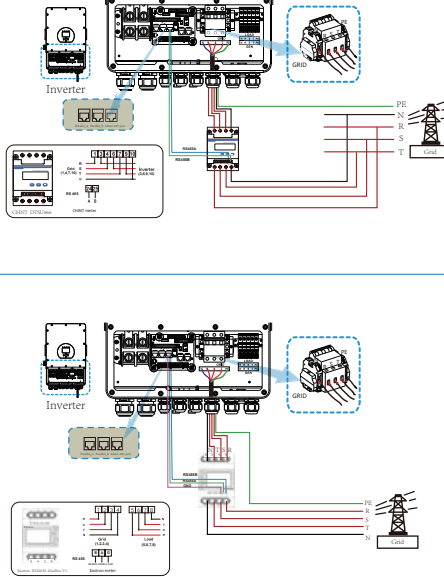
Warning: Use the DC power connector of the accessories. Do not interconnect the connectors of different manufacturers.

3.6 CT Connection



*Note: when the reading of the load power on the LCD is not correct, please reverse the CT arrow.

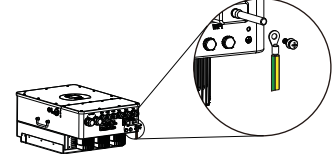
3.6.1 Meter Connection



Note: When the inverter is in the off-grid state, the N line needs to be connected to the earth.

3.7 Earth Connection(mandatory)

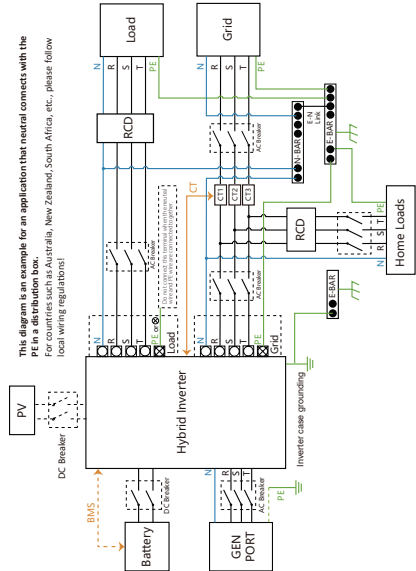
Ground cable shall be connected to ground plate on grid side this prevents electric shock. If the original protective conductor fails.



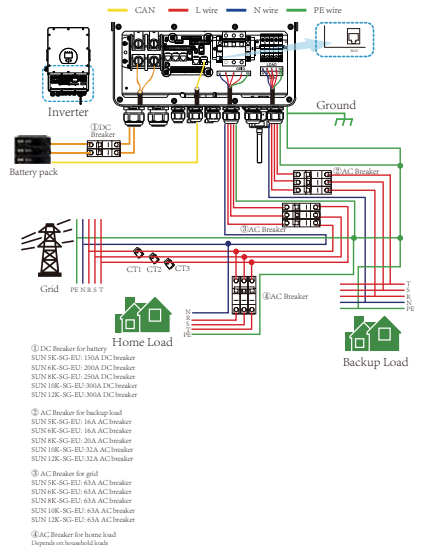
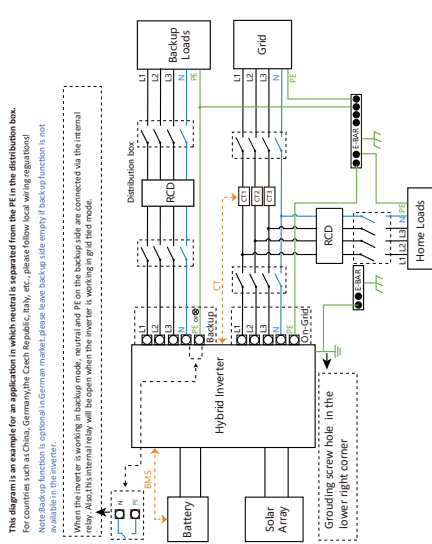
3.8 WIFI Connection

For the configuration of Wi-Fi Plug, please refer to illustrations of the Wi-Fi Plug.

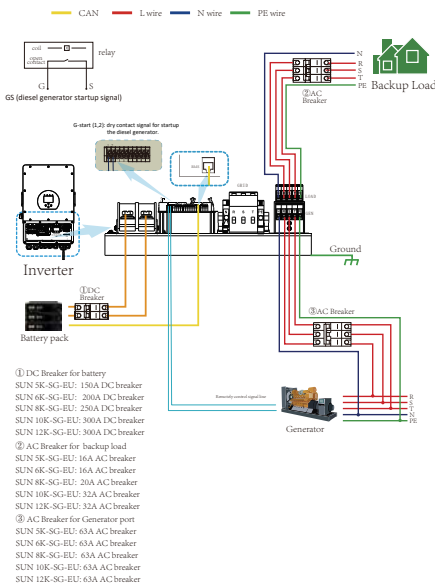
3.9 Wiring System for Inverter



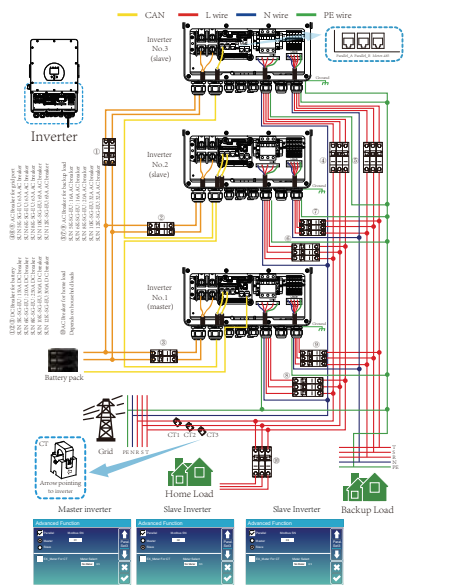
3.10 Wiring diagram



3.1.1 Typical application diagram of diesel generator



3.1.2 Three phase parallel connection diagram



4. OPERATION

4.1 Power ON/OFF

Once the unit has been properly installed and the batteries are connected well, simply press ON/OFF button (located on the left side of the case) to turn on the unit. When system without battery connected, but connect with either PV or grid, and ON/OFF button is switched off, LCD will still light up (Display will show OFF). In this condition, when switch on ON/OFF button and select NO battery, system can still working.

4.2 Operation and Display Panel

The operation and display panel, shown in below chart, is on the front panel of the inverter. It includes four indicators, four function keys and a LCD display, indicating the operating status and input/output power information.

DC	Green led solid light	PV Connection normal
AC	Green led solid light	Grid Connection normal
Normal	Green led solid light	Inverter operating normal
Alarm	Red led solid light	Malfunction or warning

Chart 4-1 LED Indicators

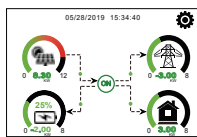
Function Key	Description
Esc	To exit setting mode
Up	To go to previous selection
Down	To go to next selection
Enter	To confirm the selection

Chart 4-2 Function Buttons

5. LCD Display Icons

5.1 Main Screen

The LCD is touchscreen, below screen shows the overall information of the inverter.



1. The icon in the center of the home screen indicates that the system is Normal operation. If it turns into "comm./F01~F64", it means the inverter has communication errors or other errors, the error message will display under this icon(F01~F64 errors, detail error info can be viewed in the System Alarms menu).

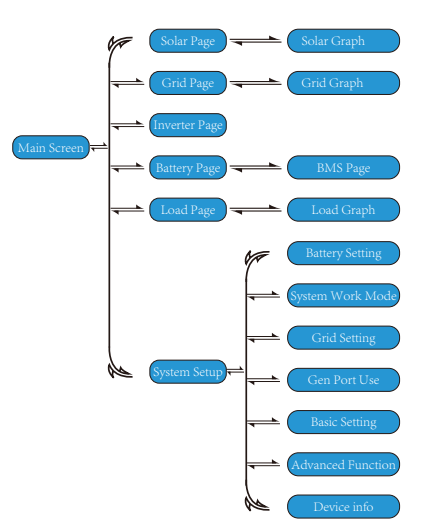
2. At the top of the screen is the time.

3. System Setup icon, Press this set button, you can enter into the system setup screen which including Basic Setup, Battery Setup, Grid Setup, System Work Mode, Generator port use, Advanced function and Li-Batt info.

4. The main screen showing the info including Solar, Grid, Load and Battery. Its also displaying the energy flow direction by arrow. When the power is approximate to high level, the color on the panels will changing from green to red so system info showing vividly on the main screen.

PV power and Load power always keep positive. Grid power negative means sell to grid, positive means get from grid. Battery power negative means charge, positive means discharge.

5.1.1 LCD operation flow chart



5.2 Solar Power Curve

Solar
Power: 1650W
PV1-V: 280V PV2-V: 45V
PV1-I: 5.5A PV2-I: 0.1A
PV1-P: 1550W PV2-P: 1W

Grid
Status: Buy
Today: 2.20KWH
Total: 11.60 KWH
SELL
Today: 0.0KWH
Total: 0.00 KWH

Load
Power: 55W
Today: 0.5 KWH
Total: 1.60 KWH

Grid detail page:
① Status, Power, Frequency.
② L-Voltage for each Phase
CT: Power detected by the external current sensors
LD: Power detected using internal sensors on AC grid in/out breaker
CT1-V: 0V LD1: 0W
CT2-V: 0V LD2: 0W
CT3-V: 0V LD3: 0W
SELL: Energy from inverter to grid.
Press the "Energy" button will enter into the power curve page.

Batt
U: 49.58V
I: 2.04A
Power: 101W
Temp: 25.0C

Li-BMS
Main Voltage: 52.24V Charging Voltage: 52.2V
New Capacity: 800Ah Discharging Voltage: 47.0V
Main Temp: 23.5C Charging Current: 47A
Test SOC: 100% Discharging Current: 25A
Range: 60km/2h

5.3 Curve Page-Solar & Load & Grid

Solar power curve for daily, monthly, yearly and total can be roughly checked on the LCD, for more accuracy power generation, pls check on the monitoring system. Click the up and down arrow to check power curve of different period.

5.4 System Setup Menu

5.5 Basic Setting Menu

Factory Reset: Reset all parameters of the inverter. Lock out all changes: Enable this menu for setting parameters that require locking and cannot be set up. Before performing a successful factory reset and locking the systems, to keep all changes you need to type in a password to enable the setting. The password for factory settings is 9999 and for lock out is 7777.

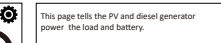
Factory Reset PassWork: 9999
Lock out all changes PassWork: 7777

5.6 Battery Setup Menu

Battery capacity: It tells Deye hybrid inverter to know your battery bank size.
Use Batt V: Use Battery Voltage for all the settings (V).
Use Batt %: Use Battery SOC for all the settings (%).
Max. A charge/discharge: Max battery charge/discharge current(0-115A for 5KW model, 0-80A for 3.5KW model). For AGM and Flooded, we recommend Ah battery size = 20h = Charge/Discharge amps.
For Lithium, we recommend Ah battery size x 50% = Charge/Discharge amps.

For Gel, follow manufacturer's instructions.
No Batt: tick this item if no battery is connected to the system.
Active battery: This feature will help recover a battery that is over charged by slowly charging from the solar array or grid.

This is Battery Setup page:
① Start = 30%: Percent S.O.C at 30% system will AutoStart a connected generator to charge the battery bank.
A = 40A: Charge rate of 40A from the attached generator in Amps.
Gen Charge: uses the gen input of the system to charge battery bank from an attached generator.
Gen Signal: Normally open relay that closes when the Gen Start signal state is active.
Gen Max Run Time: It indicates the longest time Generator can run in one day, when time is up, the Generator will be turned off, 24h means that it does not shut down all the time.
Gen Down Time: It indicates the delay time of the generator to shut down after it has reached the running time.



This page tells the PV and diesel generator power, the load and battery.

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Generator

Power: 6000W Today:10 KWH Total: 913 KWH

V_L1: 230V P_L1: 2KW
V_L2: 230V P_L2: 2KW
V_L3: 230V P_L3: 2KW

This page tells generator output voltage, frequency, power. And, how much energy is used from generator.

Battery Setting

Lithium Mode: 80
Shutdown: 10%
Low Batt: 20%
Restart: 40%

Lithium Mode: This is BMS protocol. Please reference the document (Approved Battery).
Shutdown 10%: It indicates the inverter will shutdown if the SOC below this value.
Low Batt 20%: It indicates the inverter will alarm if the SOC below this value.
Restart 40%: Battery voltage at 40% AC output will resume.

Battery Setting

Full V: 57.6V
Shutdown: 52.0V
Low Batt: 48.0V
Restart: 44.0V

There are 3 stages of charging the Battery. This is for professional installers, you can keep it if you do not know.
Shutdown 20%: The inverter will shutdown if the SOC below this value.
Low Batt 35%: The inverter will alarm if the SOC below this value.
Restart 50%: Battery SOC at 50% AC output will resume.

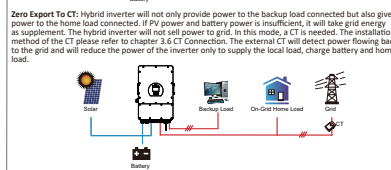
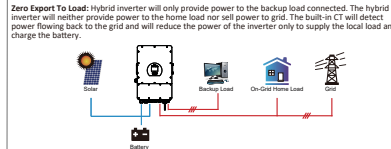
Recommended battery settings

Battery Type	Absorption Stage	Float Stage	Torque value (every 30 days 3hr)
AGM (or PCC)	14.2v (57.6v)	13.4v (53.6v)	14.2v(57.6v)
Gel	14.1v (56.4v)	13.4v (54.0v)	
Wet	14.7v (59.0v)	13.7v (55.0v)	14.7v(59.0v)
Lithium	Follow its BMS voltage parameters		

5.7 System Work Mode Setup Menu

System Work Mode

Selling First: This mode allows hybrid inverter to sell back any excess power produced by the solar panels to the grid. If time of use is active, the battery energy also can be sold into grid.
The PV energy will be used to power the load and charge the battery and then excess energy will flow to grid. Power source priority for the load is as follows:
1. Solar Panels.
2. Grid.
3. Batteries (until programmable % discharge is reached).



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Solar Sell: "Solar sell" is for Zero export to load or Zero export to CT; when this item is active, the surplus energy can be sold back to grid. When it is active, PV Power source priority usage is as follows: load consumption and charge battery and feed into grid.
Max. sell power: Allowed the maximum output power to flow to grid.
Zero-export power: For zero-export mode, it tells the grid output power. Recommend to set it as 20-100W to ensure the hybrid inverter won't feed power to grid.
Energy Pattern: PV Power source priority.
Batt First: PV power is firstly used to charge the battery and then used to power the load. If PV power is insufficient, grid will make supplement for battery and load simultaneously.
Load First: PV power is firstly used to power the load and then used to charge the battery. If PV power is insufficient, grid will provide power to load.
Max Solar Power: allowed the maximum DC input power.
Grid Peak-shaving: when it is active, grid output power will be limited within the set value. If the load power exceeds the allowed value, it will take PV energy and battery as supplement. If still can't meet the load requirement, grid power will increase to meet the load needs.

System Work Mode

Grid Charge: 31.00 31.00 31.00 31.00
Grid Discharge: 31.00 31.00 31.00 31.00
Time Of Use: 17:00 21:00 21:00 21:15
Power: 2000 2000 2000 2000
Batt: 40% 40% 40% 40%

Time of use: it is used to program when to use grid or generator to charge the battery, and when to discharge the battery to power the load. Only tick "Time Of Use" then the follow items (Grid, charge, time, power etc.) will take effect.
Grid charge: utilize diesel generator to charge the battery until the SOC reaches 40%.
Grid Discharge: utilize diesel generator to charge the battery until the SOC reaches 40%.
Gen charge: utilize diesel generator to charge the battery until the SOC reaches 40%.
Time period: 01:00-24:00.
Note: when the grid is present, only the "time of use" is ticked, then the battery will discharge. Otherwise, the battery won't discharge even the battery SOC is full. But in the off-grid mode (when grid is not available, inverter will work in the off-grid mode automatically).
Power: Max. discharge power of battery allowed.
Batt(V or SOC %): battery SOC % or voltage at when the action is to happen.
For example:
During 01:00-06:00, if battery SOC is lower than 80%, it will use grid to charge the battery until battery SOC reaches 80%.
During 06:00-08:00, if battery SOC is higher than 80%, hybrid inverter will discharge the battery until the SOC reaches 80%.
If battery SOC is lower than 40%, then grid will charge the battery SOC to 40%.
During 08:00-10:00, if battery SOC is higher than 40%, hybrid inverter will discharge the battery until the SOC reaches 40%.
During 10:00-15:00, when battery SOC is higher than 80%, hybrid inverter will discharge the battery until the SOC reaches 80%.
During 15:00-18:00, when battery SOC is higher than 40%, hybrid inverter will discharge the battery until the SOC reaches 40%.
During 18:00-01:00, when battery SOC is higher than 35%, hybrid inverter will discharge the battery until the SOC reaches 35%.

Battery Setting

Start: 30% 30%
A: 40A 40A
Grid Charge: 0.5 hours
Grid Discharge: 0.5 hours

System Work Mode

Grid Charge: 31.00 31.00 31.00 31.00
Grid Discharge: 31.00 31.00 31.00 31.00
Time Of Use: 17:00 21:00 21:00 21:15
Power: 2000 2000 2000 2000
Batt: 40% 40% 40% 40%

5.8 Grid Setup Menu

Grid Setting

Grid Mode: General Standard, UL1741&IEEE1547, CPUC RULE21, SPD-UL-1741
Grid Line: 230V-SP, 240V-SP, 120V-SP, 120V-SP
Phase Type: 0120/240, 0240/120

Please select the correct Grid Mode in your local area. If you are not sure, please choose General Standard.
Please select the correct Grid Type in your local area, otherwise the machine will not work or be damaged.
Phase type: When the inverter LCD shows "A03" which means the grid phase is error, please try to use "01/120/240".

Grid Setting

Grid Frequency: 60HZ, 60HZ
Resonance Time: 100, PF: 100
Grid HZ High: 53.0Hz, Grid Vd High: 260.0V
Grid HZ Low: 59.0Hz, Grid Vd Low: 236.0V
InV Input Voltage: 230V

UL1741&IEEE1547, CPUC RULE21, SRD-UL-1741
No need to set the function of this interface.
General Standard
Please select the correct Grid Frequency in your local area.
You can hold this in default value.

Grid Setting

Grid Mode: 0V, PV, 1V
Vd: 0.0V, 0.0V, 0.0V, 0.0V
Vc: 0.0V, 0.0V, 0.0V, 0.0V
Vb: 0.0V, 0.0V, 0.0V, 0.0V

For California only.

Grid Setting

Grid Mode: 0V, PV, 1V
Vd: 0.0V, 0.163, 0.163, 0.163
Vc: 0.0V, 0.163, 0.163, 0.163
Vb: 0.0V, 0.163, 0.163, 0.163

For California only.

5.9 Generator Port Use Setup Menu

GEN PORT USE

Micro Inverter: On/Off
Micro Inverter: On/Off
Micro Inverter: On/Off

Generator input rated power: allowed Max. power from diesel generator.
GEN connect to grid input: connect the diesel generator to the grid input port.
Smart Load Output: This mode utilizes the Gen input connection as an output which only receives power when the battery SOC and PV power is above a user-programmable threshold. e.g. ON: 100%, OFF: 85%. When the PV power exceeds 500W, and battery bank SOC reaches 100%, Smart Load Port will switch on automatically and power the load connected. When the battery bank SOC = 85%, the Smart Load Port will switch off automatically.

Smart Load Off Batt
Battery SOC at which the Smart load will switch off.
Smart Load ON Batt
Battery SOC at which the Smart load will switch on, simultaneously and then the Smart load will switch on.
On Grid always on: When click "on grid always on" the smart load will switch on when the grid is present.
Micro InV input: To use the Generator input port as a micro-inverter on grid inverter input (AC coupled), this feature will also work with "Grid tied" inverters.
* Micro InV input OFF: when the battery SOC exceeds setting value, Microinverter or grid tied inverter will shut down.
* Micro InV input ON: when the battery SOC is lower than setting value, Microinverter or grid tied inverter will start to work.
AC Couple Fre High: If choosing "Micro InV input", as the battery SOC reaches gradually setting value (OFF). During the process, the microinverter output power will decrease linear. When the battery SOC equals to the setting value (OFF), the system frequency will become the setting value (AC couple Fre High) and the Microinverter will stop working. It will export to grid cutoff. Stop exporting power produced by the microinverter to the grid.
* Note: Micro InV input OFF and On is valid for some certain PV version only.

5.10 Advanced Function Setup Menu

Advanced Function

Solar Arc Fault ON: This is only for US.
System selfcheck: Disable this is only for factory.
Gen Peak-shaving: Enable When the power of the generator exceeds the rated value of it, the inverter will provide the redundant part to ensure that the generator will not over-heat.
DRM: For AS4777 standard
BMS: For AS4777 standard
BMS: For AS4777 standard
Signal Island mode: Reserved.

Advanced Function

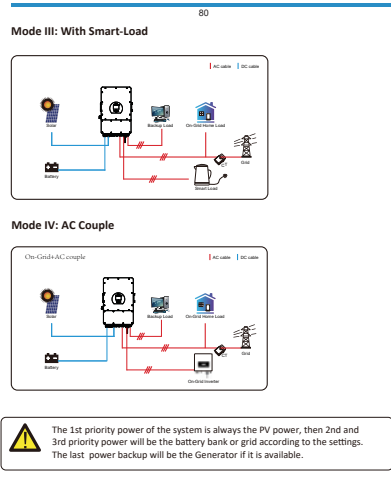
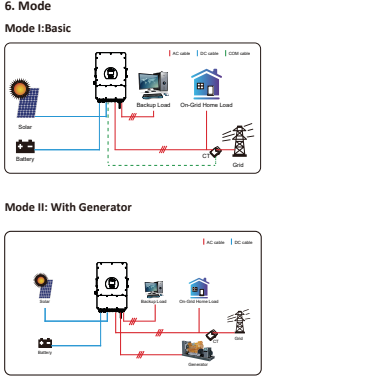
Ex_Meter For CT: when using zero-export to CT mode, the hybrid inverter can select Ex_Meter For CT function and use the different meters e.g. CHN and Eastron.

5.11 Device Info Setup Menu

Device Info

Serial No: 210218810
Firmware: 20210811 13:17
Firmware: 20210811 08:23
Firmware: 20210811 08:23
Firmware: 20210811 13:45

This page show inverter ID, inverter version and alarm codes.
HM: LCD version
MAIN: Control board FW version



7. Limitation of Liability

In addition to the product warranty described above, the state and local laws and regulations provide financial compensation for the product's power connection (including violation of implicit terms and warranties). The company hereby declares that the terms and conditions of the product and the policy cannot and can not legally exclude all liability within a limited scope.

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Error code	Description	Solutions
F01	DC input polarity reverse fault	1. Check the PV input polarity 2. Seek help from us, if can not go back to normal state.
F07	DC_START_Failure	1. The BUS voltage can't be built from PV or battery. 2. Restart the inverter, if the fault still exists, please contact us for help
F13	working mode change	1. When the grid type and frequency changed it will report F13. 2. When the battery mode was changed to "No battery mode" it will report F13. 3. For some old PV version, it will report F13 when the system work mode changed. 4. Generally, it will disappear automatically when shows F13. 5. If still same, and turn off the DC switch and AC switch and wait for one minute and then turn on the DC/AC switch. 6. Seek help from us, if can not go back to normal state.
F15	AC over current fault of software	AC side over current fault 1. Please check whether the backup load power and common load power are within the range. 2. Restart and check whether it is in normal. 3. Seek help from us, if can not go back to normal state.
F16	AC leakage current fault	Leakage current fault 1. Check the PV side cable ground connection 2. Restart the system 2-3 times 3. If the fault still existing, please contact us for help.
F18	AC over current fault of hardware	AC side over current fault 1. Please check whether the backup load power and common load power are within the range. 2. Restart and check whether it is in normal. 3. Seek help from us, if can not go back to normal state.
F20	DC over current fault of hardware	DC side over current fault 1. Check PV module connect and battery connect. 2. When in the off-grid mode, the inverter startup with big power load, it may report F20. Please reduce the load power connected. 3. Turn off the DC switch and AC switch and then wait one minute, then turn on the DC/AC switch again. 4. Seek help from us, if can not go back to normal state.

Error code	Description	Solutions
F21	Tx_HV_Overcurr_fault	BUS over current 1. Check the PV input current and battery current setting 2. Restart the system 2-3 times. 3. If the fault still exists, please contact us for help.
F22	Tx_EmergStop_Fault	Remotely shutdown 1. It tells the inverter is remotely controlled.
F23	Tx_GPCLOCC_current is transient over current	Leakage current fault 1. Check the connection of PV panels and inverter is firmly and correctly. 2. Restart the system 2-3 times. 3. If the fault still exists, please contact us for help.
F24	DC insulation failure	PV insulation resistance is too low 1. Check the connection of PV panels and inverter is firmly and correctly. 2. Check whether the PE cable of inverter is connected to ground. 3. Seek help from us, if can not go back to normal state.
F26	The DC busbar unbalanced	1. Please wait for a while and check whether it is normal. 2. When the load power of 3 phases is big different, it will report the F26. 3. When there's a DC leakage current, it will report F26. 4. Restart the system 2-3 times. 5. Seek help from us, if can not go back to normal state.
F48	AC lower frequency	Grid frequency out of range 1. Check the frequency is in the range of specification or not. 2. Check whether AC cables are firmly and correctly connected. 3. Seek help from us, if can not go back to normal state.
F29	Parallel CAN Bus fault	1. When in parallel mode, check the parallel communication cable connection and hybrid inverter communication address setting. 2. During the parallel system startup period, inverters will report F29 but when all inverters are in ON status, it will disappear automatically. 3. If the fault still exists, please contact us for help.
F34	AC Overcurrent fault	1. Check the backup load connected, make sure it is in allowed power range. 2. If the fault still exists, please contact us for help.
F41	Parallel system stop	1. Check the hybrid inverter work status. If there's 1 pcs hybrid inverter shutdown, all hybrid inverters will report F41 fault. 2. If the fault still exists, please contact us for help.
F42	AC line low voltage	Grid voltage fault 1. Check the AC voltage is in the range of standard voltage specification. 2. Check whether grid AC cables are firmly and correctly connected. 3. Seek help from us, if can not go back to normal state.

Error code	Description	Solutions
F46	backup battery fault	1. Please check each battery status, such as voltage/ SOC and parameters etc., and make sure all the parameters are same. 2. If the fault still exists, please contact us for help.
F47	AC over frequency	Grid frequency out of range 1. Check the frequency is in the range of specification or not. 2. Check whether AC cables are firmly and correctly connected. 3. Seek help from us, if can not go back to normal state.
F48	AC lower frequency	Grid frequency out of range 1. Check the frequency is in the range of specification or not. 2. Check whether AC cables are firmly and correctly connected. 3. Seek help from us, if can not go back to normal state.
F55	DC busbar voltage is too high	BUS voltage is too high 1. Check whether battery voltage is too high. 2. Check the PV input voltage, make sure it is within the allowed range. 3. Seek help from us, if can not go back to normal state.
F56	DC busbar voltage is too low	Battery voltage low 1. Check whether battery voltage is too low. 2. If the battery voltage is too low, using PV or grid to charge the battery. 3. Seek help from us, if can not go back to normal state.
F58	BMS communication fault	1. It tells the communication between hybrid inverter and battery BMS disconnected when "BMS_Err_Stop" is active. 2. If don't want to see this happen, you can disable "BMS_Err_Stop" item on the LCD. 3. If the fault still exists, please contact us for help.
F62	DRMto_stop	1. The DRM function is for Australia market only. 2. Check the DRM function is active or not. 3. Seek help from us, if can not go back to normal state after restart the system.
F34	AC Overcurrent fault	1. Check the backup load connected, make sure it is in allowed power range. 2. If the fault still exists, please contact us for help.
F63	ARC fault	1. ARC fault detection is only for US market. 2. Check PV module cable connection and clear the fault. 3. Seek help from us, if can not go back to normal state.
F64	Heat sink high temperature/failure	Heat sink temperature is too high 1. Check whether the work environment temperature is too high. 2. Turn off the inverter for 10mins and restart. 3. Seek help from us, if can not go back to normal state.

Chart 7-1 Fault information

Under the guidance of our company, customers return our products so that our company can provide service of maintenance or replacement of products of the same value. Customers need to pay the necessary freight and other related costs. Any replacement or repair of the product will cover the remaining warranty period of the product. If any part of the product or product is replaced by the company itself during the warranty period, all rights and interests of the replacement product or component belong to the company.

Factory warranty does not include damage due to the following reasons:

- Damage during transportation of equipment;
- Damage caused by incorrect installation or commissioning;
- Damage caused by failure to comply with operation instructions, installation instructions or maintenance instructions;
- Damage caused by attempts to modify, alter or repair products;
- Damage caused by incorrect use or operation;
- Damage caused by insufficient ventilation of equipment;
- Damage caused by failure to comply with applicable safety standards or regulations;
- Damage caused by natural disasters or force majeure (e.g. floods, lightning, overvoltage, storms, fires, etc.)

In addition, normal wear or any other failure will not affect the basic operation of the product. Any external scratches, stains or natural mechanical wear does not represent a defect in the product.

8. Datasheet

Model	SUN-5K-SGD04LP3	SUN-6K-SGD04LP3	SUN-8K-SGD04LP3	SUN-10K-SGD04LP3	SUN-12K-SGD04LP3
Battery Input Data	Lead-acid or Li-ion				
Battery Type	40-60V				
Battery Voltage Range(V)	40-60V				
Max. Charging Current(A)	120A	150A	190A	210A	240A
Max. Discharging Current(A)	120A	150A	190A	210A	240A
Charging Curve	3 Stages / Equalization				
External Temperature Sensor	yes				
Charging Strategy for Li-ion Battery	Self-adaptation to BMS				
PV String Input Data					
Max. DC Input Power(W)	6500W	7800W	10400W	12000W	15600W
PV Input Voltage(V)	550V (150V~800V)				
MPPPT Range(V)	200V-650V				
Start-up Voltage(V)	160V				
PV Input Current(A)	13A~13A	13A~13A	13A~13A	26A~13A	26A~13A
Max. PV ISC(A)	17A~17A	17A~17A	17A~17A	34A~17A	34A~17A
No. of MPPPT Trackers	2				
No. of Strings Per MPPPT Tracker	1+1	1+1	1+1	2+1	2+1
AC Output Data					
Rated AC Output and UPS Power(W)	5000	6000	8000	10000	12000
Max. AC Output Power(W)	5500	6600	8800	11000	13200
Peak Power(off grid)	2 times of rated power, 30 S				
AC Output Rated Current(A)	7.6/7.2A	9.1/8.7A	12.1/11.6A	15.2/14.5A	18.2/17.4A
Max. AC Current(A)	11.4/10.9A	13.6/13A	18.2/17.4A	22.7/21.7A	27.8/26.3A
Max. Continuous AC Passthrough(A)	45A				
Output Frequency and Voltage	50/60Hz, 380/400Vac (Three phase)				
Grid Type	Three Phase				
Current Harmonic Distortion	THD<3% (Linear load<1.5%)				
Efficiency					
Max. Efficiency	97.60%				
Euro Efficiency	97.00%				
MPPPT Efficiency	>99%				
Protection					
PV Arc Fault Detection	Integrated				
PV Input Lightning Protection	Integrated				
Anti-islanding Protection	Integrated				
PV String Input Reverse Polarity Protection	Integrated				
Insulation Resistor Detection	Integrated				
Residual Current Monitoring Unit	Integrated				
Output Over Current Protection	Integrated				
Output Shorted Protection	Integrated				
Output Over Voltage Protection	DC Type II / AC Type II				

Certifications and Standards	
Grid Regulation	CEI 0-21, VDE-AR-N 4105, NRS 097, IEC 62116, IEC 61727, G99, G98, VDE 0126-1-1, RD 1699, C10-11
EMC/Safety Regulation	IEC/EN 62109-1, IEC/EN 62109-2, IEC/EN 61000-6-1, IEC/EN 61000-6-2, IEC/EN 61000-6-3, IEC/EN 61000-6-4
General Data	
Operating Temperature Range(°C)	-45~60°C, >45°C Derating
Cooling	Smart cooling
Noise(dB)	≤45 (80%)
Communication with BMS	RS485; CAN
Weight(kg)	33.6
Size(mm)	422W*699.3H*279D
Protection Degree	IP65
Installation Style	Wall-mounted
Warranty	5 years

9. Appendix I

Definition of RJ45 Port Pin for BMS

No.	RS485 Pin
1	485_B
2	485_A
3	--
4	CAN-H
5	CAN-L
6	GND_485
7	485_A
8	485_B

Definition of RJ45 Port Pin for Meter-485

No.	Meter-485 Pin
1	METER-485_B
2	METER-485_A
3	COM-GND
4	--
5	--
6	COM-GND
7	METER-485_A
8	METER-485_B

Definition of RJ45 Port Pin for "Modbus port" for remotely monitoring

No.	Modbus port
1	485_B
2	485_A
3	GND_485
4	--
5	--
6	GND_485
7	485_A
8	485_B

NINGBO DEYE INVERTER TECHNOLOGY CO., LTD.

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E-mail: service@deye.com

Web: www.deyevinverter.com

30240301000690 Ver: 2.2, 2022-03-09

RS232

No.	WIFI/RS232
1	D-GND
2	
3	
4	
5	TX
6	RX
7	12Vdc
8	
9	

WIFI/RS232

This RS232 port is used to connect the wifi datalogger

10. Appendix II

- Split Core Current Transformer (CT) dimension: (mm)
- Secondary output cable length is 4m.

Technical Proposal for MC4 Connector (Multi Contact)

Multi-Contact – MC3 and MC4 connector systems

- Multi-Contact AG was founded in 1962 and is currently employing more than 700 staff. All manufacturing sites are ISO 9001 certified and therefore meet the highest quality demands.
- System voltage max. 1000 V
- Degree of protection, connected IP65
- Protection class II
- Temperature range -40°C to +90°C
- TUV Rheinland – type approved

MC connector systems

The components of the MC connector system for photovoltaics are designed to allow time-saving and safe serial and parallel wiring of PV modules for building integrated and free-standing solar installations. For practical use the connector systems MC3 and MC4 are available, depending on the existing modules or inverters.

The proven MC3 connector systems

- Diameter Ø 3 mm
- Rated current max. 30 A for 6 mm²
- max. 20 A for 4 mm²

The interlockable MC4 connector systems

- Diameter Ø 4 mm
- Rated current max. 30 A
- System voltage max. 1000 V
- Degree of protection, connected IP67
- Easy installation
- Locking system "Snap in"
- Protection class II
- Temperature range -40°C to +90°C
- TUV Rheinland – type approved



The MC4 plugs and sockets, shown with associated contacts. The MC4 plugs and sockets, shown with associated contacts.



PV H1Z22Z-K Cable (1.5kV DC) H1Z22Z-K 1/4

Contact Sales & Marketing Department Phone: +9611355040 liban.cables@nexans.com

International Designation: H1Z22Z-K
Country ref.: H1Z22Z 1/4000
TCU FLEXOPOL FLEXOPOL FLEX 1.0/1.0 (1.2) kV AC, 1.5/1.5 (1.8) kV DC EN 50618, IEC 62930

DESCRIPTION

PV cables are designed to comply with the international standards of the solar plants. They are dedicated to the photovoltaic system direct current (D.C.) side with a nominal D.C. voltage of 1.5 kV and a maximum D.C. voltage of 1.8 kV. These cables are suitable for permanent outdoor long term use, under variable and harsh climate conditions. They are designed and tested to operate at a normal maximum conductor temperature of 90°C and for 25,000 hours up to 120°C. Therefore, the expected period use is 30 to 40 years under normal usage conditions

DESIGN

Application
These cables 1.5kV D.C. crosslinked cables offer exceptional performances, easy installation and long term reliability for solar plant.
They link photovoltaic panels for Utility Scale solar plants or rooftops, and also connect them to the array box (if existing), or potentially to the inverter.

- Designation: H1Z22Z-K
- Standard: EN 50618-2014, IEC 62930
- Rated voltage: 1.0/1.0 (1.2) kV AC, 1.5/1.5 (1.8) kV DC

Design

- Single core solar cable with low smoke, halogen free, crosslinked insulation and sheath
- Intended for permanent use outdoor and indoor.
- Installation can be fixed or free movable / free hanging, and also in cable trays and conduits.

Recommended Use

- Renewable Energies: Solar Plants.
- Intended for permanent use outdoor and indoor.
- Installation can be fixed or free movable / free hanging, and also in cable trays and conduits.



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building wires, rated voltage 1000V

Contact Sales & Marketing Department Phone: +9611355040 liban.cables@nexans.com

Nexans ref.	Country ref.	Name	Conductor flexibility	Cross section [mm ²]	Nom. insulation thick. [mm]	Nom. overall diam. [mm]	Approx. weight [kg/km]	Max. DC Resist. [Ω/km]
000173	ENYA 2/	ENYA 2	Stranded class 2	2	0.7	3.3	28	9.11
000501	ENYA 120	ENYA 120	Stranded class 2	120	1.6	16.0	1142	0.153
000501	ENYA 150	ENYA 150	Stranded class 2	150	1.8	18.0	1410	0.124
000501	ENYA 185	ENYA 185	Stranded class 2	185	2.0	20.0	1761	0.0991
000750	ENYA 240	ENYA 240	Stranded class 2	240	2.2	23.0	2275	0.0754
001001	ENYA 300	ENYA 300	Stranded class 2	300	2.4	25.0	2957	0.0601
001001	ENYA 35	ENYA 35	Stranded class 2	35	1.2	9.3	352	0.524
001001	ENYA 400	ENYA 400	Stranded class 2	400	2.6	29.0	3655	0.047
001201	ENYA 50	ENYA 50	Stranded class 2	50	1.4	11.0	471	0.387
001201	ENYA 500	ENYA 500	Stranded class 2	500	2.8	32.0	4705	0.0366
001301	ENYA 630	ENYA 630	Stranded class 2	630	2.8	36.0	6014	0.0283
001301	ENYA 70	ENYA 70	Stranded class 2	70	1.4	12.5	606	0.268
000401	ENYA 95	ENYA 95	Stranded class 2	95	1.6	14.5	913	0.193

TEST AT WORKS BUILDING WIRES

- Max. DC conductor resistance at 20°C acc. to IEC 60228
- Spark test during insulation
- Liban Cables will carry out these tests on all the length and tests certificates will be provided.
- Sample Tests
 - Check of the build-up and color coding of the cable
 - Check of dimensions
- Insulation : according to VDE 250 Table 6 Column 2
- These tests will be carried out on one length of each size during each inspection.
- Tests certificates will be provided by Liban Cables

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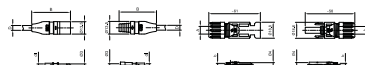
ACCESSORIES Plugs and Sockets

Art. No.	152009	152010	152011	152012	152013
Model	MultiContact PV 400T	MultiContact PV 600T	MultiContact PV 800T	MultiContact PV 1000T	MultiContact PV 1200T
Description	Female type MC3 for 4mm ² cables	Female type MC3 for 6mm ² cables	Female type MC3 for 8mm ² cables	Female type MC3 for 10mm ² cables	Female type MC3 for 12mm ² cables
Material	2 years	2 years	2 years	2 years	2 years

Art. No.	152014	152015	152016	152017
Model	MultiContact PV 400S	MultiContact PV 600S	MultiContact PV 800S	MultiContact PV 1000S
Description	Male type MC3 for 4mm ² cables	Male type MC3 for 6mm ² cables	Male type MC3 for 8mm ² cables	Male type MC3 for 10mm ² cables
Material	2 years	2 years	2 years	2 years

Art. No.	152018	152019	152020	152021
Model	MultiContact PV 400AD	MultiContact PV 600AD	MultiContact PV 800AD	MultiContact PV 1000AD
Description	Female type MC4 for 4mm ² cables	Female type MC4 for 6mm ² cables	Female type MC4 for 8mm ² cables	Female type MC4 for 10mm ² cables
Material	2 years	2 years	2 years	2 years

Art. No.	152022	152023	152024	152025
Model	MultiContact PV 400AD	MultiContact PV 600AD	MultiContact PV 800AD	MultiContact PV 1000AD
Description	Male type MC4 for 4mm ² cables	Male type MC4 for 6mm ² cables	Male type MC4 for 8mm ² cables	Male type MC4 for 10mm ² cables
Material	2 years	2 years	2 years	2 years



The MC4 plugs are based on contacts with a diameter of 3 mm and comply with protection class IP65. The interlockable MC4 plugs have contacts with diameters of 4 mm and comply with protection class IP67.

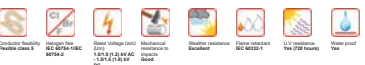


PV H1Z22Z-K Cable (1.5kV DC) H1Z22Z-K 1/4

Contact Sales & Marketing Department Phone: +9611355040 liban.cables@nexans.com

CHARACTERISTICS

Construction characteristics	
Conductor flexibility	Flexible class 5
Insulation	XLHFFER
Outer sheath	XLHFFER
Sheath colour	Black
Halogen free	IEC 60754-1/IEC 60754-2
Conductor material	Tin Coated Copper Class 5 acc. to EN 60228
Dimensional characteristics	
Number of cores	1
Conductor cross-section	4 mm ²
Nominal insulation thickness	0.7 mm
Nominal outer sheath thickness	0.8 mm
Nominal overall diameter	5.4 mm
Approximate weight	55 kg/km
Electrical characteristics	
Rated Voltage U ₀ (Um)	1.0/1.0 (1.2) kV AC - 1.5/1.5 (1.8) kV DC
Max. DC resistance of the conductor at 20°C	5.09 Ohm/km
Mechanical characteristics	
Frequent torsion	100 000 cycles
Bending	100 000 cycles in reverse bending
Mechanical resistance to impacts	Good
Usage characteristics	
Thermal endurance	IEC 60216-1-2
Weather resistance	Excellent
Flame retardant	IEC 60332-1
Odour resistance	Yes
UV resistance	Yes (720 hours)
Water proof	Yes
Resistance to vibrations	High
Gases compatibility	IEC 60754-2
Gases toxicity	IEC 60754
Smoke density	IEC 61034-1-2
Operating temperature, range	-40 - 90 °C
Max. conductor temperature in service	120 °C
Short-circuit max. conductor temperature	250 °C



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building wires, rated voltage 1000V

Contact Sales & Marketing Department Phone: +9611355040 liban.cables@nexans.com

building wires, rated voltage 1000V, CLUPVC flame retardant

DESCRIPTION

1-SCOPE
This specification covers single core, PVC insulated cables, intended for internal wiring in dry locations, concealed in conduits.
2.1-Conductor
Plain, annealed, electrolytic copper conductors, solid or stranded, complying with the applicable requirements of IEC 228.
2.2 - Insulation
PVC based thermoplastic material



STANDARDS

International IEC 60228; IEC 60332-1-2
National DIN VDE 0250



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Type Tests

Mechanical characteristics on insulation material (tensile strength and elongation at break) in accordance with VDE 250.

These tests will be carried out on one length of the order
Tests certificates will be provided by Liban Cables

Technical Proposal for AC Cable (Med Cables)

مهمتنا - رؤيتنا

نبذة عامة عن الشركة

الشهادات والإختبارات

مهمتنا

توفر شركة البحر المتوسط للكابلات لعملائها خدمات عالية الجودة تعتمد على دراسة مفصلة وشاملة لأحتياجاتهم لكافة الكابلات وتوجهنا في ذلك هو بناء علاقات شركة مثبته بيننا وبين عملائنا لضمان تحقيق التوافق بين الطرفين.

OUR MISSION

The Mediterranean Cable Company provides its customers with quality services based on a detailed and comprehensive study of their needs for all cables. Our aim is to build strong partnerships between us and our customers to ensure harmonization between the two parties.

رؤيتنا

تسعى شركة البحر المتوسط للكابلات لتغيير الصورة النمطية لتقديم الخدمات الانتاجية في الجمهورية اللبنانية والمحيط بالتركيز على:

- اختيار افضل الكوادر البشرية وجذب الكفاءات للعمل.
- الالتزام بالمعايير الدولية في عملية تصنيع الكابلات.
- السرعة في التنفيذ.
- الاسعار المنافسة.

OUR VISION

Mediterranean Cable Company seeks to change the stereotype of providing productive services in the Republic of Lebanon and the surrounding region by focusing on:

- Selecting the best human cadres and attracting competences to work.
- Compliance with international standards in cable manufacturing.
- Speed in implementation.
- Competitive prices.

النشأة

أشأت شركة البحر المتوسط للكابلات عام 2009 وهي تعمل وبشكل مستمر على تطوير منتجاتها وبالتالي تزويد المصنع بألات حديثة ومتطورة تضمن جودة الانتاج

سياسة الشركة

شركة كابلات البحر المتوسط هي شركة رائدة في مجال إنتاج الكابلات، تقوم بتصنيع الكابلات الكهربائية بالإضافة الى كابلات التحكم للاستخدام العام-من قبل الحكومة، والاستخدام الشخصي - من قبل المواطنين. نحن نقدم مجموعة واسعة من الكابلات عالية الجودة.

ونحن نؤمن أن أهم أصولنا هم موظفينا المؤهلين والمختصين الذين يساعدوننا بالتأهيل، ويلتزم موظفوننا بالعمل ضمن متطلبات آيزو 9001:2015 كما نلتزم بإجراء التحسينات المستمرة لنظام إدارة الجودة لديها.

الشركة عضو في

- جمعية الصناعيين اللبنانيين.
- غرفة التجارة والصناعة والزراعة في صيدا والجنوب.
- تجمع صناعي الجنوب.

الشهادات

- حائزة على:
- شهادة الجودة ISO 9001:2015 منذ العام 2012
- شهادات Type Test من جامعة DEGLI STUDI DI ROMA
- شهادات Type Test من معهد البحوث الصناعية في لبنان.
- شهادات Type Test من جامعة دمشق.

الموارد البشرية

- الكادر الاداري يتضمن:
- 1. مجلس الإدارة
- 2. المدير العام
- 3. مدراء الأقسام الادارية.

الكادر التقني:

ويتضمن المهندسين المتفرفين على الانتاج والجودة.

الكادر الفني:

المتخصص بأعمال الصيانة الكهربائية والميكانيكية والالكترونية.

العمالين:

يتوفر في المصنع اليد العاملة الماهرة من ذوي الخبرة والكفاءة العالية في تصنيع الكابلات في جميع الاقسام المصنع.

الموارد غير البشرية

يتوفر في المصنع جميع الآلات المتخصصة بصناعة الكابلات المنخفضة والمتوسطة ومختبر.

زبائننا

- الجمهورية اللبنانية:
- 1. وزارة الطاقة
- 2. وزارة الاشغال العامة
- 3. شركة كهرباء لبنان
- 4. مجلس الإنماء والاعمار
- 5. مجلس الجنوب.
- 6. الشركات والمعهدين في لبنان
- 7. الصليب الاحمر الدولي

الجمهورية العربية السورية

(شركة الكهرباء، الصليب الاحمرمهاولين وكلاء ...)

العراق

(شركة الكهرباء، تجارة بيع بالتجزئة، ...)

الاردن

(شركة الكهرباء، تجارة بيع بالتجزئة، ...)

دبي

(تجارة بيع بالتجزئة، ...)

الكويت

(تجارة بيع بالتجزئة، ...)

وودول افريقية

(السودان، الكونغو، ابيدجان، نيجيريا غانا، ...)

المشاريع المنفذة بمنتجاتنا

- ألوستراد العربي
- ألوستراد النبطية - مرجعيون
- مشروع البازوك ونبع الصفا (محطات توليد)
- مشروع نهر الليطاني (محطات توليد)
- مشروع عمشيت (محطات توليد)
- مشروع دير اعص، شوخين، عين الشعب ... (محطات توليد)
- مشروع تلجكو (مشاريع سكنية)

آلية العمل

المواد الأولية:

يتم تأمين جميع المواد الأولية الخاصة بالإنتاج من مصادر متعددة داخليا وخارجيا (نورد على سبيل المثال ل الحصر، روسيا، مصر، البحرين، دبي، الهند، الصين، ايطاليا، استراليا... والسوق المحلي) .

الإنتاج:

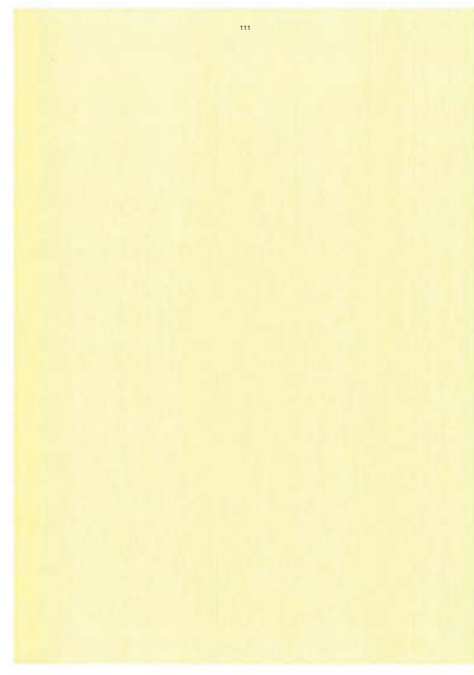
- المواصفات المعتمدة في عملية الإنتاج
- IEC 60502
- NF 209-33
- NL 43
- NL 1-166
- NL Mark Scheme

تبدأ عملية الإنتاج بعد تأمين المواد الأولية إجمالا بالعملية التالية :

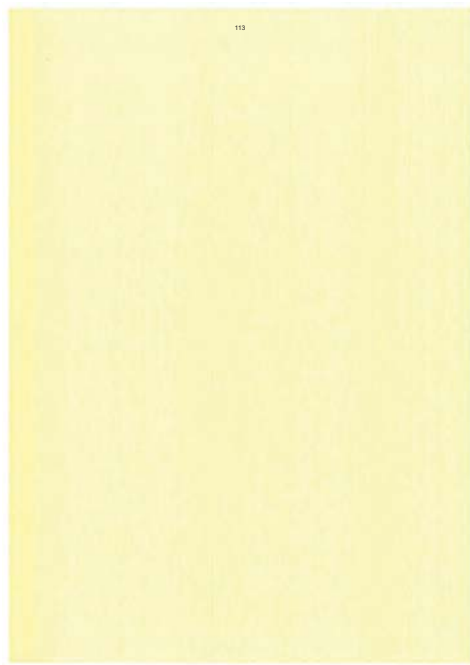
- السحب
- الجدل
- الجمع
- التسليح
- الغلاف

الاسم	الآلة
السحب	T45 AL
	F13
	T45 CU
	T20
	T6
	T15
	630
الجدل	500
	6+1
	30+1
	60+1
	1250
	3+2 (1400)
	3+2 (1000)
الجمع	3+1
	50
	60
	70
	80
	90
	100
	110
	120
	150
الغزل	CCV Line 33-66KV
	CCV Line up to 66-220KV
	(MV & HV)
التخفيف	المنفذ

- الرقابة على الجودة: يتوفر في الشركة مختبر حديث بهدف التدقيق والتأكد على جودة الإنتاج (مرفق لائحة بالمعدات)
- الفحوصات والاختبارات التي يخضع لها المنتج
- Electrical High voltage test
- المواصفات المعتمدة في عمليات الفحص والاختبار
- IEC 60502
- NF 209-33
- NL 43
- NL 1-166
- الإختبارات الدورية (ROUTINE TEST)
 - A: visual inspect aspect, color...etc
 - B: Measuring
 - B1: Diameter
 - B2: Thickness
 - B3: Linear resistance
 - B4: Excentricity
 - B5: Stamp the tag
- إجراءات مراقبة المنتج الكهربائي
 - A: Partial discharge
 - B: Test voltage U²+2.5
 - C: Identification cores
 - D: Tengan Delta and Impulse Test
 - E: Stamp the tag
- منتجاتنا: ينتج المصنع جميع الكابلات التوتر المنخفض والتوتر المتوسط
 - Domestic Cables
 - Power Cables
 - High and Medium Voltage
 - Arial Bundle
 - Communication Cables



Scanned with CamScanner



Med Cables



POWER CABLES
PVC
INSULATED
LOW VOLTAGE



SINGLE CORE CABLES, WITH SOLID CIRCULAR COPPER CONDUCTOR, PVC INSULATED, PVC SHEATHED .

SPECIFICATIONS : VDE0271 IEC502
CABLE TYPE : NYY Cu/PVC/PVC
NOMINAL VOLTAGE : 0.6/1 KV 0.6/1 KV



DESCRIPTION

- CONDUCTOR:** Soft annealed solid copper wire.
- CORE:** Each conductor is insulated with a layer of extruded normal PVC compound rated 70°C or heat resistant PVC Compound rated 85°C with different colours.
- ASSEMBLING:** Two or more cores are laid up with a suitable lay to form the assembled cable.
- BEEDING:** The so assembled cores are bedded with a layer of extruded rubber or other suitable plastic material to fill the interstices between cores and render the cable round.
- SHEATHING:** Over the so bedded cable is applied an outer protecting layer of extruded PVC compound.
- APPLICATION:** For outdoor installation in damp and wet locations, laid direct to the ground (when well protected) in ducts, in trenches and in steel brackets. They are normally used for power distribution in urban networks, in industrial plants, as well as in thermopower and Hydropower stations.

تتكون الوحدة من كابل من صلك مسطح، خطين أو عدة خطوط العزل بغطاء من البلاستيك المتينة التحمل لدرجة 70 أو 85 درجة مئوية تتجمع هذه الخطوط العازلة بغطاء مناسبة لتزويد الكابل الجمعي. يغطي الكابل الجمعي بغطاء من حشو البلاستيك أو من مثابه التكرنوكولون لزيادة العزل الكهربائي والحد من تأثيرات الرطوبة. يتم تصنيع الكابلات الجماعية في الحامضات الكهربائية وتستخدم في التطبيقات الصناعية والعمارة السكنية على الأرض أو على حوامل فولاذية. كما يستعمل لتوزيع الطاقة في المناطق الصناعية كما يستعمل في مراكز توليد الطاقة الكهربائية والمحطات.

MULTICORE CABLES WITH SOLID CIRCULAR COPPER CONDUCTORS, PVC INSULATED, PVC SHEATHED, ACCORDING TO VDE 0271 (NYY) AND IEC 502 (CU/PVC/PVC) SPECIFICATIONS.

NUMBER AND CROSS SECTION OF CONDUCTORS	MINIMUM NUMBER OF WIRES	NOMINAL INSULAT THICKNESS	NOMINAL SHEATH THICKNESS	APPROX. CABLE DIAMETER	APPROX. CABLE WEIGHT	MAX.D.C RESIST AT 20°C
2 X 1.5	1	0.8	1.8	11.3	165	12.1
2 X 2.5	1	0.8	1.8	12.4	204	7.41
2 X 4	1	1.0	1.8	13.8	270	4.61
2 X 6	1	1.0	1.8	14.4	335	3.08
2 X 10	1	1.0	1.8	16.5	452	1.83
3 X 1.5	1	0.8	1.8	11.8	186	12.1
3 X 2.5	1	0.8	1.8	13.0	238	7.41
3 X 4	1	1.0	1.8	14.7	317	4.61
3 X 6	1	1.0	1.8	15.6	398	3.08
3 X 10	1	1.0	1.8	17.6	554	1.83
4 X 1.5	1	0.8	1.8	12.7	220	12.1
4 X 2.5	1	0.8	1.8	13.5	285	7.41
4 X 4	1	1.0	1.8	15.7	394	4.61
4 X 6	1	1.0	1.8	17.3	500	3.08
4 X 10	1	1.0	1.8	19.0	696	1.83
5 X 1.5	1	0.8	1.8	13.5	254	12.1
5 X 2.5	1	0.8	1.8	14.9	326	7.41
5 X 4	1	1.0	1.8	17.1	463	4.61
5 X 6	1	1.0	1.8	18.6	592	3.08
5 X 10	1	1.0	1.8	20.8	835	1.83

MULTICORE CABLES WITH SOLID CIRCULAR COPPER CONDUCTOR, PVC INSULATED PVC SHEATHED

SPECIFICATIONS : VDE0271 IEC502
CABLE TYPE : NYY Cu/PVC/PVC
NOMINAL VOLTAGE : 0.6/1 KV 0.6/1 KV



DESCRIPTION

- CONDUCTOR:** Soft annealed copper wires, concentrically stranded in successive layers, in opposite direction, to form the stranded conductor.
- CORE:** The so stranded conductor is insulated with a layer of extruded normal PVC compound rated 70°C or heat resistant PVC compound rated 85°C.
- ASSEMBLING:** Two or more cores are laid up with a suitable lay to form the assembled Cable Cores.
- BEEDING:** The assembled cable core is bedded with a layer of extruded rubber or other suitable plastic material, in order to fill the interstices between the cores and render the cable round.
- SHEATHING:** Over the so bedded cable is applied an outer protecting layer of extruded PVC compound.
- APPLICATION:** For outdoor and indoor installations in damp and wet locations, laid direct to the ground (when well protected) in ducts, in trenches and in steel brackets. They are normally used for power distribution in urban networks, in industrial plants, as well as in thermopower and Hydropower stations.

تتكون الوحدة من كابل من صلك مسطح مركزية يتجمعها سلكة مختلفة التوزيع أو صلك الكابل الجمعي. يغطي الكابل الجمعي من البلاستيك المتحمل لدرجة 70 أو 85 درجة مئوية. يتجمع صلك أو عدة خطوط لتزويد الكابل الجمعي. يغطي الكابل الجمعي بغطاء من حشو البلاستيك أو من مثابه التكرنوكولون لزيادة العزل الكهربائي والحد من تأثيرات الرطوبة. يتم تصنيع الكابلات الجماعية في الحامضات الكهربائية وتستخدم في التطبيقات الصناعية والعمارة السكنية على الأرض أو على حوامل فولاذية. كما يستعمل لتوزيع الطاقة في المناطق الصناعية كما يستعمل في مراكز توليد الطاقة الكهربائية والمحطات.



BY1-C/4-420-20

Specification

Type	BY1-C1	BY1-C2	BY1-C3	BY1-C4	BY1-40
Rating Voltage (DCV)	220	220	320	320	320
DC Voltage(U _N)/V	110	110	160	160	110
Max Working	I _N	320	320	420	420
	I _{sc}	415	415	560	560
Max Available	I _{sc} =10kA	0.9	0.9	1.2	1.2
	I _{sc} =16kA	1.0	1.0	1.3	1.3
	I _{sc} =18kA	1.2	1.2	1.7	1.7
	I _{sc} =19kA	1.3	1.3	1.8	1.8
	I _{sc} =20kA	1.4	1.4	1.9	1.9
	I _{sc} =25kA			2.4	2.4
	I _{sc} =30kA				
	I _{sc} =40kA	1.9	1.9		2.0
Clamping current (i _{cc})/kA	30			30	
Max Clamping current (i _{cc})/kA	40			60	
Response time (ms)	20				
Energy (20kA/40kA)	200				
Temperature	-40°C~+85°C				
Color	Module	Grey		Orange	
	Base	Grey			
Material of case	Nylon				