



Spec.No.

File. No.

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TGPRO New Energy Technology Co., Ltd

## Energy Storage Project Specification



TG-eBank-261LHYB2

Factory address No. 16, Hengxing Road, Liaobu Town, Dongguan City, Guangdong Province

## Specification For Approval

## History of specification

[illegible]

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|     |                                     |       |   |
|-----|-------------------------------------|-------|---|
| 1   | Scope of application documents/     | ..... | 1 |
| 2   | The Specification Amendment/        | ..... | 1 |
| 3   | Product or Cell testing conditions/ | ..... | 1 |
| 4   | Standard /                          | ..... | 1 |
| 4.1 | Reference Standard/                 | ..... | 1 |
| 4.2 | Measuring Instrument and Apparatus/ | ..... | 1 |

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## 1 Scope of application documents/

7KLV SURGXFV VSHFLILFDWLRQ RQO\ DSSOLHV WKH SURJUH  
OLWKLXP LRQ EDWWHU\ SURGXFV DQG EDWWHU\ HQHUJLJQ  
7HFKQRORJ\ &R /WG

bŸ ÷ ?ú r æ ûF8+^+g R9Ô 8 ? æ73\$/E0 ¶ ?L† ¢ .AôA×,° % {+kK8/ñ †+k"— Ÿ ÷ Â+k"—4ú  
,° Ú ø !

## 2 The Specification Amendment/

,I WKH UHZ PDWHULDOR SURGXFWLRQ SURFHVVLQXV SURR  
HQYLURQPHQWV RWKHU FRQGLWLRQV QHHG WR EH SUKRYLGHG  
ZULWWHQ DGylfH WR WKH RWKHU VLGH RQO\ WKH ERWKGLH  
ZLOO EH HIIHFWLYH

, Õ†İ=+UŸI0A =+UŸ315 L+k"—μ+^ )å¹L¬ —, +Uo , \$AØ ïM6 < o ,°  
¥ æM~EFP. /ï í ÑM6 ïB E D Ñ>, \$AØ >

## 3 Product or Cell testing conditions/

,W LV UHFRPPHQGHG WR XVH QHZO\ SURGXFHG EDWWHU\ S

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### 4.3 Testing Conditions (Unless Specially Requirements)

\$WPRVSKHUH 3UHV VXUH Æ a N3D J"J ÁÑ Æ a N3D  
7HPSHUDWXUHÆ f )å¹\$ \_ÜÆ f  
5HODWLYH +XPLGLW\Æ O )å¹\$µ ÜÆ O

## 5 Model Description

Our company's product model definition rules are as follows:

| Number | Code Name | Code Description |
|--------|-----------|------------------|
|--------|-----------|------------------|

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## 6 Main specifications

### 6.1 System Parameter

| No | Item                        | General Parameter   | Remark                               |
|----|-----------------------------|---------------------|--------------------------------------|
| 1  | system energy               | 261.248KWh          |                                      |
| 2  | MPPT power<br>MPPT          | 120KW               |                                      |
| 3  | PCS power<br>PCS            | 125KW               |                                      |
| 4  | STS power<br>STS            | 250KW               |                                      |
| 5  | STS                         | have                |                                      |
| 6  | GEN                         | have                |                                      |
| 7  | Transformer                 | not have            | Optional                             |
| 8  | Communication access method | 3P4W                |                                      |
| 9  | rated output voltage        | 380/400V            |                                      |
| 10 | Rated output power          | 125KW               |                                      |
| 11 | Cooling method              | Liquid cooling      |                                      |
| 12 | Placement environment       | Outdoor             | Suggest a cool and ventilated place  |
| 13 | Fire Protection System      | Have                | Pack level and cabinet level<br>pack |
| 14 | Size                        | W1700*D1350*H2050mm |                                      |
| 15 | Weight                      | 2.9T                |                                      |
| 16 | protection grade            | IP54                |                                      |



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## 6.3 Technical parameters of battery cluster

| No | Item                                    | General Parameter                     | Remark                                                                                                                                                 |
|----|-----------------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Combination method                      | 260S1P                                |                                                                                                                                                        |
| 2  | Rated Capacity                          | 314Ah                                 | Standard discharge after Standard charge package)                                                                                                      |
| 3  | Factory Voltage                         | 832V-858V                             |                                                                                                                                                        |
| 4  | Recommended Voltage at end of Discharge | $\leq 702V$                           | Discharge Cut-off Voltage                                                                                                                              |
| 5  | Recommended charging voltage            | 910V                                  | $V = \quad *3.5V$                                                                                                                                      |
| 6  | Internal Impedance                      | $\leq 140m\Omega$                     | Under $20 \pm 5$ Environment Temperature , the Usage Frequency of Fully Charge( 1KHz) , Use AC Internal Impedance test machine to test $20 \pm 5$ 1kHz |
| 7  | Max Charging Current(Icm)               | 157A                                  | Ampere-meter ,Maximum allowable charging current of the battery pack ,                                                                                 |
| 8  | Limited Charging Voltage(Ucl)           | 949V                                  | Volta-meter (Serial*3.53V) ,Battery pack safe charging voltage ( $*3.65V$ ( )),                                                                        |
| 9  | Max Discharging current                 | 157A                                  | Maximum discharge current allowed by the battery pack                                                                                                  |
| 10 | Discharge Cut-off voltage(Udo)          | 650V                                  | Voltage of the battery when the discharge is stopped ( )                                                                                               |
| 11 | Operation Temperature Range             | Charge:0~55 /Discharge: -20~55        |                                                                                                                                                        |
| 12 | Storage Temperature Range               | -20 ~50                               |                                                                                                                                                        |
| 13 | Single pack Size/weight /               | W790*1125*H248 350kg<br>Quantity 5pcs |                                                                                                                                                        |
| 14 | Recommended operating temperature       | $21 \pm 3$ ° C average21              |                                                                                                                                                        |
| 15 | IP code<br>IP                           | IP65                                  |                                                                                                                                                        |



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## 6.4 MPPT parameters MPPT

|                                     | Model                                                                         | MPPT 120KW                                                                                                   |
|-------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| *) RU]<br>\URZGMK<br>YOJK<br>+vz9<  | 8GZKJ VU]KX<br>ì ä                                                            | Q=                                                                                                           |
|                                     | 8GZKJ I[XXKTZ<br>ì v                                                          | ,                                                                                                            |
|                                     | 8GZKJ \URZGMK<br>ì 9                                                          | <                                                                                                            |
|                                     | 3G^OS[S \URZGMK<br>ÂÝ 9                                                       | <                                                                                                            |
|                                     | <URZGMK XGTMK<br>98                                                           | d <                                                                                                          |
|                                     | 3OTOS[S \URZGMK GZ L[RR VU]KX<br>äÂ4 9                                        | <                                                                                                            |
|                                     | <URZGMK XKW[OXKSKTZY LUX RU]<br>\URZGMK YOJK OT YZKV JU]T SUJK<br>'9%"z9< 9}L | < ‡ RU] \URZGMK ZKXSOTGR \URZGMK ‡ N<br>\URZGMK ZKXSOTGR \URZGMK [V ZU <<br>< ‡ z9€ 9 ‡ ä9€ 9kÂä<br><        |
|                                     | 2U] \URZGMK YOJK YZGXZOTM \URZGMK<br>z9<o 9                                   | <                                                                                                            |
|                                     |                                                                               |                                                                                                              |
| *) NOMN<br>\URZGMK<br>YOJK<br>+vä9< | 8GZKJ VU]KX<br>ì ä                                                            | Q=                                                                                                           |
|                                     | 8GZKJ I[XXKTZ<br>ì v                                                          | ,                                                                                                            |
|                                     | 8GZKJ \URZGMK<br>ì 9                                                          | <                                                                                                            |
|                                     | 3G^OS[S \URZGMK<br>ÂÝ 9                                                       | <                                                                                                            |
|                                     | <URZGMK XGTMK<br>98                                                           | d <                                                                                                          |
|                                     | ,[RR VU]KX \URZGMK XGTMK<br>ä 98                                              | d <                                                                                                          |
|                                     | <URZGMK XKW[OXKSKTZY LUX NOMN<br>\URZGMK YOJK OT HUUYZ SUJK<br>9%"ä9< 9}L     | < ^ NOMN \URZGMK ZKXSOTGR \URZGMK<br>RU] \URZGMK ZKXSOTGR \URZGMK SOTOS[S<br>< ^ ä9€ 9^ z9€ 9 kÂz<br><       |
|                                     | .OMN \URZGMK YOJK YZGXZOTM \URZGMK<br>ä9<o 9                                  | <                                                                                                            |
| Y_YZKS<br>VGXGSKZKX<br>©i@f         |                                                                               | 8K\KXYKIUTTKIZOUT VXUZKIZOUT L[YK<br>VXUZKIZOUT U\KXI[XXKTZ VXUZKIZOUT<br>U\KX\URZGMK [TJKX\URZGMK VXUZKIZOU |
|                                     | 6XUZKIZOUT GTJ L[TIZOUTGROKZ<br>' C                                           | 6XUZKIZOUT GTJ L[TIZOUTGROKZ<br>YNUXZIOXI[OZ VXUZKIZOUT OTY[RGZOUT C<br>JKZKIZOUT                            |
|                                     |                                                                               | FN' o•Ã•~' o• v' o• >-9'<br>o• ½' o•z9<?è' o•íÜŠ y                                                           |



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## 6.5 PCS parameters PCS

|                                                   | Model                                 | PCS 125KW                                                                                                                                                                                                                          |
|---------------------------------------------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| *) YOJK<br>VGXGSKZ<br>+v<                         | 4[SHKX UL OTV[Z INGTTKRY ŷµèf         |                                                                                                                                                                                                                                    |
|                                                   | SOTOS[S \URZGMK Âz 9                  | <                                                                                                                                                                                                                                  |
|                                                   | KXY<br>8GZKJ \URZGMK XGTMK ì          | 98 d g = 6+h<br>d g = 4 6+h                                                                                                                                                                                                        |
|                                                   | 3G^OS[S OTV[Z I[XXKTZ ÂÝŷµ v          | '                                                                                                                                                                                                                                  |
| ' ) MXOJ<br>IUTTKIZO<br>VGXGSKZ<br>Av<gwàh        | XGZKJ \URZGMK ì 9g<h                  |                                                                                                                                                                                                                                    |
|                                                   | *K\OGZOUT 9ž[                         | d                                                                                                                                                                                                                                  |
|                                                   | )USS[TOIGZOUT U[ZV[Z Z_VK Avŷß•       | g = 6+h , ž<br>g = 4 6+h ,šž                                                                                                                                                                                                       |
|                                                   | 8GZKJ U[ZV[Z VU]KX ì ŷß ägQ=h         |                                                                                                                                                                                                                                    |
|                                                   | 3G^OS[S U[ZV[Z VU]KX ÂÝŷß= ä<br>h     |                                                                                                                                                                                                                                    |
|                                                   | 3G^OS[S I[XXKTZ ÂÝ vg'h               |                                                                                                                                                                                                                                    |
|                                                   | U8GZKJ MXOJ L XKW[KTI_ ì àĖäg.`h      |                                                                                                                                                                                                                                    |
|                                                   | KXY 6U]KX LGIZUX äæ <sup>a</sup>      |                                                                                                                                                                                                                                    |
|                                                   | 6U]KX LGIZUX XGTMK äæ <sup>a</sup> 8  | gÝùhd ŷeh<br>RKGJOTM d RGM MOTM                                                                                                                                                                                                    |
|                                                   | ) [XXKTZ JOYZUXZOUT XGZK vH Jā        | { 8GZKJ VU]KX<br>{ gì äh                                                                                                                                                                                                           |
|                                                   | *) )USVUTKTZ +vãO                     |                                                                                                                                                                                                                                    |
|                                                   | 5\KXRUGJ IGVGIOZ_ ú                   | RUTM ZKXS<br>xĖ                                                                                                                                                                                                                    |
| )USS[TOIGZOUT<br>T ULL MXOJ<br>VGXGSKZ<br>Av<gYàh | XGZKJ U[ZV[Z \URZGMK ì ŷß 9           |                                                                                                                                                                                                                                    |
|                                                   | ' ) \URZGMK NGXSUTOIY Av 9'f          | " ROTKGX RUGJ<br>{ gž Åžúh                                                                                                                                                                                                         |
|                                                   | 8GZKJ L XKW[KTI_ ì Ėäg.`h             |                                                                                                                                                                                                                                    |
|                                                   | 8GZKJ U[ZV[Z VU]KX ì ŷß ägQ=h         |                                                                                                                                                                                                                                    |
|                                                   | 3G^OS[S GVVGXKTZ VU]KX<br>ÂÝ," ägQ<'h |                                                                                                                                                                                                                                    |
|                                                   | 3G^OS[S U[ZV[Z I[XXKTZ<br>ÂÝŷß vg'h   |                                                                                                                                                                                                                                    |
| -KTKXGR<br>VGXGSKZ<br>©İ@f                        |                                       | ' ) U\KXI[XXKTZ VXUZKIZOUT ' )<br>U\KX \URZGMK VXUZKIZOUT ' ) Y[XMK<br>VXUZKIZOUT ' ) YNUXZ IOXI[OZ<br>VXUZKIZOUT GTZO OYRGJTJOTM<br>)GVGHRK UL L[TIZOUTGROZ<br>VXUZKIZOUT *) XK\KXYK IUTTKIZOU<br>VXUZKIZOUT ' ) Y[XMK VXUZKIZOUT |
|                                                   |                                       | Av v' o•Av 9' o•Av~<br>... ' o•Av?è' o•... N' o•<br>+vFN' o•+v~... ' '                                                                                                                                                             |
|                                                   | 9O`K >*gSSh                           |                                                                                                                                                                                                                                    |
|                                                   | =KOMNZ MOgQMh                         |                                                                                                                                                                                                                                    |
|                                                   | 'RZOZ[JK •#ätgSh                      | ;YKJ LUX JU]TMXGJOTM U\KX                                                                                                                                                                                                          |

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|                                 |                                 |                                               |
|---------------------------------|---------------------------------|-----------------------------------------------|
|                                 |                                 | g Y 'ì... h                                   |
| 5VKXGZOUT ZKSVKXGZ[XK W         | • <sup>-1/2</sup> -g -Y 'ì... h | W <sup>•</sup> †<br>;YKJ LUX JKXGZOTM GHU\K - |
| 9ZUXGMK ZKSVKXGZ[XK             | ¥“†                             | - <sup>1/2</sup> -                            |
| .[SOJOZ_ ~†                     | 8.d 8.k4U IUTJKTYGZOUT          | —Ò(†                                          |
| )UUROTM SKZNUJ Ò0•”             | /TZKRROMKTZ LUXIKJ              | GOX IUURO T                                   |
| 6XUZKIZOUT RK\KR ... †          | /6                              |                                               |
| )USS[TOIGZOUT OTZKXLG\K         | *'NM                            | )'4 89                                        |
| )USVROGTZ JOZN YZGTJGXJY ...`öÖ | -( : +4                         | -( : +4 /+)                                   |
| 6U]KX MXOJ Y[VVUXZ àu8Ü         | 2 .<8: Ä o— äOò                 | 2 .<8: 'IZO\K GTJ XKGIZO\K                    |
| '[ZNKTZOIGZOUT •š               | VU]KX IUTZXUR                   |                                               |
|                                 |                                 | (+B)7)                                        |

6.6 STS parameters STS

|       |           |
|-------|-----------|
| Model | STS 250KW |
|-------|-----------|

+RKIZXOIGR  
YVKIOLGZOU  
TY  
H•

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|  |                            |                                          |
|--|----------------------------|------------------------------------------|
|  | MO                         |                                          |
|  | 9O`K<br>>*                 | SS    SS    SS                           |
|  | /TYZGRRGZOUT SKZNUJ<br>x•" | 3UJ[RGX XGIQ OTYZGRRGZOUT<br>% 2 " Ñ ě x |



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## 6.7 Parameters of 5KW liquid cooling machine 5KW

| No | project                                    | Unit                                                                                                                       | Data    |
|----|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|---------|
|    | 6U]KX Y[VVR_ Y_YZKS<br>>ò”                 | 6+ ') <r .`z 6+ ') <r .`                                                                                                   |         |
|    | 3G^OS[S VU]KX I[XXKTZ<br>ÂÝ ä v            | Q= ' ,                                                                                                                     |         |
|    | VWDQGE\ SRZHU<br>-Ñ ä                      | =                                                                                                                          |         |
|    | 9KRL IOXI[RGZOTM VU]KX<br>²ê ä             | Q=                                                                                                                         |         |
|    | )USS[TOIGZOUT VXUZUIUR<br>*’#‘             |                                                                                                                            |         |
|    | 8KLXOMKXGZOUT IGVGIOZ_<br>òÒO              | Q= -                                                                                                                       | 2 - = - |
|    | )UUROTM VU]KX I[XXKTZ<br>òÒ ä v            | Q= ' ,                                                                                                                     | 2 - = - |
|    | .KGZOTM IGVGIOZ_<br>½O                     | Q=                                                                                                                         |         |
|    | .KGZOTM VU]KX I[XXKTZ<br>ò½ ä v            | Q= ' ,                                                                                                                     |         |
|    | =UXQOTM SUJK<br>W•%”                       | '[ZUSGZOI IUTZXUR SUJK IUUROTM SUJK NKGZO<br>YZGTJH_ SUJK YKRLI_ IROTM SUJK<br>O ò % "o•ò Ò % "o•ò ½ % "o•- Ñ % "o• ²ê % " |         |
|    | 2OW[OJ ZKSVKXGZ[XK YKZZOTM XGTMK<br>@à“— 8 | ROW[OJ ZKSVKXGZ[XK LGIZUX_ YK<br>-<br>½ g@à“ß4—å -h                                                                        |         |
|    | 8KLXOMKXGTZ<br>òÒ÷                         | 8 ' ,                                                                                                                      |         |
|    | )UTJKTYKJ GOX \UR[SK<br>Ò(ïO               | S - N                                                                                                                      |         |
|    | 4UOYK<br>TM O                              | J( ' ,                                                                                                                     | ‡       |
|    | 8GZKJ LRU] XGZK<br>ì vO                    | 2 SOT                                                                                                                      |         |
|    | 8GZKJ VXKYY[XK JOLLKXKTIK<br>ì 9[          | Q6G                                                                                                                        |         |
|    | VXUZKIZOUT MXGJK<br>... ^~                 | /6 K RKIZXOIGR IUTZXUR IGHOTKZ<br>/6 g Oñh                                                                                 |         |
|    | 3KJO[S<br>PÀ                               | )UTIKTZXGZOUT ‡ KZN_RKTK MR_IUR GW[KU[Y<br>   ‡ %â 8a6 JAî@â z                                                             |         |

## 6.8 Specification for Single Cluster Battery Management System

% 0 6 I X Q F W U L R Q X I F Q W L R Q % 0 6 Ö 7 3 5

- 1 :BMS is designed for high-voltage energy storage series lithium batteries  
BMS
- 2 The BMS have all functions which are :  
BMS
  - .1 overcharge detection function
  - .2 over discharge detection function
  - .3 over current detection function
  - .4 short detection function
  - .5 Temperature detection function
  - .6 balance function
  - .7 communicate function
  - .8 Alarm function
  - .9 Total capacity function
  - .10 Storage history function



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% 06 3URWHFW SDUDPHWHU +k"-1x\*<315 Ü ø!

| Items                          | Details                                       | General Parameter                   |
|--------------------------------|-----------------------------------------------|-------------------------------------|
| Cell overcharge Protection     | Overcharge detection voltage                  | $3.65 \pm 0.025V$                   |
|                                | Overcharge detection delay time               | Typical:1.0s                        |
|                                | Overcharge release voltage                    | $3.4 \pm 0.05V$                     |
| Cell over-discharge protection | Over-discharge detection voltage              | $2.7 \pm 0.5V$                      |
|                                | Over-discharge detection delay time           | Typical:1.0s                        |
|                                | Over-discharge release voltage                | $3.1 \pm 0.1V$<br>or charge release |
| Over-current Protection        | discharge Over-current protection current1    | 162A                                |
|                                | discharge Over-current detection delay time 1 | 1S                                  |
|                                | discharge Over-current protection current 2   | 167A                                |
|                                | discharge Over-current detection delay time 2 | $\leq 200m \pm 50ms$                |
|                                | Charge Over-current protection current        | 162A                                |
|                                | Protection condition                          | Load short                          |
|                                | Detection delay time                          | $\leq 30ms$                         |
|                                | Protection release condition                  | Charging release                    |
| Temperature(T) protection      | Charge high T protection                      | $55 \pm 3$                          |
|                                | Charge high T recover                         | $47 \pm 4$                          |
|                                | Discharge high T protection                   | $60 \pm 3$                          |
|                                | Discharge high T recover                      | $50 \pm 4$                          |

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|               |                                                                                                                                                                                                                                                                                                                                             |             |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
|               | Charge low T protection<br>T                                                                                                                                                                                                                                                                                                                | $0 \pm 3$   |
|               | Charge low T recover<br>T                                                                                                                                                                                                                                                                                                                   | $5 \pm 4$   |
|               | Discharge low T protection<br>T                                                                                                                                                                                                                                                                                                             | $-20 \pm 3$ |
|               | Discharge low T recover<br>T                                                                                                                                                                                                                                                                                                                | $-10 \pm 4$ |
| Balance       | Balance threshold voltage                                                                                                                                                                                                                                                                                                                   | 3.4V        |
| Communication | <p>It has CAN and RS485 ,RS232 standard communication interface, it real-time monitoring the capacity of battery bank, the voltage, current,environment temperature, and charging/discharging current,</p> <p>RS485,RS232,Baud rate:9600Kb/S,CAN common Baud rate:500K/S,</p> <p>CAN RS485 RS232</p> <p>RS485 RS232 9600Kb/S CAN 500K/S</p> |             |
| Alarm         | <p>It has over-temperature, over charge, under-voltage, over-current, short circuit alarm Function.</p>                                                                                                                                                                                                                                     |             |

## 6.9 System schematic diagram



## 7 Appearance and structural dimensions

The surface of the battery pack should have no obvious scratches, burrs and mechanical scratches, and the exposed metal terminals should be free of oxidation and rust.



## 8 Storage and Others

### Long Time Storage

If stored for a long time(don't used, exceed three months), the cell and pack should be stored in drying and cooling place. The PACK is to be stored in a condition that the temperature of  $23 \pm 2$  and the humidity of 45%- 75%. Long-term use of unused batteries to recharge every 3 months Ensure that the battery voltage is within the above range

, 3  
3

PACK

$23 \pm 2$

45%- 75%

## Appendix

### Li-ion battery operation instructions and precautions

#### Preface

This document of 'Handling Precautions and Guideline Li-ion Rechargeable Batteries' shall be applied to the battery cells manufactured by TGPRO.

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## Caution!

Do not use or store the battery where is exposed to extremely hot, such as under window of a car in direct sunlight in a hot day. Otherwise, the battery may be overheated. This can also reduce



