儲能櫃產品規格

1. 儲能櫃

1.1 1MW/1.024MWh 規格表

編號 \ 項目			說明
1	PCS 設備容量(kW)		1,000kW (200kW x5pcs)
2	電池容量(kWh)		1,024kWh (64kWh x16pcs)
3	電池種類		$LiFePO_4$
4	冷卻能力(kW)		48.0kW
5	備援電力		具備 1 小時以上備援電力
6	儲能櫃內部 設備型號	PCS	Taurus 200 x 5pcs
		BAT Rack	7x6-16S1P2-0-IP00 x 8pcs (含 BMS 與電池模組,依案場配置而調整)
		EMS	EMS-P-1T x 1pcs
		UPS	Ares 3000 Plus x 1pcs
7	DC 充放電運轉效率@25℃		92%
8	電池櫃自放電率@無負載、通訊		<5% / 月
9	防護機制		多層防護機制： 1. 電池模組與 PCS 具有防過熱機制 2. 電池模組具有防延燒設計 3. 冷卻系統 4. 電池發生短路、遭外物穿刺或異常時，可避免電池模組爆裂或不斷升溫異常，及避免電池爆炸或不斷升溫 5. 氣霧式消防系統 6. 儲能系統具備送電力致電網能力，且具備孤島效應保護功能。
10	電池櫃保護機制		1. 每串電池櫃具有專用電池管理系統 2. 該專用電池管理系統可監測每顆電池模組內部電芯電壓, 電池模組溫度, 整串電池電壓與電流, 及控制電芯平衡。 3. 每串電池櫃具有電流與電壓量測元件 4. 每串電池櫃具有異常主動斷開機制(relay) 5. 每串電池櫃具有異常被動保護機制(Fuse)
11	消防設備		氣霧式滅火 符合本國消防法規之自動滅火設施
12	消防偵測裝置		包含煙霧偵測器 x 2 pcs, 溫度偵測器 x 2 pcs
13	斷電時監控時間		具備不斷電系統(UPS)，於斷電時監控系統(消防、PCS、EMS)運

		作 30 分鐘(註 1)
14	貨櫃尺寸 (L x W x H)	12.192m x 2.438m x 2.896m
15	貨櫃防護等級	IP54
16	交流多功能電錶	設置於 PCS 交流端，量測 PCS 交流側之電力資訊，可透過通訊埠連接，將資料回傳至 EMS

註 1: PCS 控制用電直接採用儲能櫃電池電能。

2. 能源管理系統 EMS

2.1 能源管理系統 EMS-P 系列規格表

Item \ Mode		EMS-P	EMS-P-1T
量測項目		電壓 / 電流 / 頻率 / 功率因數 / 實功 / 虛功 / 度數	
量測精準度		0.50%	
交流系統		3P3W / 3P4W	
輸入電源	交流電壓	90 - 264 Vac	
	交流頻率	47 - 63 Hz	
	消耗功率	<30W	
尺寸 (W x D x H in mm)		423 x 463 x 127	
重量	淨重	10.5 kg	
	毛重	12.2 kg	
防水防塵等級		IP20, Indoor	
操作環境溫度		0 ~ 40℃	
儲存環境溫度		-20 ~ 70℃	
相對溼度		0 ~95% (無凝結)	
顯示器尺寸		10.1 吋	
顯示解析度		1,280 x 800	
觸控面板		電阻式觸控面板	
顯示器背光模組		LCD	
顯示器作業系統		Windows 10	
RTC		有	
時間校準		每 10 分鐘自動校時一次 國家時間與頻率標準實驗室 (time.stdtime.gov.tw)	
IPC	記憶體	DDR3L 1600 Mhz 4GB	
	Memory Socket	2 x 204-pin SO-DIMM, 2 x 4GB or 1 x 8GB memory	
	CPU	Intel Atom E3940 Quad Core SoC	
	Frequency	1.6GHz, turbo burst up to 1.8GHz	
	Core Number	4	
	BIOS	AMI EFI 64 Mbit	
	儲存容量	SSD 128G 1x2.5’ SATAIII Drive bay (compatible with 15mm height)	SSD 1TB 1x2.5’ SATAIII Drive bay (compatible with 15mm height)
	作業系統	Microsoft Windows Win10 IoT 64 bit Linux Support by project	

	串列埠	2 x RS-232/422/485 with auto flow control, COM2 with 5V/12V power supply	
	USB	USB 3.0 x 4 pcs	
	GPIO	8-bit Programmable DIO (in packing list)	
通訊介面	RS485 x10	PCS-1~ PCS-2	預留
		PCS-3	PCS, CM x Max. 4 pcs, PM x Max. 32 pcs 或 Taurus 200 x Max. 8 pcs
		EMS-1 ~ EMS-2	EMS x Max. 4 pcs
		BMU-1~ BMU-2	BMU-1 x Max. 32 pcs, BMU-2 x Max. 32 pcs
		ICM	預留
		METER	Meter x Max. 4 pcs
		External RS485	第三方通訊
	CAN x4	CAN-1 ~ CAN-4	環控 CAN1 x Max. 1 pcs，其餘預留
	Ethernet x2	Ethernet-1	外部網路 (含網路, Meter 通訊)
		Ethernet-2	第三方通訊
	USB x2	USB 1~2	USB
	EPO x2	PCS	PCS EPO
		BMU	BMU EPO
	Dry Contact x8	1-1 ~ 1-3	預留
		2-1 ~ 2-5	冷氣空調 1, 冷氣空調 2
	Wet Contact x5	3-1 ~ 3-6	火災警報 1 級與 2 級, 火災系統、EPO、接地故障、發電機測試
電池監控功能		工作狀態	包含 Discharging、Charging、Protection mode、Relay on/off (B+與 B-同時切離)等。
		警告狀態	包含 Charge /Discharge over current、Over/Under voltage、Over/Under temperature、Cell Unbalance 等，並即時記錄警告狀態。
		故障狀態	包含 Charge/Discharge over current protection、Over/Under voltage protection、Over/Under temperature protection 等，並即時記錄故障狀態。
		資料紀錄	約每分鐘紀錄 1 筆資訊 可匯出 Excel 表

3. PCS 規格

依案場需求 PCS 可搭配 Taurus 120-250 系列或 ESS-PCS-85 系列。

3.1 Taurus 120-250 系列

3.1.1 規格表

PCS 名稱	Taurus 120	Taurus 160	Taurus 200	Taurus 250
容量	120kVA	160kVA	200kVA	250kVA
輸入				
電壓	400V 3 Phase			

電壓範圍	±20% @100%負載 ; -40%@50%負載 20% ~ -40%輸出容量線性降低	
頻率	40~70Hz	
頻率偵測精度	≦0.01Hz	
功率因數	≥0.99	
諧波失真 THDi	<3%	
輸出		
電壓	380/400/415V 3 Phase + N	
電壓穩定度	±1%(穩定負載)	
頻率	50/60Hz	
頻率穩定度	±0.01% (自由運轉)	
功率因數	1.0	0.8
波峰因數	3:1	
波形失真	≦1%線性負載 ; ≦3%非線性負載	
超載能力	110% 60 分鐘，125% 10 分鐘，150% 30 秒	
並聯數	最多 8 台並聯	
旁路		
電壓	380/400/415V 3 Phase + N	
電壓範圍	預警範圍±10%(可設定±0%~±20%);嚴重異常範圍 ±20%(可設定±0%~±20%)	
頻率	50/60Hz	
頻率範圍	±1Hz / 3Hz(可設定)	
電池		
電壓	670Vdc ~ 345.6Vdc, 最大 670Vdc	
電池數量	36~43 顆 12V 鉛酸電池可設置 若為其他種類電池則依電池規格調整	
充電電流[1] 0%負載	最大持續 340A	
放電電流	*最大持續 410A*	
並聯共用電池串	*可*	
最高效率		
正常模式	>96%	
經濟模式	≥99%	
電池供電	>96%	
人機介面		
顯示控制介面	10.1''彩色觸控 LCD 面板	
內建通訊界面	RS-232/USB/EPO/乾接點	
選購通訊界面	提供 4 個通訊卡槽，可安裝如下通訊卡: SNMP 卡/RS-485 MODBUS 卡/乾接點卡	
機構外觀		
尺寸 (W x D x H)mm	800x800x1955	
重量	480kg	
防護等級	IP20	

顏色		RAL 7016
環境		
儲存溫度		-20°C ~70°C
儲存濕度		≦95%
操作溫度		0~40°C
操作濕度		0~95%(無凝結)
運轉高度		<1,000m 無需降載(2)
認證	併網	IEEE 1547:2003, IEEE 1547.1:2005
	安規	IEC 62477-1:2012, AMD1:2016
	EMC	IEC 62040-2:2018 其測試方法符合 CISPR11:2015+AMD1:2016+AMD2:2019 CSV
噪音(距離 1 米)		≦70dB

(1)充電電流會依照負載功率自動調整。

(2)海拔超過 1,000mm，每增加 100m 需降容量 1%。

4. 電池櫃

4.1 電池櫃規格表

項目型號	6x4-20S1P1-0-IP20	7x8-21S1P2-0-IP00	7x4-21S1P1-0-IP00	7x6-16S1P2-0-IP00
Product name	Lithium-ion battery bank			
Rated battery voltage	768.0Vdc	806.4Vdc	806.4Vdc	614.4Vdc
Battery voltage range	720-828Vdc	756-869.4Vdc	756-869.4Vdc	576-662.4Vdc
Rated battery current (C/D)	100A / 100A 1C / 1C	100A / 100A 1C / 1C	100A / 100A 1C / 1C	100A / 100A 1C / 1C
Capacity (Ah)	105Ah	105Ah	105Ah	105Ah
Capacity (kWh)	80kWh	84kWh	84kWh	64kWh
Configuration	20S1P	21S1P	21S1P	16S1P
AC input voltage	100-300Vac			
AC input frequency	47-63Hz			
AC input power	100W			
size	670x736.5x1,809.2	670x1433x2076.2	670x736.5x2,076.2	670x1,106x2,076.2
weight	840kg	1785kg	899kg	1422kg
Ambient temperature	0°C~40°C			

Humidity	≦70%RH (non-condensing and no dust and noncorrosive gas atmosphere)	
IP	IP20	IP00
Company	Ablerex	

5 電池模組

5.1 電池模組規格表

Item	Function		Specification			Comment
1	Cell Model		EVE LF105			UL1642, IEC62619, CNS62619, UN38.3
2	Module Configuration.		12S1P			Cell type: LFP
	Nominal Voltage		38.4VDC			Per cell = 3.2V
	End of Discharge Voltage		36VDC			Discharge end voltage: 3V/by cell
3	Capacity (module)	Nominal	105Ah			Charge: 0.5C, 41.4V, taper current 0.05C cut-off @25°C Discharge: 1C, 36V cut-off @ 25°C
		Minimum	100Ah			
	Capacity (string)	Minimum	95Ah			Note: If modules operation in cascade structure, the capacity should refer to battery system specification
4	Charging Method		CC-CV Mode			
	Charging Voltage		41.4VDC			Per cell = 3.45V
5	Max. Continue Charge Current		100A			@ 25°C
6	Max. Continue Discharge Current		100A			@ 25°C
7	Maximum allowable discharge current in 25 Seconds transient at temperature and SOC conditions		Temperature	SOC		Could not conflict with protection function
			25°C ~55°C	40%~100%	315 A	
				20%~40%	210 A	
			10°C ~25°C	50%~100%	210 A	

8	Cycle life (module)		≥80% of initial capacity with 3000 cycles at 25°C ambient.	Charge: 1C,41.4V,0.05C cut-off @25°C Discharge: 1C,36V cut-off @ 25°C. Note: If modules operation in cascade structure, the capacity should refer battery system specification (BMU specification). Operation conditions should include rest between charging and discharging to cool the battery to 25°C.
8.1	Cycle life (String)		≥75% of initial capacity with 3000 cycles at 25°C ambient.	Charge: CV voltage refer to battery concatenation,1C, 0.05C cut-off @25°C. Discharge: End voltage refer to battery concatenation, 1C, 3V/per cell cut-off @ 25°C. Operation conditions should include rest between charging and discharging to cool the battery to 25°C.
8.2	Design MTBF		>10 years	0.2C charge /0.2C discharge cycles≤140 per years， SOC≤50%SOC @ rest period @ 25°C ambient. Meet 10years@65%SOH
9	Initial AC Impedance		<20 mΩ	1kHz AC Method
10	Ambient Operating Temperature	Charge (Note i)	0°C ~10°C	Not allowed to fast charge, charge below 0.2C
			10°C ~45°C	Except over temperature protection occur
			45°C ~55°C	Not allowed to fast charge, charge below 0.1C
		Discharge (Note i)	-20°C ~0°C	discharge below 0.5C
			0°C ~55°C	Except over temperature protection occur

11	Storage Temperature without system		0°C ~35°C	Less than 12 months (at least with 20% SOC)
			-20°C ~45°C	Less than 1 months (at least with 20% SOC)
12	Storage Humidity		≤ 70%RH	Non-condensing, no dust and non-corrosive gas atmosphere.
13	Module Net Weight		30.5±1Kg	
	Module Gross Weight		31.5±1Kg	
	Module Gross Weight (UN)		33.0±1Kg	
14	Communication Interface		Iso SPI	LECU board adapt inside with Iso SPI interface
15	LECU Power Consumption		<10mA@Working Mode <10uA@ sleep mode	If there is no communication, it will enter sleep mode in 2 sec then wake up once communication resumes.
16	Measurement accuracy	Cell Voltage	≤ ±5mV / resolution 0.0001V	QTY of Sensor, Battery Cell Voltage x 12 Battery Module Voltage x 1 Temperature x 4
		Module Voltage (B+ to B-)	≤ ±1% (V) / resolution 0.0001V	
		temperature	≤ ±3°C, 4 sensors resolution 0.01°C	
17	Module Dimension		499.4(D)*148.6(W)*236 (H)	D x W x H (mm)
	Package Dimension		547(D)*198(W)*296(H)	
	Package Dimension (UN)		550(D)*202(W)*306(H)	
18	Altitude		<2000M above sea level	
19	Charge State at delivery		20%~40%	Charge Capacity retention > 97% @RT for 30days Capacity Recovery > 95% @RT for 30days
20	Safety Certification		IEC62619, UN38.3, UL1973, CNS62619	IEC62619 File No.DK102132-UL UN38.3 File No.GNGF20200622U01 UL1973 File No.MH62258
21	Enclosure Protection Rating		IP20	
22	Short Current		5800A	@ 40.8V external short impedance 0 Ω
23	Accessories		Power connector cover *2 M5*8L Screw *4 Warranty certificate *1	

6. 電池管理系統 BMS

6.1 BMS 規格表

電池管理系統 BMS 在每一串列電池櫃皆設置對應的電池管理單元 BMU，其詳細規格如下表所列。

No	Item		Specification		Comment
1	BMU input Voltage Range		19.2~28.8 Vdc		24V/40W for BMU DC in
2	Maximum Number of Parallel BMU		32		
3	Module Serial Capability		24		
4	BMU ID assignment		8 pin DIP switch		
5	BMU Communication		Connecter type	Baud rate	isolated with Battery Please refer to Note (1) for details
		RS485(J Bus)	RJ45	9600bit/s	
		Can bus	RJ45	500Kbit/s	
6	BMU Firmware Update		Remotely update through CAN Bus		
7	BMU Current Fuse		160A		Fuse type:160A1000VDC BB
8	Cell Balance		20ohm		Bleeding the higher voltage cell in charge mode or release mode. Start Voltage: 3350mV Active Voltage (Vcell-Vmin): 20mV
9	BMU Power Consumption	Total Consumption	≤10W @Working Mode ≤ 1W @relay off Mode.		
10	LECU Power Consumption	LECU power source is individual module (from module+ to module-)	<10mA@Working Mode <10uA@ sleep mode		If there is no communication, it will enter sleep mode in 2 sec then wake up once communication resumes.
11	Disconnection Solution	Device	Relay		Relay type: HVC500B-24SE2F
		Location	P+, P-		
12	1. High side Pre-charge resistance 2. Low side Pre-charge resistance		100Ω/100W, RelayHFE82P-20/1500-24-H-Q2J-1(101)		Pre-charge load circuit by resister before battery main connection to avoid peak current.
13	EPO (Emergency Stop input)		Normal Open		If the EPO node is shorted, battery output will turn off relay. The signal should use with dry contact.
14	SOC Accuracy		≤±5% / resolution 0.01%		@ 25°C
15	Measurement Accuracy	Cell Voltage	≤±5mV / resolution 0.0001V		Measurement data get from battery module, except battery current
		Module Voltage (B+ to B-)	≤±1% (V) / resolution 0.0001V		

		Pack Voltage (P+ to P-)	≤±2% (V) / resolution 0.0001V	
		Current	≤±1% (A) ±100mA / resolution 0.001A	
		Temperature	≤±3°C, 4 sensors / resolution 0.01°C	
16	QTY of Sensor	Battery Cell Voltage	12	Per Battery Module
		Battery Pack Voltage	1	Per Battery Module
		Battery Module Voltage	1	Per BMU
		Current	2	Per BMU
		Temperature	4	Per BMU
17	Dry Contact	Output1: charge status	Full charge: NO and COM close, Release: NC and COM close	Full charge condition: Please refer to section 2.1, 2.2 , 2.3, 2.4, 2.5 full charge condition。 Release condition: when discharge current over 0.5A or SOC under 90% (85%~95% adjustable)
		Output2: abnormal status	abnormal: NO and COM close, normal NC and COM close	BMS report abnormal situation, Refer condition of section 5.2 protection function
18	Net weight		9.75±0.5 Kg	
	Gross weight		11.35±0.5 Kg	
19	BMU module Dimension		480.1(D)*142(W)*236(H)	D x W x H (mm)
	Package Dimension		547(D)x198(W)x296(H)	D x W x H (mm)
20	Altitude		<2000M above sea level	
21	Design MTBF >10years		Design MTBF >10 years	
22	Enclosure Protection Rating IP20		Enclosure Protection Rating IP20	
23	Accessories		● Power connector cover *4 ● M5*8L Screw *2 ● AUX Plug/ MC101 – 50804*1 ● dry contact Plug/ DECA MC421-38103Z-1 *2 ● EPO Plug/ DECA MC101-50803*1 ● HV Power conn. fixed plate(33600054)*1	

		● HV Power screw M3*L8(33200126) *2 ● Warranty certificate *1	
24	Safety Certification	UL 60730-1	

7. 併網端集合式電錶(依據案場需求而選配)

7.1 SATEC PM335

7.1.1 集合式電錶規格表

Item \ Mode	說明
Model Number	SATEC PM335
INPUT RATINGS VOLTAGE INPUTS	
Operating range *	10-1,000V AC (L-L)
Operating range for direct DC Voltage*	10-820V DC
Input impedance	4 Mega Ohm
Burden for 400V	≤ 0.04VA
Burden for 120V	< 0.01VA
Isolation	4,000V AC @ 1mn
Wire size	up to 12 AWG (≤ 2.5 mm2)
INPUT RATINGS CURRENT INPUTS	
Operating range	Continuous 10A RMS
Burden	< 0.2 VA @ In=1A or 5A
Overload withstands	15A RMS continuous, 200A (20 × Imax) RMS for ½ second
ANALOG INPUT(1 AI)	
Galvanic isolation	4,000VAC @ 1mn
Connector type	removable, 5 pins
Wire size	14 AWG (up to 1.5mm2)
Accuracy	< 0.5% FS
ACCURACY	
1	IEC62053-22:2003,class 0.2S
2	IEC 62053-24:2014,class 0.5S

3	ANSI C12.20 –2015,class 10 (0.2%)

*UL listing covers nominal voltage up to 277/480V AC (L-N/L-L)

8. A30

8.1.1 集合式電錶規格表

Item \ Mode	說明
Model Number	A-30
輔助電源	
交流電壓	110…400VAC
交流電壓容差	±10%
直流	120~350VDC/12~48VDC
直流電壓允差	±20% / -6~+20%
頻率	50/60Hz
功率消耗	≤ 10 VA
功率量測	
量測刷新週期	1S
精確度	0.5%
頻率量測	
量測範圍	45~65Hz
量測刷新週期	1s
精確度	0.1%
電度精度	
有功電度值(符合 IEC 62053-22 標準)	0.5S 級
無功電度值(符合 IEC 62053-23 標準)	2 級
MODBUS 速度	
連接方式	RS485
類型	2 至 3 條半雙工線
協議	MODBUS RTU
MODBUS 速度	4800 至 38400 波特率
乙太通訊模塊	
連接技術	RJ45
波特率	10 base T / 100 base
協議	TCP 上的 MODBUS TCP 或 MODBUS RTU