

ELSR722-00004 / ELSR103-00001 Scalable All In One

Installation Manual

ELSR722-00004: Battery Tray (ELPT362-00004) x 2 ELSR103-00001: Battery Tray (ELPT362-00004) x 3

	CAUTION
	 Use this product only at home.
	 Do not operate with other components not approved by the ESS systems. (Connecting other products in parallel to Hansol Technics's products may result in abnormal operation.)
	 The internet connection is required to use all functions of the ESS system.
	 If you have a problem, please contact the installer.
	 The Specifications of the product may be modified without prior notice to improve product quality.
	CAUTION

	1.	Read the manual and all other available information.
	2.	Attend Hansol installation training course/s. This course/s is recommended before the distributor Provides an ESS.
	3.	Register as a Hansol installer.
Λ	4.	Be compliant with CEC accreditation requirements for grid connect systems with batteries, which currently requires off-grid installation accreditation.
	5.	Visit the installation site prior to quoting.
	6.	Check that the switchboard has room, or is suitable for, additional connection/s (e.g. external meter for ESS 3.6 model).
	7.	Be aware of Dangerous Goods Class 9 regulations for transport, storage and handling of lithium batteries.
	8.	Be aware of Building Code regulations for battery installations.
	9.	Read the manual again.
	10	. Ensure you have the latest version of the installation manual, which can be downloaded from your distributor's website.

Table of Contents

Table of Contents i			
Table o	of Tab	bles	iv
Table	of Fig	ures	v
1. Abo	ut thi	s Manual	1
1.	1 Va	lid Range	1
1.	2 Ta	rget Group	1
1. 1.	3 Ma 4 Sv	anual Storage mbols Used	1 1
1.	т Ју		1
2. Safe	ty		4
2.	1 Int	tended Use	4
2.2	2 Sa	fety Precautions	5
2	3 Pro	oduct Overview	6
	2.3.	Basic Specifications	/
	2.3.	2 Grounding the PV Inverter	
	2.3.	5 Fail-sale actions upon power failure	8
3. Pack	kage F	Removal and Inspection	9
3.	1 Pa	ckage Removal and Tray Assembly	9
	3.1.	1 Removing the Enclosure Package	9
	3.1.	2 Removing the Battery Tray Package	10
	3.1.	3 Checking Components on the Packing List	11
	3.1.4	4 Assembling the Battery Tray	12
3.2	2 Ch	ecking for damage in Delivery	12
3.	3 Ide	entifying Hansol Scalable All in One	13
4. Insta	allatio	on	16
4.	1 Se	lection of Installation Location	16
	4.1.	1 Possible locations for installation	17
	4.1.	2 Storing the ESS system	17
	4.1.	3 Dimensions and Weight	18
	4.1.4	4 Ambient Conditions and Temperatures	18
	4.1.	5 Minimum Clearance	18
	4.1.0	6 Position (Location Selection)	19
4.	2 Mo	ounting Instructions	20
5. Elec	trical	Connections	22
5.	5.1 The Overview of Electrical Connection23		
5.2	5.2 Opening the Side Case Cover		
5.3	3 Th	e Overview of the Connection Area	29
5.4	4 Ва	ttery installation	30

		5.4.1	7.2 kWh and 10.8 kWh Battery Installation	
		5.4.2	Scalable (From 7.2 kWh to 10.8 kWh)	
	5.5	Closir	ng the Side Case Cover	34
	5.6	A Met	hod of Locking the Distribution Box (Board)	
		5.6.1	AC Circuit Breaker and DC Isolator	
		5.6.2	RCD (residual current device) Leakage Circuit Breaker	
	5.7	Grid S	witch Box Connection between Grid and System	
	5.8	A Con	necting Method of DC and AC Line	46
		5.8.1	Mounting	49
	5.9	A con	necting method of DRM connection	51
	5.10) LAN (Cable Connection between PC and System	52
6. C	omn	nunicat	tion Connection	
	6.1	Interr	net Connection	57
		6.1.1	Components	57
		6.1.2	Connection Block Diagram	57
		6.1.3	Connection Method	57
7. Ei	nteri	ing Init	ial Installation Information	
	71	Inform	nation Input Administrator	58
	7.2	Syster	m Information input stage	
	7.3	Web I	Page Connection	59
		7.3.1	Web Page Connection	
		7.3.2	Remote Monitoring	66
	7.4	PC Di	rect Connection and Local Setting Value	70
		7.4.1	PC Direct Connection Flow	70
		7.4.2	Inserting Jumper Wire	70
		7.4.3	LAN Cable Connection between PC and System	70
		7.4.4	SIM (System Install Manager) Connection	71
		7.4.5	Operating test	73
		7.4.6	Entering Setting Value	
8.0	pera	ation To	est	79
	8.1	Starti	ng the System	79
	8.2	Turniı	ng off the System	81
	8.3	Descr	iptions of Operation Mode	81
		8.3.1	PV-Auto Mode	
		8.3.2	PV-Only Mode	
		8.3.3	Battery-Discharge Mode	
		8.3.4	Standby Mode	
		8.3.5	Grid-Charge Mode	
		8.3.6	Stand-Alone Mode	
		8.3.7	Self-Keliance Mode	
		8.3.8	Application Download Mode	85

9. P	robl	em Cor	nfirmation	86
	9.1	Gener	ral Events	86
		9.1.1	INVERTER General Events (Warnings)	86
		9.1.2	System General Events (Protection)	89
		9.1.3	BMS General Events	90
		9.1.4	EMS/Communication Events	92
		9.1.5	Single Fault Events	92
	9.2	Signif	icant Events	94
10.	Ma	aintena	ince	96
	10.1	I Clean	ing the Fan and the Cover	96
	10.2	2 Check	king and Exchanging Various Components	98
		10.2.1	Fuse Check	98
		10.2.2	Input / Output Terminal Check	98
		10.2.3	DC Link Check	99
		10.2.4	FAN Operation Check	99
	10.3	Batter	ry Maintenance	100
		10.3.1	Checking Battery Problem	100
		10.3.2	Battery Exchange Procedure	101
	10.4	4 The Li	ist of Replaceable Parts	102
		10.4.1	Li-Ion Battery Tray	102
		10.4.2	PV Connector	103
		10.4.3	FAN	103
11.	Те	chnical	Specifications	104
12.	Di	sassem	bly	109
	12.1	I Disass	sembly	109
		12.1.1	Removing Electric Connection	109
		12.1.2	Disassembling the Main Body of Scalable All in One	109
	12.2	2 Packa	ging	110
	12.3	3 Storag	ge	110
	12.4	1 Dispo	sal	110
13.	Со	ntact		111
Safe	ety F	Precaut	ions	112
Add	litio	nal Gui	delines for Fire Fighting Safety Cautions for the Transporter	115

Table of Tables

[Table 1-1: Symbol Description]	3
[Table 2-1: Part Description]	6
[Table 2-2: Basic Specifications]	7
[Table 2-3: Maximum Outage Response Times for each System with Battery Full]	8
[Table 3-1: Component Description]	11
[Table 4-1: Weight of All in One]	18
[Table 4-2: Specifications for anchor bolt]	20
[Table 5-1: Component Description]	25
[Table 5-2: Part List]	27
[Table 5-3: Front Case Open Process]	
[Table 5-4: Front and Rear view of All in One (For 7.2 kWh system)]	29
[Table 5-5: Circuit breaker, DC Isolator and power line specification]	37
[Table 5-6: RCD Leakage circuit breaker description]	37
[Table 5-7: Wire Standard]	46
[Table 5-8: DRMs Supported by the Inverter]	51
[Table 8-1: Description of Icons on indication screen]	79
[Table 9-1: Inverter general events warning list]	87
[Table 9-2: System general events protection list]	89
[Table 9-3: BMS general events list]	90
[Table 9-4: EMS/communication events list]	91
[Table 9-5: Single fault events list]	92
[Table 9-6: Significant events list]	94
[Table 10-1: Replaceable parts list]	101
[Table 11-1: Technical specifications]	

Table of Figures

[right 2 r. connection Didgram]	4
[Figure 2-2: Part View of Hansol All in One]	5
[Figure 2-3: Back up mode (LCD)]	8
[Figure 3-1: Process for the enclosure package removal]10	0
[Figure 3-2: Process for the battery package removal]10	0
[Figure 3-3: Packing List]	1
[Figure 3-4: Process for the battery assembly (For 10.8 kWh System)]12	2
[Figure 3-5: Name Plate]	4
[Figure 3-6: Battery Tray Label]	5
[Figure 4-1: Dimension of All in One]18	8
[Figure 4-2: Minimum Clearance for All in One]	9
[Figure 4-3: Restriction for the surface gradient]	9
[Figure 4-4: Spanner for fastening anchor nuts (Minimums 4ea)]	0
[Figure 4-5: Anchor Bolt]	0
[Figure 4-6: A Flat head driver for the front cover knob (larger than 10 mm)]	1
[Figure 4-7: The Plus head driver (No.2) for the tray, the side cover, and grounding]	1
[Figure 4-8: A spanner for fastening use]	1
[Figure 4-9: A fork lifter with height of 85-200 mm]2	1
[Figure 5-1: Electrical connections]	3
[Figure 5-2: PV connections]	4
[Figure 5-3: Front Inside View]	б
[Figure 5-4: Rear Inside View]	б
[Figure 5-5: Side View]	7
[Figure 5-6: Removed Side Cover View]	0
[Figure 5-7: Battery Connection]	0
[Figure 5-8: Battery Docking description]	1
[Figure 5-9: Unfastening screws]	1
[Figure 5-10: Removal of the side cover]	2
[Figure 5-11: Removal of the battery cover grade]	2
[Figure 5-12: Battery tray mounting]	3
[Figure 5-13: Side Cover Assembly process 1]	4
[Figure 5-14: Side Cover Assembly process 2]	4
[Figure 5-15: Side Cover Assembly process 3]	5
[Figure 5-16: Distribution box connection diagram]	5
[Figure 5-17: Wiring Schematic of Single Phase System for Australia]	0
[Figure 5-18: Components of Grid Switch Box]	0
[Figure 5-19: Assembling the Cable Gland]4	1
[Figure 5-20: Wiring Diagram]4	1
[Figure 5-21: Assembling the Wires]42	2
[Figure 5-22: Assembling the Sealing nuts]42	2
[Figure 5-23: Final assembly]43	3
[Figure 5-24: Assembling the Upper Part]43	3
[Figure 5-25: Assembling the Rubber Seal]44	4
[Figure 5-26: Assembling the Knob]44	4
[Figure 5-27: Final Assembly]4	5
[Figure 5-28: PV connector (Female) and PV line (Male)]46	5
[Figure 5-29: Load Connector (Male) and Grid Connector (Female)]46	б
[Figure 5-30: Connection of system for floating solar array, load and grid]42	7
[Figure 5-31: PV connector connection (MC4 connector connection)]42	7

[Figure 5-32: L and N AC line connection method]	48
[Figure 5-55: Optional Actions]	
[Figure 5-54: Structure of the cable for RJ45 steeve housing]	ا C
[Figure 5-55: RJ45 cable clip and the groove of RJ45 sleeve housing]	
[Figure 5-36: Assembling RJ45 LAN cable]	
[Figure 5-37: Fastening RJ45 LAN cable in RJ45 sleeve nousing]	52
[Figure 5-38: Assembling the waterproof cap set]	52
[Figure 5-39: Putting the sealing cap into RJ45 sleeve housing]	53
[Figure 5-40: Assembling the sealing nut to RJ45 sleeve nousing]	53
[Figure 5-41: Assembled RJ45 sleeve housing cable]	53
[Figure 5-42: Opening the cap of RJ45 LAN socket]	54
[Figure 5-43: Position of RJ45 LAN port]	54
[Figure 5-44: Inserting the assembled cable]	54
[Figure 5-45: Upper and lower locking grooves]	55
[Figure 6-1: Internet Connection]	56
[Figure 7-1: Main page]	58
[Figure 7-2: Installer in page]	59
[Figure 7-3: Product Information Entry Screen in Step 1]	60
[Figure 7-4: Address Entry in Step 2]	61
[Figure 7-5: Product Setup Information Details Entry in Step 3]	62
[Figure 7-6: Energy Rate Information Entry in Step 4]	63
[Figure 7-7: Installation Completion Screen]	64
[Figure 7-8: Remote Monitoring Screen]	65
[Figure 7-9: Selection of Product Serial No. to Test]	65
[Figure 7-10: Selection of Detailed Product Information]	66
[Figure 7-11: Operation checkup for energy meter page]	66
[Figure 7-12: ESS Operation Test Page]	67
[Figure 7-13: Jumper]	69
[Figure /-14: ICP/IP setting]	70
[Figure /-15: Initial setup page]	/1
[Figure 7-16: Operating Test Screen]	72
[Figure 7-17: PV-Output Test Screen]	73
[Figure 7-18: Grid-Charge Test Screen]	74
[Figure 7-19: Battery-Discharge Test Screen]	75
[Figure /-20: Auto-Weak/Strong Test Screen]	/6
[Figure 8-1: Initial indication screen on power on]	78
[Figure 8-2: Standby state indication screen before the EMS command]	/9
[Figure 8-3: PV generation, Battery charge, Load use, sell remaining amount]	80
[Figure 8-4: PV generation, Battery discharge, Load use, buy shortage amount]	80
[Figure 8-5: PV generation, Battery standby, Load use, sell remaining amount]	81
[Figure 8-6: PV generation, Sell remaining amount]	81
[Figure 8-7: PV generation, Buy shortage amount]	81
[Figure 8-8: Battery discharge, Load use]	82
[Figure 8-9: Battery discharge, Load use, Buy shortage amount]	82
[Figure 8-10: Indication screen on Standby Mode, Buy shortage amount]	82
[Figure 8-11: Indication screen on Grid charge Mode]	83
[Figure 8-12: Indication screen on stand-alone mode]	83
[Figure 8-13: Indication screen on Self-Reliance mode, Battery to LOAD discharge]	83
[Figure 8-14: Indication screen on Self-Reliance mode, PV to BATTERY charge (LOW SOC).]84
[Figure 8-15: Indication screen on Application Download Mode]	84
[Figure 10-1: PV MC4 connector]	95
[Figure 10-2: Upper cover removal]	96
[Figure 10-3: Fan removal]	96

[Figure 10-4: Li-lon Battery tray (manufactured by SAMSUNG SDI)]	101
[Figure 10-5: PV Connector (MC4)]	102
[Figure 11-1: Derating Curve]	106
[Figure 11-2: Power efficiency curve of System]	106
[Figure 11-3: Power efficiency curve of PV Generation]	107

1. About this Manual

1.1 Valid Range

This is the installation manual for the Scalable (7.2 kWh/10.8 kWh) All in One system. Please read this installation and user manual carefully before installing and operating the scalable all in one system.

It contains important safety instructions. The warranty will be void if you fail to follow the instructions in this manual.

1.2 Target Group

This installation manual applies only to the Hansol Scalable All in One.

1.3 Manual Storage

The user manual and installation manual can be downloaded from the product download section at "https://myess.hansoltechnics.com". The specifications of the product can be changed for improvement without notice.

Also, the software can be updated automatically without notice over the Internet.

1.4 Symbols Used

Symbols	Meaning
	CAUTION
	This symbol indicates a hazardous situation which could result in a light injury, if not avoided.
\land	NOTICE
	This symbol indicates a hazardous situation which could result in damage to the property, if not avoided.
	Information
Ĩ	This symbol indicates valuable tips for optimum installation and operation of the product.

Number	Symbol	Description
1		Direct current
2	\sim	Alternating current
3	$\overline{\sim}$	Both direct and alternating current
4	$3\sim$	Three-phase alternating current
5	$3N\sim$	Three-phase alternating current with neutral conductor
6		Earth terminal
7		Protective conductor terminal
8		Frame or chassis terminal
9	Ĩ	Refer to the operating instructions
10		On (supply)
11	\bigcirc	Off (supply)
12		Equipment protected throughout by double insulation or reinforced insulation
13		Caution: Risk of Electric Shock
14		Caution: Hot Surface

Number	Symbol	Description
15		Caution: Risk of Danger
16		In position of a bi-stable push control
17		Out position of a bi-stable push control
18		Input terminal or rating
19	$\bigcirc \rightarrow$	Output terminal or rating
20	$\langle \rangle$	Bidirectional terminal rating
21	$\mathbf{A}(\mathbf{i})$	Caution: Risk of Electric Shock and Energy Storage Timed Discharge
22		Caution: Risk of Hearing Damage and Wear Hearing Protection Wear hearing protection
23		Do not dispose of the inverter with household wastes. For further information on disposal, refer to the installation manual provided.
24	CE	The CE Indication: The relevant equipment complies with the requirements in the EC guidelines.
25	5min.	Caution: Risk of Electric Shock and wait at least 5 min after power turn off when opening the product.

[Table 1-1. Symbol Description]	[7	Table	1-1:	Symbol	Description]
---------------------------------	----	-------	------	--------	--------------

2. Safety

2.1 Intended Use



The Scalable All in One system is designed for residential use. It is a single-phase, gridconnected system of solar energy sources and Li-Ion Battery energy storage.

The Scalable All in One system uses solar energy power connected to the input/output terminal installed on the side of the device in order to:

1) charge the Li-lon battery energy storage,

2) provide a supply to the household load, and

3) convert direct current (DC) electricity of the battery to alternating current (AC) to discharge as household single-phase load or electric system.

This device should not be used for any purpose other than the purpose described in this installation manual. Any substitute use of this device, random change in any of its parts, and use of components other than sold or recommended by Hansol Technics will nullify the product's guarantee. For example, Hansol Li-lon battery energy storage should not be replaced by other manufacturer's battery storages. For further information on proper use of this device, contact the Hansol Technics Service line or visit at"www.hansoltechnics.com"



[Figure 2-1: Connection Diagram]

2.2 Safety Precautions

CAUTION

High voltages in power conditioning circuits. Lethal hazard of electric shock or serious burns.

All work on the PV modules, inverters, converters, and battery systems must be carried out by qualified personnel only.

Wear rubber gloves and protective clothing (protective glasses and boots) when working on high voltage/high current systems such as INVERTER and battery systems.

CAUTION

Li-lon battery energy storage system (ESS) inside. When assembling the system, do not intentionally short the positive (+) and negative (-) terminals with metallic object.

All work on the ESS and electrical connections must be carried out by qualified personnel only. The ESS within Scalable All in One provides a safe source of electrical energy when operated as intended and as designed.



A potentially hazardous circumstance such as excessive heat or electrolyte mist may occur due to improper operating conditions, damage, misuse and/or abuse. The following safety precautions and the warning messages described in this section must be observed. If any of the following precautions are not fully understood, or if you have any questions, contact Customer Support for guidance (see chapter 13).

The safety section may not include all regulations for your locale; personnel working with Scalable All in One must review applicable federal, state and local regulations as well as the industry standards regarding this product.



CAUTION

This product is intended to be used for PV source inputs and residential home grids (AC 230V). If not used as intended, the protection provided by the equipment may be impaired.



This device is designed appropriate for two-PV string structure. Therefore, the PV string 1 and PV string 2 must be connected to PV input 1 and PV input 2, respectively.

Do not split one PV string output for connecting it into the PV input terminal 1 and input terminal 2.

2.3 Product Overview

The All in One system includes the PV inverter, battery charger/discharger, Li-Ion battery, and EMS.

The basic operating modes consist of PV generation mode, PV generation + charge/discharge mode. The operation mode of this product is automatically determined by the EMS algorithm.



[Figure 2-2: Part View of Hansol All in One]

No.	Description
1	Lithium Ion battery
2	INVERTER & Converter (PV inverter and battery charger / discharger)
3	Air Filter1 (Bottom)
4	Air Filter2 and FAN (Top)
5	Input terminal (MC4-2set)
6	DC isolator
7	Grid and Load connector (RST50i5S connector)
8	Service Connecter for Installation
9	Communication (LAN)
10	DRM Connection (LAN)

[Table 2-1: Part Description]

2.3.1 Basic Specifications

PV Generator Data (DC)							
Max. input total power	6.6 kWp						
Max. input power per string	3.3 kWp						
Max. input voltage	55	0 V					
Min. input voltage/Initial input voltage	125 V,	/150 V					
MPPT voltage range	125 V~	~500 V					
Max. input current per string	15	5 A					
Number of independent MPP trackers	-	2					
Battery	Battery Data (DC)						
System model No.	ELSR722-00004	ELSR103-00001 (*)					
Battery rated capacity	7.2 kWh	10.8 kWh					
DOD (Depth of Discharge)	90 % (6000cycles, 5 ~ 95 %),						
Battery voltage range/nominal voltage	96 ~ 132 V / 120 V	145 ~ 198 V / 180 V					
Battery Max. current	46 A	38 A					
Battery DC/DC	Converter Data						
Rated power	4.0 kW	4.98 kW					
Grid Connect	ion Data (AC)						
Rated power	4.98	3 kW					
Max. apparent AC power	4.98 kVA						
Max. output current	22 A						
Max. input AC power 8 kW							
Max. allowed current for fuse protection	43 A						
Nominal AC voltage/range	230 V/200 V~270 V						
Rated power frequency	50	Hz					

(*):2 battery trays for 7.2 kWh; 3 battery trays for 10.8 kWh

[Table 2-2: Basic Specifications]

2.3.2 Grounding the PV Inverter

The PV inverter complies with the local requirements for grounding the PV inverter. Hansol Technics recommends connecting and grounding the PV inverter's frame and other electricity conducting surfaces in such a way that there is continuous conduction in order to achieve maximum protection for systems and persons. And the PV inverter's DC (+) pole and DC (-) pole are not permitted to be grounded.

2.3.3 Fail-safe actions upon power failure

When a system outage occurs, the utility pole in the following figure disappears and it switches to the backup mode after 20 seconds to supply power. With 7.2 kWh, the supplied power is a maximum of 4 kW and with 10.8 kWh, a maximum of 4.98 kW. The back mode is canceled in 5 minutes after return to normal operation.

The utility pole appears when power is supplied to the system. Upon system outage, it disappears. Upon PV generation, the sun mark appears.



[Figure 2-3: Back up mode (LCD)]

Under DOD 90% and 95% of battery to loads, the 7.2 kWh system can operate for approx. 92 minutes and the 10.8 kWh system for approx. 110 minutes.

System	Battery capacity	Battery energy	Load	Hour	Min
7.2 kWh	7.2 kWh	6.48 kWh	4 kW	1.5	92.3
10.8 kWh	10.8 kWh	9.72 kWh	4.98 kW	1.8	110.8

[Table 2-3: Maximum Outage Response Times for each System with Battery Full]



3. Package Removal and Inspection



CAUTION

Included in this box are a battery and printed circuit board, and the entire weight amounts to 105 kg. Therefore, special care must be taken in handling. Make sure to have at least two persons deliver with something like trolleys and remove the package.

3.1 Package Removal and Tray Assembly

3.1.1 Removing the Enclosure Package

As shown in the figure in this section, remove the package components from the enclosure in the following order.

1. Place the system on the installation location.



2. Open the upper part of the system case.



3. Remove top side of the cover in the front of the product.



4. Open the side support on the bottom.



[Figure 3-1: Process for the enclosure package removal]

3.1.2 Removing the Battery Tray Package

As shown in the [Figure 3-2], remove the package for the battery tray.

- **1**. Open the box cover of the product.
- 2. Remove the buffers with a straight pull.
- 3. Take out the battery tray by grabbing the handle and pulling it up.

Note: The tray weighs approximately 45 kg, so make sure to have at least two persons lift it.



[Figure 3-2: Process for the battery package removal]

3.1.3 Checking Components on the Packing List

Once the product has been delivered, refer to the figure [Figure 3-3] and [Table 3-1], identify the entire components included in the package and the correct number of the quantity listed in the table.

Packing List



[Figure 3-3: Packing List]

Object	Part Name	Code No.	Quantity
Α	INVERTER ASSY	SJ94-00146A or SJ94-00147A	1
В	TRAY ASSY	ELPT362-00004	2 or 3(*)
С	1. SCREW(M4xL8)	6001-002698	12
	2. LAN Connector	VS-08-T-H-RJ45/IP67	2
	3. GRID Connector	97.051.4253.1	1
	4. LOAD Connector	97.052.4253.1	1
	5. Service Connector	A366-CP-T0651	1
	6. DOOR KEY		2
	7. Grid Switch Box	3406-001136	1
D	Installation Quick Guide Manual	SJ68-02142A	1

(*):2 battery trays for 7.2 kWh system; 3 battery trays for 10.8 kWh system

[Table 3-1: Component Description]

3.1.4 Assembling the Battery Tray

The [Figure 3-4] shows the assembly process for the battery tray. Refer to Clause 5.4 and assemble the battery tray as described in it.





[Figure 3-4: Process for the battery assembly (For 10.8 kWh System)]

3.2 Checking for damage in Delivery

When opening the box that contains Hansol Scalable All in One system in it, check for any possible damage caused in transit and ensure the correct number of the components therein. If there is a scratch on the enclosure, contact your local dealer for inspection and service.

3.3 Identifying Hansol Scalable All in One

Attached on the enclosure of this product is the Type Label where the identity of this product is described. For safe usage, make sure that the following product information is indicated on the Type Label.

- Product Name
- Device Type (Model)
- Serial Number (Serial No.)
- Device-specific characteristics
- Certification Lists
- Warnings and Notification

The model No. of All in One system is defined as below.

- ELSR722-00004
 - ELSR: Residential application
 - 72: Battery capacity (x0.1 kWh, Less than 10 kWh)
 - 2: Battery capacity group
 - 00004: product line number
- ELSR103-00001
 - ELSR: Residential application
 - 10: Battery capacity (x1 kWh, More than 10 kWh)
 - 3: Battery capacity group
 - 00001: product line number

The model No. of INVERTER (power conditioning system) is defined as below.

- SJ94-00146A
 - SJ: battery for ESS
 - 94: Ass'y
 - 00146: product number
 - A: National Code (Australia)

The Type Label is shown in the [Figure 3-5].

Hansol Technics Hansol								
Model Name : Scalable All-in-One								
Inverter No. : SJ94-UU146A								
💩 CE 💮								
2		\sim						
		\mathbf{i}						
		[/] 5min.						
Serial No.								
	1							
	Max. Voltage	550V						
DC	MPPT Range	125V ~ 500V						
Photovoltaic Module Input	Max. PV Current 15A Per String/I _{SC PV}		/ 20A					
Δ_{i}	Normal Voltage (Vac)	2	30					
AC	Nominal Frequency (Hz) 50		0					
(Input)	Max. Continuous Current (A)	(A) 35						
	Normal Voltage (Vac)	230						
	Nominal Frequency (Hz)	50						
Load	Normal Active Power Pn (kW) (AC Input + Inverter rating)		8					
	Normal Voltage (Vac)	230						
\sim	Normal Frequency (Hz)	50						
AC	Max. Continuous Current (A) 22		2					
(Output)	Normal Active Power (kW)	4.98						
	Power Factor	0.8un ~	1 ~ 0.8ov					
	Battery Type	Li-	lon					
Battery	Battery Capacity (kWh)	7.2	10.8					
(Input/	Max. Continuous Current (A)	46	38					
	Nominal Voltage (V)	120	180					
Pro	tection Degree / Class	IP5	4/1					
IEC62109-1/-2, AS62040.1.1, AS4777.2:2015, IEC62619, IEC60730-1 Annex H, IEC61000-6-2/-3, IEC61727, IEC62116								

E.

[Figure 3-5: Name Plate]

The product serial number is defined as below

- AR00500108Z11510300001C
 - AR: Residential Type
 - 0050: Output power of inverter (x0.1 kW) *
 - 0108: Capacity of battery (x0.1 kWh)
 - Z1: Factory Line
 - 151030: Production date (YY-year, M-month, DD-day)
 - 0001: Production order per day (001 ~ 999)
 - C: National Code (Australia)
 - (* It was rounded off. (e.g. 4.98 \rightarrow 5.0))

The Battery Tray Label is shown in the [Figure 3-6]. The number of Battery Tray is normally not matched inverter's one. It is finally coupled when installing

SAMSUNG SDI SAMSUNG	IXP46/175/127/[16S]M/-20+60/90 Rechargeable Li-ion Battery Tray		
	Model Name	ELPT362-00004	
Serial No	Nominal Voltage	 60Vdc	
	Rated Capacity	60Ah	
	Recommended CC	21A	
	Recommended CV	=== 65.92V	
	End Charge Current	3.15A	

[Figure 3-6: Battery Tray Label]

The battery tray serial number is defined as below

ET361A14709000X

- ET: Tray type
- 36: Capacity of tray (under x0.1 kWh)
- 1A: Factory Line
- 14709: Production date (YY-year, M-month, DD-day)
- 0001: Production order per day (0001 ~ 9999)
- X: Grade of Cell

4. Installation

4.1 Selection of Installation Location

CAUTION
Danger to life due to fire or explosion!
Danger to life due to high voltages!
Despite careful construction, a fire can occur with electrical devices.
Do not install the Scalable All in One on the following locations:
On flammable construction materials;
In potentially explosive areas; and
In areas where highly flammable materials are stored!

CAUTION
Li-lon battery energy storage is equipped within Scalable All in One. The ESS within Scalable All in One provides a safe source of electrical energy when operated as intended and as designed. A potentially hazardous circumstance such as excessive heat or electrolyte mist may occur due to improper operating conditions, damage, misuse and/or abuse. The following safety precautions and
the warning messages described in this section must be observed. If any of the following precautions are not fully understood, or if you have any questions, contact Customer Support for guidance. The Safety Section may not include all regulations for your locale; Personnel working with 7.2/10.8 kWh All in One must review applicable federal, state and local regulations as well as the industry standards regarding this product.



CAUTION

All work on the ESS and electrical connections must be carried out by qualified personnel only.

4.1.1 Possible locations for installation



Selecting an optimal installation location for the ESS is required for operation safety, efficiency and life of the product.

- 1. This IP54 product is recommended to be installed indoor. If it is required to be installed outdoor, the place must have a roof to avoid direct sunlight, rain and snow.
- Install the product in a well ventilated and clean area with no dust or insects. (e.g. stockyards and carpets are not allowed).
- 3. Do not install the product in an area prone to floods or a high humidity area.
- 4. Do not install the product where a fire or explosion might occur.
- Install the product in a place that is not exposed to corrosive gases (e.g. ammonia, acid, salinity content, etc.).
- 6. Install the product in a place where children cannot reach.
- 7. Install the product considering the noise level because noise is generated during operation, which may cause discomfort. (e.g. near a bedroom)
- The floor must be hard so that it can withstand the weight and vibration of the product. (e.g. concrete structure)
- **9.** The floor must not be sloped or recessed where a pool of water may form. If this is an issue, adjust the height of the floor to be at a higher point.
- **10.** The floor surface must be fixed with anchors.
- **11.** Do not install the product on flammable material. Flammable materials must not be placed within a specific distance.
- **12.** Objects must not be stacked on top of the product.
- **13.** After connecting all the cables, make sure that they are firmly inserted.

4.1.2 Storing the ESS system

- **1.** The product must not be tilted when being moved. It must be lifted vertically.
- 2. The product must not fall from a height of 10 cm or more.
- 3. Make sure the product does not get wet in the rain or snow.
- 4. Do not stack the products on top of each other.

4.1.3 Dimensions and Weight

Once the 7.2/10.8 kWh All in One system has been assembled, its dimension is 1140 x 1200 x 280 mm, and its weight is approximately from 194 kg (7.2 kWh) to 239kg (10.8 kWh). The [Figure 4-1] and [Table 4-1] show the outer dimensions and the weight of the device after assembly, respectively.



[Figure 4-1: Dimension of All in One]

System	Battery	Inverter (Include case)	Total
7.2 kWh	90 kg	104 kg	194 kg
10.8 kWh	135 kg	104 kg	239 kg

[Table 4-1: Weight of All in One]

4.1.4 Ambient Conditions and Temperatures

Identify a proper installation location to install and remove the device easily at any time. This device must be located within reach distance.

The ambient temperature of the installation location will range from -10°C to +40°C.

4.1.5 Minimum Clearance

This device is required to maintain a minimum clearance distance for the safe installation of the product. Refer to the [Figure 4-2] to secure enough space and keep a distance of 0.1 m from the wall, 1 m in the front of the device, 1 m on both sides, and 0.3 m on top.



[Figure 4-2: Minimum Clearance for All in One]

4.1.6 Position (Location Selection)

As shown in the [Figure 4-3], install the device on a flat surface. (Front, back, left, right gradient within $\pm 0.5^{\circ}$)

To allow for natural ventilation, the side of the system must be kept away from the wall about 0.3m at least. Make sure not to have foreign substances and objects stuck in the blowing fan, ventilation entrance and exit sides.



[Figure 4-3: Restriction for the surface gradient]

4.2 Mounting Instructions



[Figure 4-4: Spanner for fastening anchor nuts (Minimums 4ea)]





Screw name	L	S	D	L1	Drill Used	Drill depth (Min.)	Tensile capacity (Max.)	Shear Capacity (Max.)
1/2 (M12)	100	60	17	50	17	55 (mm)	3,200 (kgf)	3,400 (kgf)

[Table 4-2	2: Specification	is for anchor	bolt]
------------	------------------	---------------	-------

- 1. Select the drill proper for specifications for drilling specifications.
- 2. Remove the dust from the hole, then separate the nut and the washer to insert both the bolt and the cap.
- **3.** Set the product in place, assemble the washer and the nut to the bolt, and then use the spanner to fasten the nut (7 Nm).

Required tools for installation



[Figure 4-6: A Flat head driver for the front cover knob (larger than 10 mm)]



[Figure 4-7: The Plus head driver (No.2) for the tray, the side cover, and grounding]



[Figure 4-8: A spanner for fastening use]



[Figure 4-9: A fork lifter with height of 85-200 mm]

5. Electrical Connections

	NOTICE
	The All in One system can be damaged by static discharge.
	Before you touch a component inside the All in One, ground yourself by touching PE or a grounded object
	CAUTION
	CAUTION
	When handling with the Li-Ion Battery Tray for the All in One, you must wear the following personal protective equipment:
	High voltage rated rubber gloves
	Safety goggles or other protective eye equipment
^	40-minute standby period of time to complete discharging in the system before testing electrical parts inside the system!
	Follow the guidelines below when handling the Li-lon Battery Tray.
	Do not intentionally short circuit the positive (+) and negative (-) terminals with a metallic object.
	Do not remove the cap on the terminals. If the cap is removed, avoid contact between the metals and the battery terminals. Do not damage the screw thread.
	Do not use seriously scarred or deformed battery. Dispose immediately according to proper regulations.
	Do not damage sheath of cable and connectors.

5.1 The Overview of Electrical Connection

The Scalable All in One has two solar energy inputs (PV1, PV2). 3.3 kW (per string) is the maximum output for each PV input. The Grid of All in One is connected to the Grid. The Load of All in One is connected to the Home Load. Between the Home Load and the Grid, the Digital Energy Meter is placed for power metering. The AC circuit breaker and DC Isolator in the distribution box are installed between the All in One for safety reasons.



[Figure 5-1: Electrical connections]

As shown in the [Figure 5-2], the Scalable All in One uses the two independent channels of the PV Input ({PV1+, PV1-}, {PV2+, PV2-}). They are used independently for running the maximum power from the sources of PV1 and PV2. Two channels are recommended for independent use for the two PV Inputs. Make sure not to connect one PV string in parallel with the two independent PV inputs (PV1, PV2). (Refer to Scalable All in One Solar energy input connection in the [Figure 5-2]).

A PV string must not be commonly connected to the two input terminals of the All in One system. That is, make sure not to connect the split wiring from one PV string output with the two independent PV inputs (PV1+, PV1- and PV2+, PV2-). (Refer to the PV String connection method in the [Figure 5-2]).

When want connect the two PV input with one PV Module, should be carried out by qualified personnel only.

X PV modules shall have an IEC61730 Application Class A rating or equivalent.



[Figure 5-2: PV connections]

As shown in the [Table 5-1], the input / output power cables correspond to the AC/ DC input / output specifications for this system.

	Area	Insulation	Colo	or code
Grid/Load (L, N)	6~16 mm ²	600 V or more	Black	
PE	6~16 mm ²	600 V or more	Green with y	ellow lines
PV (+), (-)	6 mm ²	700V or more	Black	
Object		Part List		Туре
D	DC Isolator			INVERTER
R	Battery Relay			INVERTER
F	Air Filter1 (Bottom)			INVERTER
DC	DC Board (PN. SJ92	-01490A)		INVERTER
AC	AC Board (PN. SJ92-	-01489A)		INVERTER
SW	SW Board (PN. SJ92	-01491A)		INVERTER
EMS	EMS Board (PN. SJ9	2-01424x)		INVERTER
А	AC reactor			INVERTER
P1	PV1 reactor			INVERTER
P2	PV2 reactor			INVERTER
B1	BDC1 reactor			INVERTER
B2	BDC2 reactor			INVERTER
Н	Heat sink			INVERTER
C1	DC reactor case			INVERTER
C2	AC reactor case			INVERTER
BT	Battery Tray top vie	W		BATTERY
AC_SUB	AC sub board			INVERTER
TR	Transformer			INVERTER

Recommended cables for the Scalable All in One

[Table 5-1: Component Description]



The [Figure 5-3] shows the overall drawing of the scalable system. Please refer to the figure of the drawing for installation and maintenance.





[Figure 5-4: Rear Inside View]



[Figure 5-5: Side View]

Object	Part List	Туре
PV 1	PV input 1	INVERTER
PV 2	PV input 2	INVERTER
D	DC Isolator	INVERTER
L	ESS Load Output	INVERTER
G	Grid Input	INVERTER
LCN	LAN Connector	INVERTER
М	Service for installation	INVERTER
DRM	DRM Connector	INVERTER

[Table 5-2: Part List]

5.2 Opening the Side Case Cover

As shown in the [Table 5-3], Scalable All in One is delivered with the side case cover attached. Remove the side case cover for electrical connections.



CAUTION

Never open the front case cover because it is for after-sales service only. Its high voltage and current may cause damage to your body. Keep the key of the cover in a safe place for later use.



[Table 5-3: Front Case Open Process]

5.3 The Overview of the Connection Area



The [Table 5-4] shows the inner structure of the 7.2 kWh All in One when the front case cover is removed (Section 5.1).

[Table 5-4: Front and Rear view of All in One (For 7.2 kWh system)]

5.4 Battery Installation

5.4.1 7.2 kWh and 10.8 kWh Battery Installation

1. As described in Subsection 5.2, remove the side case.



[Figure 5-6: Removed Side Cover View]

2. Prepare the battery tray to dock the battery on the main body and have at least the two persons work together because the battery weighs much. The [Figure 5-7] shows the battery tray seen from the enclosure.



[Figure 5-7: Battery Connection]

3. When docking the battery, make sure not to leave space with main body. After docking the battery, fasten the screws to fix the tray and the body. Make sure to have two persons lift the battery tray.

Use a torque screwdriver of 1.4 – 1.6 Nm to tighten the screws on the battery tray.



[Figure 5-8: Battery Docking description]

5.4.2 Scalable (From 7.2 kWh to 10.8 kWh)

	CAUTION
	When it is scalable from 7.2 kWh to 10.8 kWh, the system is maintained with the battery life (SOH, EOL) for 7.2 kWh.
	It means that the system guarantees the battery life for 7.2 kWh.
	When it is scalable to 10.8 kWh, the battery life is guaranteed for 7.2 kWh.
\bigwedge	NOTE



1. Unfasten 6 side cover bolts.



Screwing Torque = 1.4 Nm

[Figure 5-9: Unfastening screws]

2. Side cover open



[Figure 5-10: Removal of the side cover]

3. Unfasten 6 screws for the battery cover grade and remove the battery cover grade.



[Figure 5-11: Removal of the battery cover grade]

4. Mount the battery tray.





5.5 Closing the Side Case Cover

1. Hold the side case cover with both hands.



[Figure 5-13: Side Cover Assembly process 1]

2. Hang the product cover on the upper surface of the enclosure, then push the product cover forward to close it.



[Figure 5-14: Side Cover Assembly process 2]

3. As shown in the [Figure 5-15], use a tool such as a flat driver to fix the bolts into ten positions.



[Figure 5-15: Side Cover Assembly process 3]

5.6 A Method of Locking the Distribution Box (Board)

The distribution board performs the following functions when it is connected to the INVERTER, the PV and the Grid.

Grid block function (external) AC circuit breaker

: 230 Vac, 63 A, 10 kA (short circuit current rating)

DC block function; DC Isolator may be fitted.

PV String1 block function (external) DC Isolator

PV String2 block function (external) DC Isolator

: 650 Vdc or more / 15 A or more

Residual current device (RCD): Leakage current measure and block

The [Figure 5-16] shows the connection diagram on the distribution board. The distribution box receives the DC input (the PV string 1 and the PV string 2) from the solar energy module. The power grid and the house load are connected to the Grid (L, N) and Load (L, N).



[Figure 5-16: Distribution box connection diagram]



CAUTION

The PV string 1 and the PV string 2 must be each connected to the distribution box terminals, as shown in the distribution board connection diagram. Make sure that the string numbers match correctly. For example do not connect a PV string 1 to a PV string 2.

5.6.1 AC Circuit Breaker and DC Isolator

The circuit breaker populated on the distribution board varies depending on the installer. Follow the installation standards to install a circuit breaker satisfying the voltage, the current specification of the Grid and the PV. The cables presented in the [Table 5-5] are recommended for use.

ltem	Standard	Short circuit current rating
AC circuit breaker	230 Vac / 63 A	10 kA minimum
DC isolator	650 Vdc / 15 A or more	-

ltem	Area	Insulation	Color code
Grid/Load (L, N)	6 mm ²	600 V or more	Black
PE	6 mm ²	600 V or more	Green with yellow lines
PV (+), (-)	6 mm ²	700 V or more	Black

[Table 5-5: Circuit breaker, DC Isolator and power line specification]

As illustrated in the [Figure 5-16], the distribution box connection diagram, the connection between the All in One system and the distribution box is made to the terminals of the solar energy (PVdso1+,PVdso1-,PVdso2+, and PVdso2-) of PV1+, PV1-, PV2+, and PV2-. On one hand, the main body terminals (PV1 +, PV1 -, PV2+, PV2-) and the distribution box terminals are connected in proper order. On the other hand, for the lines coming from the GRID, L and N leads are connected to the distribution board (LG, NG). The lines coming out from the LGO, PGO of the distribution board are connected to the L and N terminals of the All in One System.

5.6.2 RCD (residual current device) Leakage Circuit Breaker

This product can cause a DC current in the external protective earthling conductor. Where a residual current-operated protective (RCD) or monitoring (RCM) device is used for protection in case of direct or indirect contact, either an RCD or RCM of Type B is only available on the supply side of this product.





5.7 Grid Switch Box Connection between Grid and System



CAUTION

When it is required to check the ESS system and its connected load, make sure that the Grid is disconnected.

Power is supplied to the Grid Switch Box from Grid upon any failure in the ESS system. Normal indicates that the power for the load is supplied via the ESS system.

During

1. ordinary times,

2. power outage (when the ESS system is in normal status),

3. and normal status after finishing the quality inspection of the product, set it to Normal to supply power to the load via the ESS system.

In case of failure in the ESS system, power must be supplied from Grid by Bypass.

When power outage happens, it is changed to the stand-alone mode within 30 seconds to supply power to the load.

When the elapsed time is over 30 seconds after power outage but power is not supplied to the load, it is caused by the ESS system failure.

1. Upon no PV power generation,

2. full battery discharge,

3. and ESS system failure,

it must be changed to Bypass to supply power to the load upon restoration from power outage.

NOTICE
 At this time, the power to the load is switched from the ESS system to the main system. If the switching occurs when the ESS system is in normal status, the following actions are sequentially taken. At this time, the system encounters no problem but the power outage happens for the switching time of the load switch from OFF to Bypass.
(a) While the ESS system supplies power: The switch is switched from OFF to Bypass. The load encounters power outage for the switching time and then power is supplied from the main system to the load by Bypass. When the power that is being supplied from the ESS system to the load, is instantly supplied to the system, the power level can exceed the zero feed-in limit but it will be stabilized within several seconds.
 System encounters no problem except from load power outage during the switching time.
While the ESS system supplies no power: The switch is switched from OFF to Bypass. The load encounters power outage for the switching time and then power is supplied from the main system to the load by Bypass.
 System encounters no problem except from load power outage during the switching time.



1. Grid Switch Box Wiring Schematic of Single Phase System for Australia

[Figure 5-17: Wiring Schematic of Single Phase System for Australia]

- 2. Assembling the Grid Switch Box
 - a. The components of the Grid Switch Box are as follows.



[Figure 5-18: Components of Grid Switch Box]



NOTICE

Properly use the fitting tools and apply the following torques as maximum values: For M4 - 1.5 Nm, for M6 - 5 Nm, for M8 - 20 Nm and for M10 - 40 Nm When securing the handle, do not tighten the screw more than required.

b. Assemble the cable gland into the hole of the Grid Switch Box.







c. Check the wiring diagram of the Grid Switch Box.



[Figure 5-20: Wiring Diagram]



CAUTION

To operate the product normally, be sure to wire according to [Figure 5-20]. Incorrect wiring may cause product malfunction.

d. Assemble the wires according to [Figure 5-20].



[Figure 5-21: Assembling the Wires]

e. Assemble the sealing nuts.



[Figure 5-22: Assembling the Sealing nuts]

f. The final assembly is as follows



[Figure 5-23: Final assembly]

g. Close the upper part of the Grid Switch Box and tighten the embedded screws.



[Figure 5-24: Assembling the Upper Part]



Information

The screws in the upper part are already embedded in each hole.

h. Assemble the rubber seal after aligning with the groove of the shaft.



[Figure 5-25: Assembling the Rubber Seal]

i. Assemble the knob after aligning with the groove of the shaft and tighten it with an embedded screw.



[Figure 5-26: Assembling the Knob]

	Information
İ	The screw is already embedded in the knob.



j. The final assembly of the Grid Switch Box is as follows.

[Figure 5-27: Final Assembly]

5.8 A Connecting Method of DC and AC Line

Refer to the [Figure 5-28] for the PV module connection. The lead wire coming from the PV module is connected to the distribution box. For the structure of the distribution box, refer to subsection 5.7. For the connection to the distribution box, connect each to the terminals of the solar energy of PV1+, PV1-, PV2+, and PV2-. On the other hand, connect the distribution box terminals with the main body terminals (PV1+, PV1-, PV2+, and PV2-) of the Scalable All in One in proper order. The lead wire thickness is presented shown in the following Table.

For the connectors (PV1+, PV1-, PV2+, and PV2-) between the distribution box and the All in One input, the following types of connectors are used (MC4 connector, PV-Stick Photovoltaic connector "PUSH IN "connection).



[Figure 5-28: PV connector (Female) and PV line (Male)]

The [Table 5-7] shows the lead wire standard for the PV. The thickness (6mm²) of the lead wire is recommended for the All in One.

Туре	Area	Insulation	Color code
PE	6 mm ²	600 V or more	Green with yellow lines
PV (+), (-)	6 mm ²	700 V or more	Black

[Table 5-7: Wire Standard]



[Figure 5-29: Load Connector (Male) and Grid Connector (Female)]



[Figure 5-30: Connection of system for floating solar array, load and grid]

The Male product is connected to the lead wire coming from the distribution box in the PV side, and the Female part is attached to the All in One system. The two products are properly docked when connected together.





[Figure 5-31: PV connector connection (MC4 connector connection)]

We recommend the cable composed of two power cords and one PE cord and have insulation cover which contains all three cords as in the figure. Each cord shall be 6 mm² and the diameter of the cable shall be approximately 18 mm². Make sure that the PE cord is longer than other live cords of the cable so that the PE cord will not be affected by the pulling force. The PE terminal is connected to the PE of the sash to be ground connected.



[Figure 5-32: L and N AC line connection method]

5.8.1 Mounting

- 1. Move housing over cable
- 2. Prepare conductor
- 3. Insert prepared conductors (with screw connections: tighten screws, torque 2 Nm (17.7 lbf-in))



\land	NOTE		
	Due to cold flow, extreme temperatures or temperature variations may have a detrimental effect on the strain relief.		
	NOTE on Releasing Crimp Connections		
	a. Insert screwdriver (see detail)		
	c. Take out cable		
ö			

- 4. Insert contact insert into housing(note)
- 5. Turn contact insert until arrested.
- 6. Lock contact insert.
- 7. Tighten cable gland, torque

M32 gland: 12 Nm (106 lbf-in)

M40 gland: 14 Nm (124 lbf-in)

- 8. Plug in RST connector
- 9. Fasten bayonet



Options



[Figure 5-33: Optional Actions]

