

# *User Manual*

V SERIES LFP LITHIUM BATTERY PACK

51.2 V 280 Ah



**TABLE OF CONTENTS**

**1. SAFETY PRECAUTIONS** ..... 1

1.1. Safety ..... 2

1.2. Tools ..... 2

1.3 Transport ..... 2

**2. DIMENSIONS OF THE V SERIES LFP LITHIUM BATTERY PACK (LBP)** ..... 3

2.1. Dimensions of the BTR-P-51.2 V-280 Ah LBP ..... 3

**3. CONTENTS OF THE V SERIES LFP LBP** ..... 4

3.1. Front Side of the V Series LFP LBP ..... 4

3.2. Battery Management System (BMS) ..... 4

3.3. Back Side of the V Series LFP LBP ..... 5

3.4. Technical and Physical Specifications of the V Series LFP LBP ..... 6

3.5. Warning Label of the V Series LFP LBP ..... 7

3.6. Product Label of the V Series LFP LBP ..... 7

**4. RECOMMENDED INVERTER AND BATTERY POWER COMBINATIONS** ..... 8

**5. ADDRESSING SETTINGS** ..... 9

5.1. Single-Use Settings ..... 9

5.2. Multi-Use Settings (Parallel Connection) ..... 9

5.3. Multi-Use Addressing Settings (Parallel Connection) ..... 11

5.4. RJ45 Communication Cable Definition Between Inverters ..... 14

5.4 1. Compatible Inverters ..... 14

**6. CONTENTS OF THE V SERIES LFP LBP PACKAGE** ..... 15

**7. INSTALLATION** ..... 16

7.1. Installation Steps ..... 16

**8. OPERATION AND ALARM INDICATORS** ..... 24

8.1. Charging Indicator ..... 24

**9. TEST FEATURES OF THE V SERIES LFP LBP** ..... 25

9.1. Electrical Performance Test ..... 25

9.2. Safety Test ..... 25

**10. FREQUENTLY ENCOUNTERED ISSUES AND SOLUTION SUGGESTIONS** ..... 26

**11. MAINTENANCE** ..... 27

**12. PACKAGING and STORAGE** ..... 27

**13. WARRANTY CERTIFICATE**



## 1. SAFETY PRECAUTIONS



### WARNING:

Failure to comply with the instructions and safety rules outlined in this manual may result in death or serious injury. Before operating the Lithium Battery Pack (LBP), carefully read and understand the safety rules and usage instructions, and follow them strictly. Avoid hazardous situations. Always conduct an inspection before making any connections. Use the Lithium Battery only for its intended purpose. Read, understand, and adhere to all applicable legal regulations. Complete the necessary training to ensure the safe use of the Lithium Battery.



### CAUTION:

- Please read the technical specifications and the user manual carefully before using or testing the LBP. Otherwise, issues such as overheating, efficiency loss, short circuits, or electrical malfunctions may occur.
- During the installation of the LBP, use the required equipment (electrically insulating gloves, safety goggles, protective clothing, and recommended tools).
- Do not puncture the LBP or apply physical force to it.
- Do not open or interfere with the inside of the LBP.
- Do not draw current from the LBP exceeding the battery's capacity.
- Do not connect any conductive material other than the battery connector to the positive (+) and negative (-) terminals of the LBP.
- Ensure that the LBP connectors are fully inserted and not loose.
- Do not expose the LBP to high current or voltage.
- Avoid contact of the LBP with liquids; do not leave the battery in wet or humid environments, and do not submerge it in liquids.
- Keep the LBP away from sunlight, fire, heaters, or materials with high temperatures.
- Do not charge the LBP directly from the mains with alternating current without using a rectifier.
- Do not connect lithium batteries in series.
- When electrically connecting products in parallel, do not use battery packs of different types or capacities.
- Use a circuit breaker appropriate for the voltage and current values to disconnect the battery connection in case of a dangerous situation.
- Do not place the LBP in a microwave oven or a pressurized container.
- Place the LBP properly in the designated area of use.
- Do not continue to use the LBP in risky situations.
- Do not attempt to disassemble the LBP or make any modifications to it in any way.
- The LBP must not be opened except by authorized service personnel. If opened, it will no longer be covered by the warranty.

### 1.1. Safety

- \* The LBP should be installed by individuals trained in electrical connections and systems and possessing sufficient knowledge of battery and power systems.
- \* During the installation process of the LBP, the protective equipment listed below must be used.



**Electrically Insulating  
Gloves**



**Protective Goggles**



**Protective Shoes**

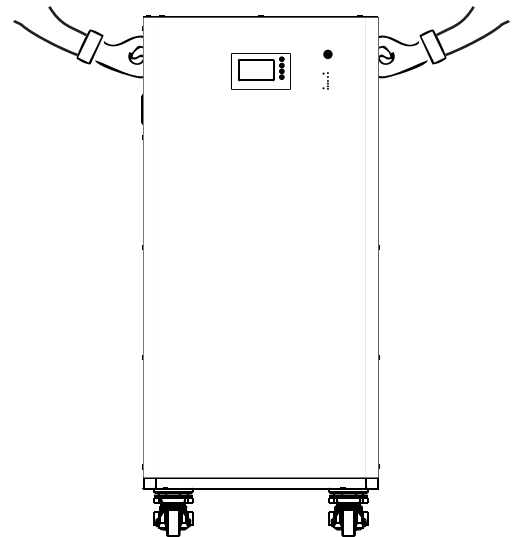
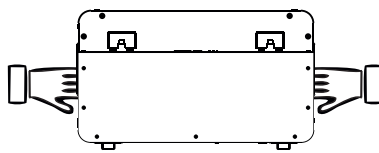
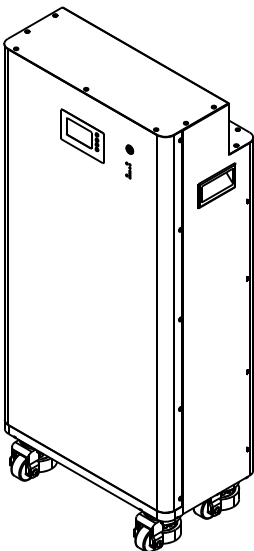
### 1.2 Tools

- \* The tools and measuring devices that may be needed during the installation are listed below.

<b>Screwdriver</b>	<b>Insulation Tape</b>
<b>Electric Drill</b>	<b>Thermometer</b>
<b>Torque Wrench</b>	<b>Pliers</b>
<b>Side Cutter</b>	<b>User Manual</b>
<b>Current Meter</b>	<b>Wrench</b>
<b>Voltmeter</b>	

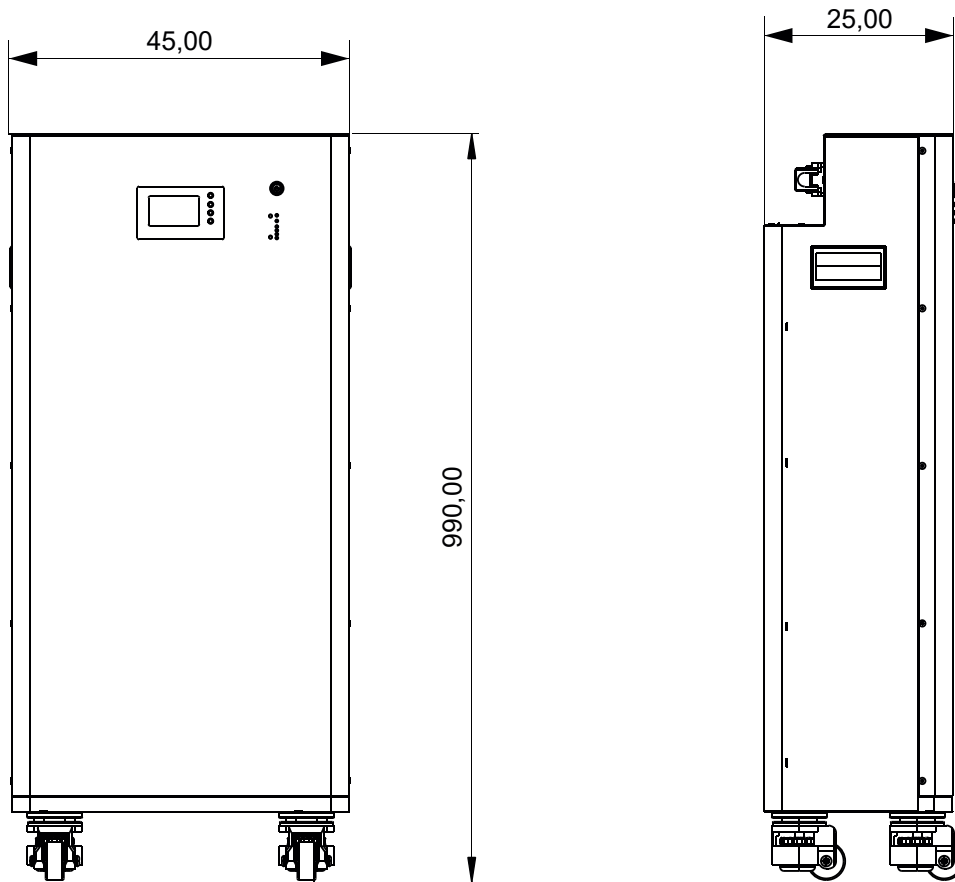
### 1.3 Transport

- \* The LBP must be packaged with insulation and impact-resistant material to prevent physical damage.
- \* During the transportation process, care should be taken during loading and unloading. The LBP must not be opened or subjected to physical impacts or collisions.
- \* The LBP must never be transported alongside flammable, explosive objects or sharp metal items.
- \* To transport the LBP, it should be carried by at least two people using the handles for guidance.



## 2. DIMENSIONS OF THE V SERIES LFP LBP

### 2.1. Dimensions of the BTR-P-51.2 V-280 Ah LBP



### 3. CONTENTS OF THE V LFP LBP

#### 3.1. Front Side of the V Series LFP LBP

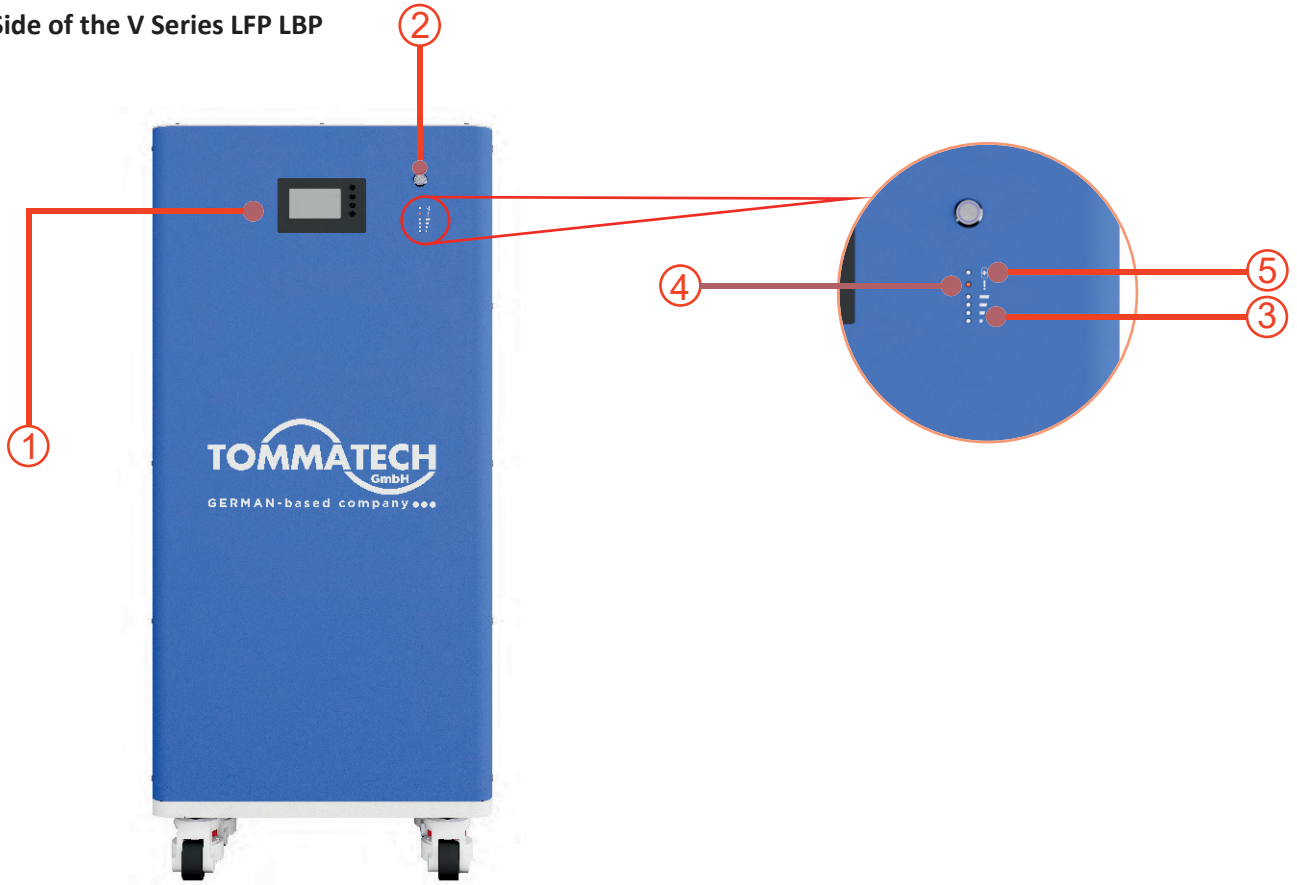


Figure 3.1

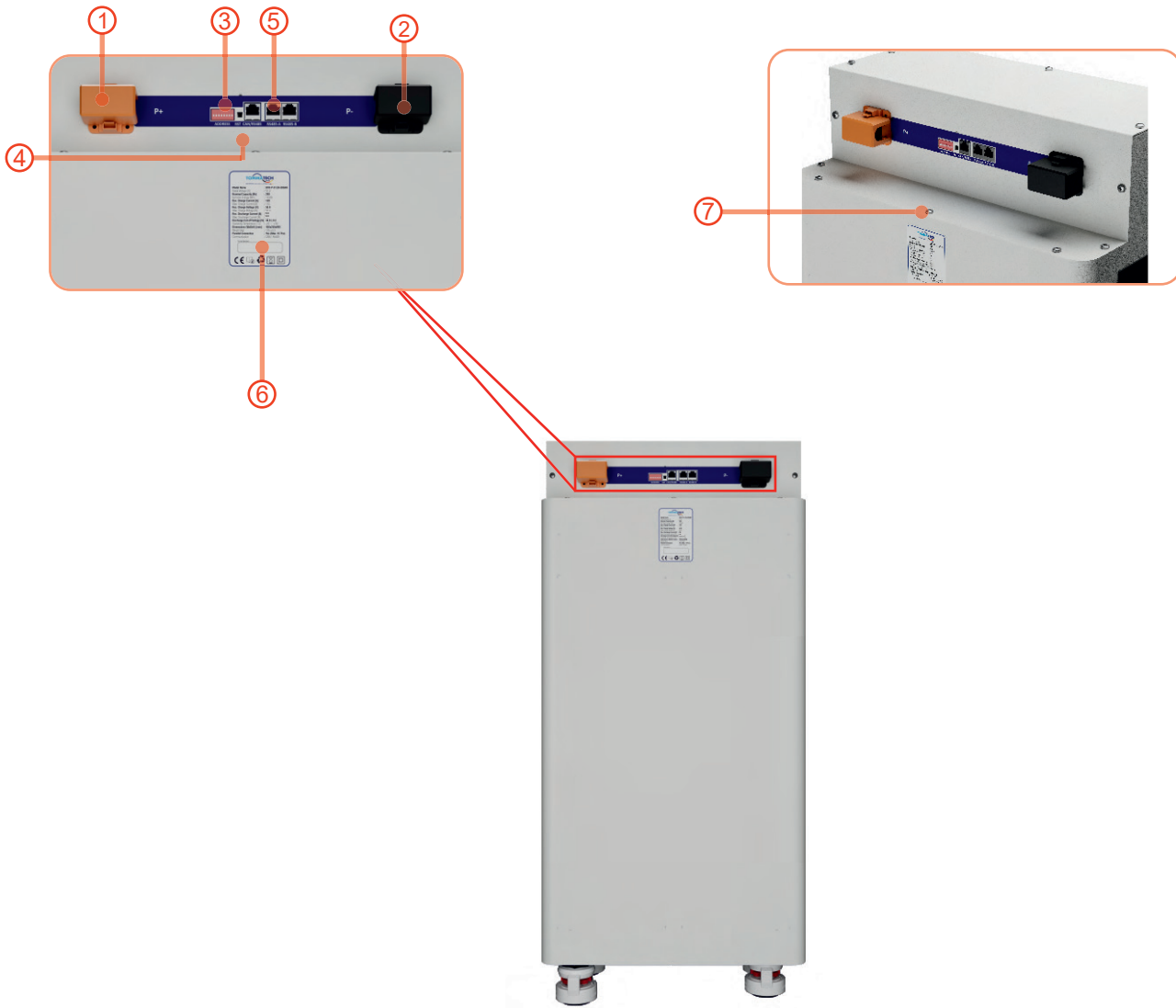
NUMBER	DESIGNATION	DESCRIPTION
1	LCD Screen	Allows real-time monitoring of battery data and adjustment of battery settings.
2	Power Switch	It is the switch that controls the power on and off of the LBP.
3	Battery State of Charge (SOC)	It is a series of green LEDs that display the battery's charge status in four stages. See page: 24.
4	Error Indicator	It is a warning LED that lights up in red in undesirable situations such as high temperature or low battery level.
5	Battery Status Indicator	It is a warning indicator that shows the battery's charge, discharge, and standby status.

#### 3.2. Battery Management System (BMS)

The Battery Management System (BMS) is a component that ensures the safety and control of the battery pack during charging and discharging processes in lithium battery applications. The BMS continuously monitors and manages the battery's operation, including overcharging/overdischarging, high current, high/low voltage, and high-temperature conditions. Additionally, it balances the voltage between cells and performs charge balancing, enabling the battery to be used for long periods with high performance.



### 3.3. Back Side of the V Series LFP LBP



Şekil 3.2

NUMBER	DESIGNATION	DESCRIPTION
1	(+) Connector	Positive Power Connector of the Lithium Battery
2	(-) Connector	Negative Power Connector of the Lithium Battery
3	Addressing Switch	It is the switch used for addressing in parallel connections.
4	Restart Switch	It enables the restart of the BMS.
5	Communication Ports	It has RS 485 and CAN ports for communication connections between the computer and inverters.
6	Device Label	Label containing information such as voltage, current, weight, and similar details.
7	Mounting Bracket	It is used for connecting multiple battery packs.

### 3.4. Technical and Physical Specifications of the V Series LFP LBP

VOLTAGE - CAPACITY		BTR-P-51.2 V-280 Ah
Nominal Voltage (V)		51.2
Nominal Capacity (Ah)		280
Nominal Energy (Wh)		14336 <sup>1</sup>
Recommended Charge Current (A)		100 <sup>2,3</sup>
Maximum Charge Current (A)		140 <sup>2,3</sup>
Recommended Charge Voltage (V)		56.8
Maximum Charge Voltage (V)		58.4
Recommended Discharge Current (A)		100 <sup>2,3</sup>
Maximum Discharge Current (A)		140 <sup>2,3</sup>
Discharge Cut-off Voltage (V)		44.8±0.2
BATTERY / CELL		
Cycle Count		8000 <sup>1,2,3,4,5</sup>
Gravimetric Energy Density (Wh / Kg)		165
Volumetric Energy Density (Wh / L)		350
Internal Resistance (mΩ)		<15 <sup>7</sup>
STANDARD		
Overcharge Protection		Yes
Overdischarge Protection		Yes
Overcurrent Protection		Yes
Short Circuit Protection		Yes
Overtemperature Protection		Yes
Temperature Sensor		Yes
Adjustable Charge / Discharge Current		Yes
Battery Chemistry		LFP Prismatic
Safety		IEC 61960 / 62133-2 / RoHS
OPERATING CONDITIONS		
Charge Temperature [°C]		0 ~ +60
Discharge Temperature [°C]		-20 ~ +60
Storage Temperature [°C]		0 ~ +35
Humidity (Non-condensing)		Maximum 85%
Protection Class		IP20-IP65
Expected Product Lifespan (Years)		>15
Warranty Period (Years)		5
OTHER		
Dimensions (W x D x H) [mm]		450x250x990
Weight		119 ± 0.5
Battery Connection		IP67-Protected Positive (+) and Negative (-) Connector Caps
Series Connection		No
Parallel Connection		Yes (Maximum 16 Units)
Communication		CAN / RS485 / Bluetooth
Display		LCD
Outer Enclosure		Metal Enclosure

1) Kullanılabilir Enerji (Usable Energy)  
 2) 0.5C  
 3) 25°C ± 2°  
 4) 50% SOC (State Of Charge)  
 5) 75% D.O.D (Depth Of Discharge)  
 6) 80% EOL (End Of Life)  
 7) 17% ± 3% SOC

### 3.5. Warning Label of the V Series LFP LBP

WARNING HIGH VOLTAGE INSIDE	ÖNEMLİ UYARI YÜKSEK VOLTAJ İÇERİR
<p>- <b>Please read the user manual before installing and operating the Lithium Battery.</b> Lityum Bataryayı kurulum yapmadan ve çalıştırmadan önce lütfen kullanım kılavuzunu okuyun.</p> <p>- <b>Do not drop or expose the Lithium Battery to any impact during use or relocation.</b> Lityum Bataryayı kullanım sırasında veya yer değişikliği esnasında düşürmeyin ve herhangi bir darbeye maruz bırakmayın.</p> <p>- <b>Please do not open and touch your product in case of malfunction. Otherwise, the lithium battery will be out of warranty.</b> Lütfen arıza anında ürününüzü açmayın ve müdahale etmeyin. Aksi takdirde lityum batarya garanti kapsamı dışında kalır.</p> <p>- <b>Do not immerse the device in water. Keep away from safety risk environments with flammable liquids, gases and dust.</b> Cihazı suya batırmayın. Yanıcı sıvılar, gazlar ve tozların bulunduğu güvenlik riski bulunan ortamlardan uzak tutun.</p> <p>- <b>Do not step on the lithium battery and do not put any material on the device.</b> Lityum Batarya üzerine kesinlikle basmayın ve cihazın üzerine herhangi bir malzeme koymayın.</p> <p>- <b>Do not pierce, hit or throw the lithium battery from a high place. Do not use in high pressure, high temperature, water contact environments.</b> Lityum bataryayı delmeyin, vurmuyun, yüksek yerden atmayın. Yüksek basınç, yüksek sıcaklık, su ile temaslı ortamlarda kullanmayın.</p> <p>- <b>Please keep your device out of the reach of children and animals.</b> Lütfen cihazınızı çocukların ve hayvanların ulaşamayacağı yerde saklayın.</p> <p>- <b>When cleaning the Lithium Battery, turn off your device and clean it with a dry cloth.</b> Lityum Bataryayı temizleme esnasında cihazınızı kapatın ve kuru bez ile temizleyin.</p> <p>- <b>Store the Lithium Battery under the storage conditions specified in the user manual.</b> Lityum Bataryayı kullanım kılavuzunda yer alan depolama koşullarında saklayın.</p> <p>- <b>In case of any problem with your product, please contact the authorized service.</b> Ürününüzde herhangi bir problem ile karşılaşılmaması durumunda lütfen yetkili servis ile iletişime geçin.</p>	
<p><b>! EMERGENCIES !</b>                      <b>! ACİL DURUMLAR !</b></p>	
<p>- <b>If your battery is leaking, flowing or damaged, turn off your device and do not continue to use it.</b> Bataryanızda sızıntı, akıntı veya hasar var ise cihazınızı kapatın ve kullanmaya devam etmeyin.</p> <p>- <b>Do not touch liquid leaking from your battery.</b> Bataryanızdan sızan sıvıya temas etmeyin.</p> <p>- <b>Never use water in case of fire.</b> Herhangi bir yangın durumunda kesinlikle su kullanmayın.</p> <p>- <b>Use special fire extinguishers containing carbon dioxide or dry chemical powder.</b> Karbondiyoksitli veya kuru kimyevi toz içeren özel yangın söndürücüler kullanın.</p>	

### 3.6. Product Label of the V Series LFP LBP

#### BTR-P-51.2 V - 280 Ah

GERMAN-based company

<b>Model Name</b>	: BTR-P-51.2V-280AH
<b>Rated Voltage [V]</b>	: 51.2
<b>Nominal Capacity [Ah]</b>	: 280
<b>Nominal Energy [Wh]</b>	: 14336
<b>Rec. Charge Current [A]</b>	: 100
<b>Max. Charge Current [A]</b>	: 140
<b>Rec. Charge Voltage [V]</b>	: 56.8
<b>Max. Charge Voltage [V]</b>	: 58.4
<b>Rec. Discharge Current [A]</b>	: 100
<b>Max. Discharge Current [A]</b>	: 140
<b>Discharge Cut-off Voltage [V]</b>	: 44.8±0.2
<b>Operating Temperature [°C]</b>	: -20 ~ +60
<b>Dimensions (WxDxH) [mm]</b>	: 450x250x990
<b>Weight [kg]</b>	: 119±0.5
<b>Parallel Connection</b>	: Yes (Max. 16 Pcs)
<b>Communication</b>	: CAN / Rs485

Serial Number

### 3.5. RECOMMENDED INVERTER AND BATTERY POWER COMBINATIONS

The table has been created based on a system voltage of 48V in the inverters.

INVERTER	NUMBER OF PARALLEL CONNECTIONS	BATTERY ENERGY (KWH)
≤5.6 KW	1	14,3
≤7.2 KW	1 v 2	14,3 v 28,6
≤11 KW	2	28,6
≤15 KW	3	42,9
≤20 KW	4	57,2
≤30 KW	5	71,5
≤40 KW	6	85,8

The table has been created based on the recommended battery configuration for an 11 kW inverter.

Battery Specifications	An 11 kW inverter operating at maximum power will draw a current of: $11000 \text{ W} / 51.2 \text{ V} = 214 \text{ A}$ - Maximum discharge current: 140 A - Maximum current supported by the connectors: 200 A - Operating voltage: 51.2 V
Number of Batteries	Connection Types
Single:	Since the maximum discharge current is 214 A, the discharge current should be limited to 140 A through the inverter.
2 parallel:	When the inverter operates at maximum power, it will draw 214 A, and each parallel battery will supply $214 / 2 = 107 \text{ A}$ . This value is suitable for both the battery packs and the inverter. Therefore, the battery packs can be directly connected in parallel using 35 mm <sup>2</sup> jumper cables, and the + and – power outputs of the battery packs can be connected directly to the inverter using 50 mm <sup>2</sup> cables.
3 parallel:	When the inverter operates at maximum power, it will draw 214 A, and each parallel battery will supply $214 / 3 = 72 \text{ A}$ . This value is suitable for the battery packs and battery connectors. The battery packs can be connected to each other using 35 mm <sup>2</sup> cables, and the + and – power outputs of the battery packs can be connected directly to the inverter using 50 mm <sup>2</sup> cables.
4 parallel:	When the inverter operates at maximum power, it will draw 214 A, and each parallel battery will supply $214 / 4 = 53.5 \text{ A}$ . This value is suitable for the battery packs and battery connectors. The battery packs can be connected to each other using 35 mm <sup>2</sup> cables, and the + and – power outputs of the battery packs can be connected directly to the inverter using 50 mm <sup>2</sup> cables.
n parallel: (n ≤ 16)	The calculations above are based on the number of parallel batteries (n).

**NOTE:** As the number of batteries increases, the possibility of parallel connection at the inverter input decreases. Therefore, all batteries can be connected to the inverter through a DC bus.

## 5. ADDRESSING SETTINGS

### 5.1. Single Use Settings



Figure 5.1

**NOTE:** In single-use mode, no addressing switch configuration is required. All switches should remain in the closed position as shown in Figure 5.1.

### 5.2. 5.2. Multi-Use Settings (Parallel Connection)

**NOTE:** In multi-parallel connections, connecting the power output cables of the lithium battery as shown in Figure 5.2, with the positive and negative outputs connected from the beginning and end, will be suitable for power distribution.

Example: LBP 3-Unit Parallel Connection

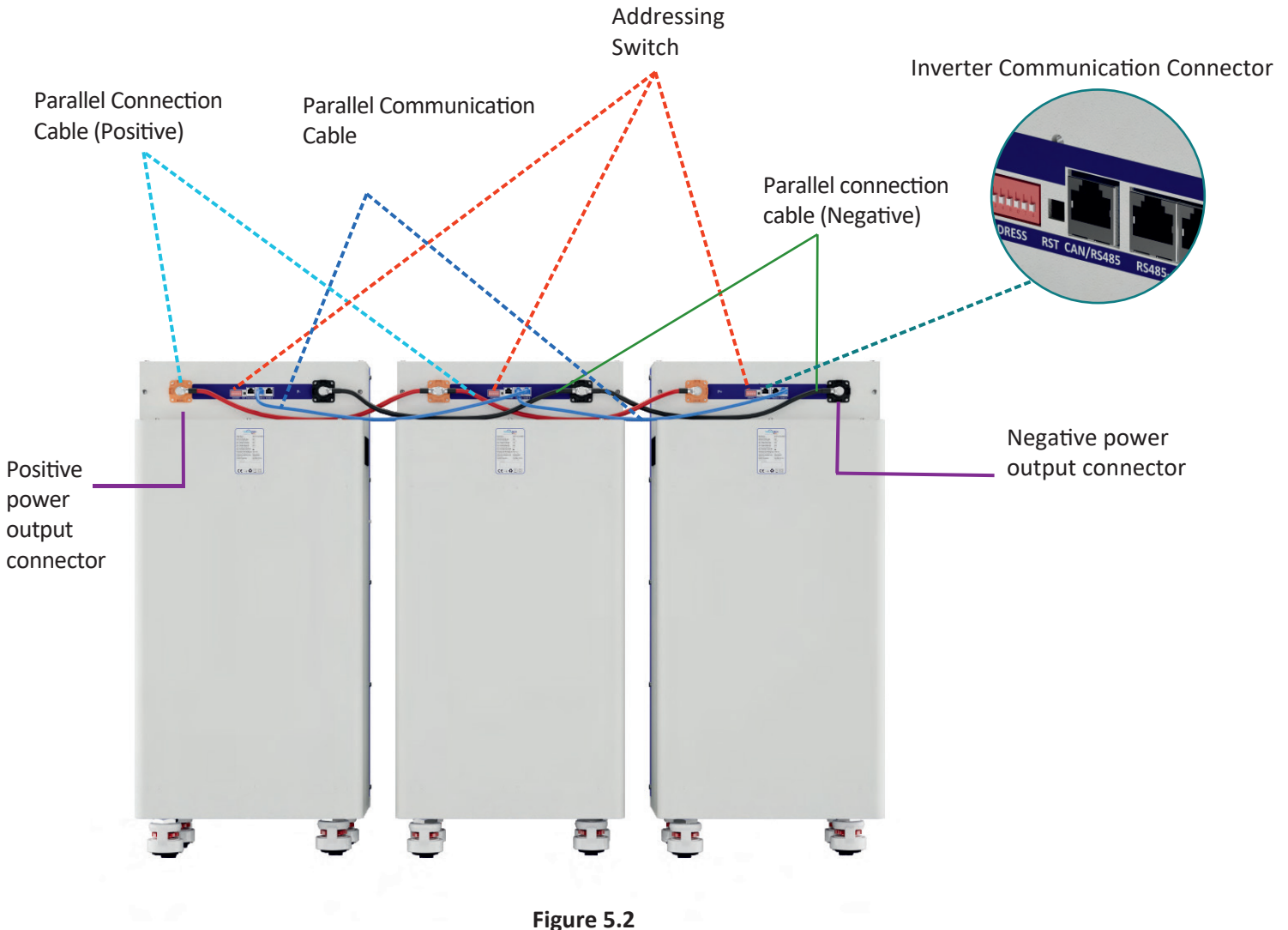


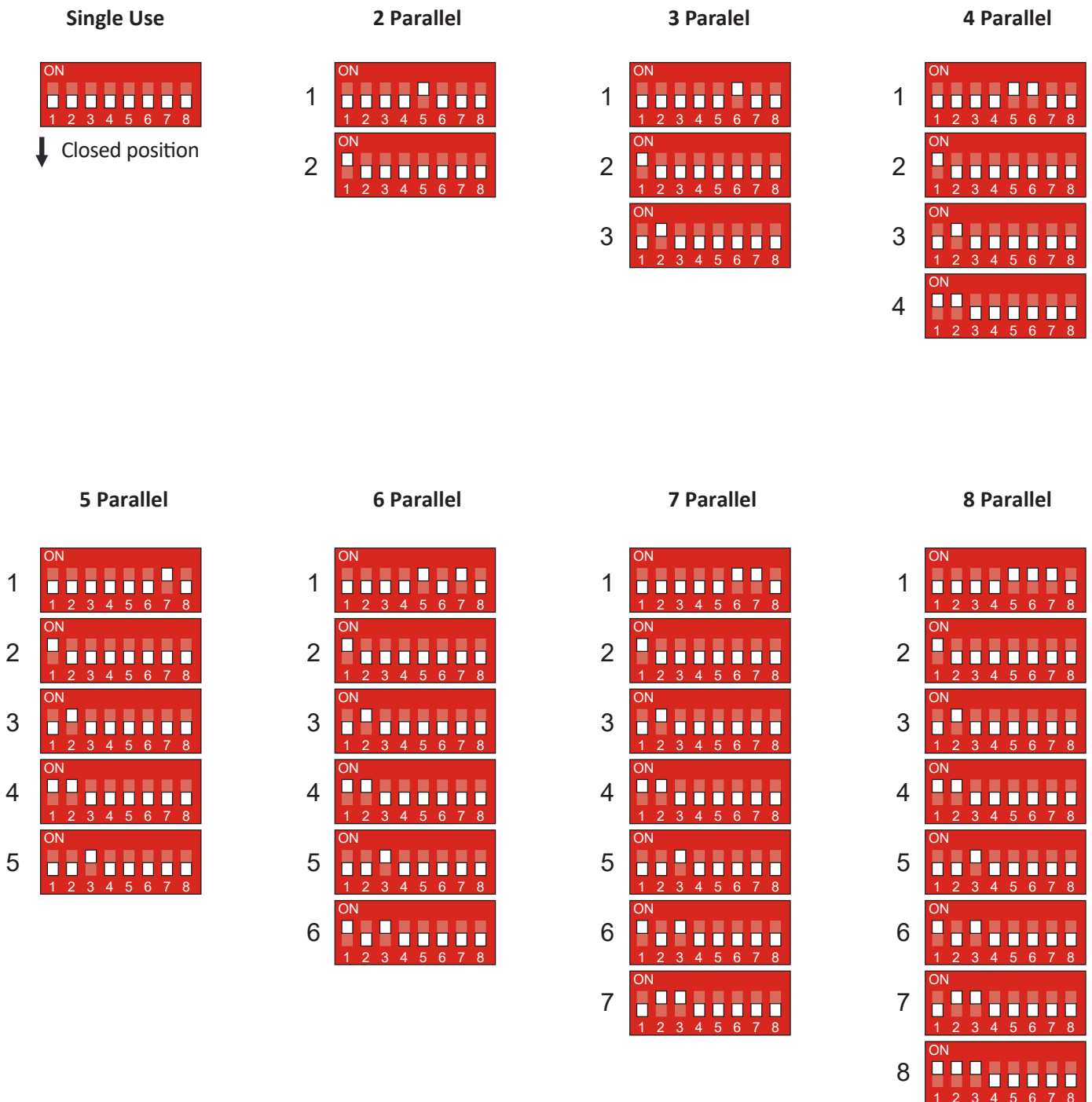
Figure 5.2

### 5.3. Multiple Use Addressing Settings (Parallel Connection)

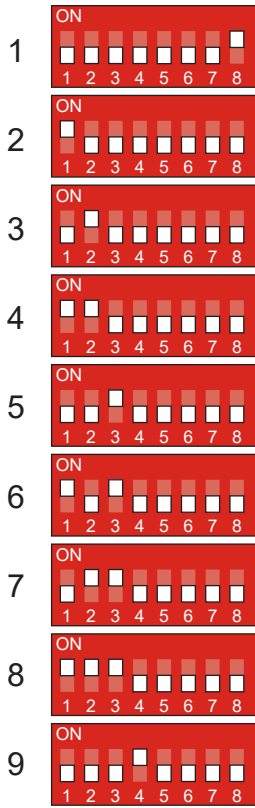
#### Addressing Switch

When LBP units are connected in parallel, the main protocol communicates with dependent protocols via the CAN interface. The main protocol summarizes the information of the entire battery system and shares it through a converter using CAN or RS 485.

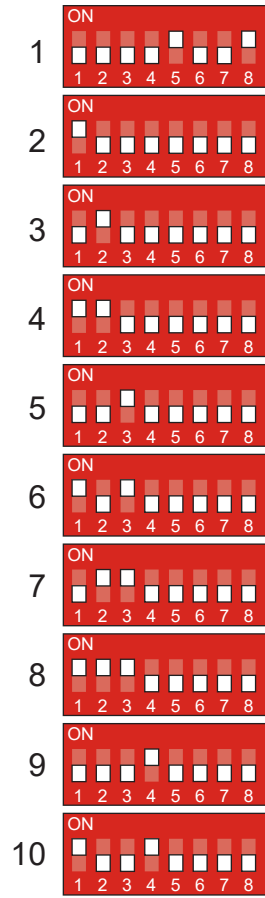
In single-use mode, no addressing configuration is required. All switches must remain in the closed position. For multi-parallel connections, the addressing process should be set according to the number of devices, as specified in the following configurations.



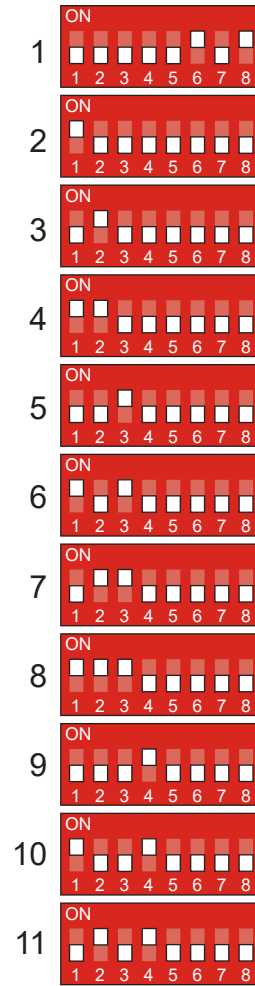
**9 Parallel**



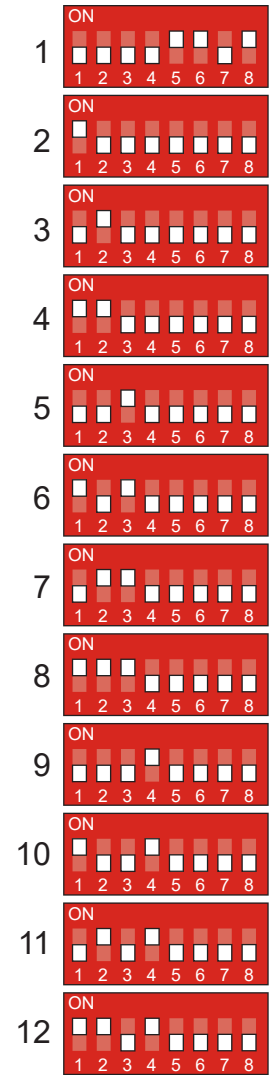
**10 Parallel**



**11 Parallel**

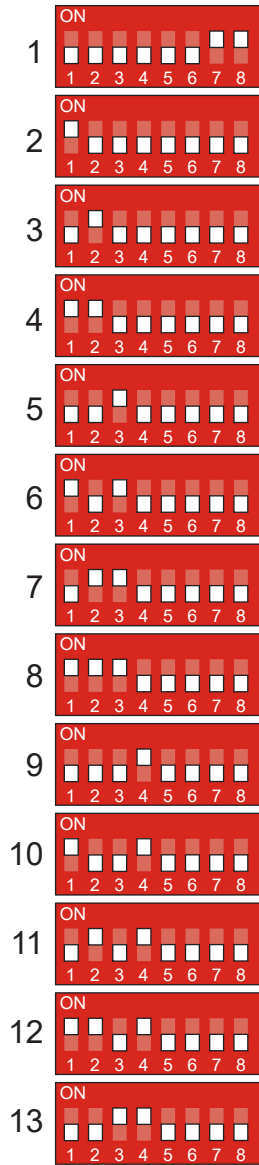


**12 Parallel**

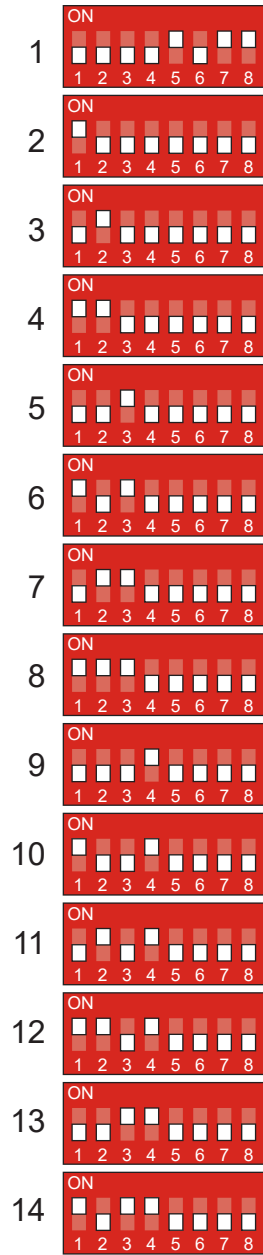




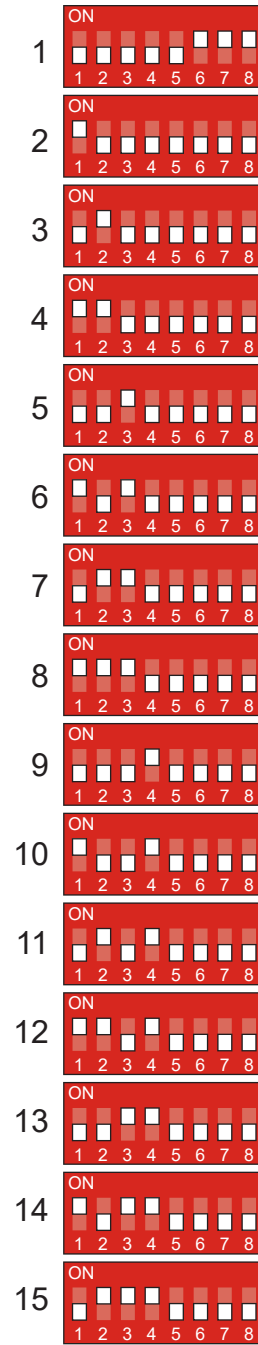
**13 Parallel**



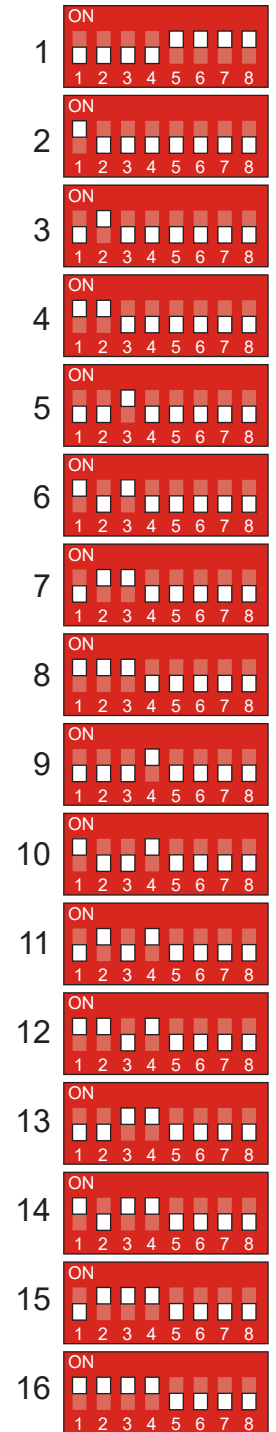
**14 Parallel**



**15 Parallel**



**16 Parallel**



### 5.4. RJ45 Communication Cable Definition Between Inverters

#### 5.4. Compatible Inverters

- TOMMATECH
- GOODWE
- GROWATT
- VICTRON
- VOLTRONIC
- LUXPOWER
- SOFAR
- DEYE
- SERMATEC
- RENAC
- TBB POWER
- SOLIS
- SMA
- FOXESS

**NOTE:** If your inverter is not listed above, please contact our technical service.

- |                 |         |
|-----------------|---------|
| 1. Orange White | RS485-B |
| 2. Orange       | RS485-A |
| 3. Green White  | GND     |
| 4. Blue         | CAN-H   |
| 5. Blue White   | CAN-L   |
| 6. Green        | GND     |
| 7. Brown White  | RS485-A |
| 8. Brown        | RS485-B |



FRONT SIDE

8  
1

CAN/RS485

Inverter  
Communication  
Cable Input

+Positive Power Output

#### Example: LBP 3-Parallel Connection

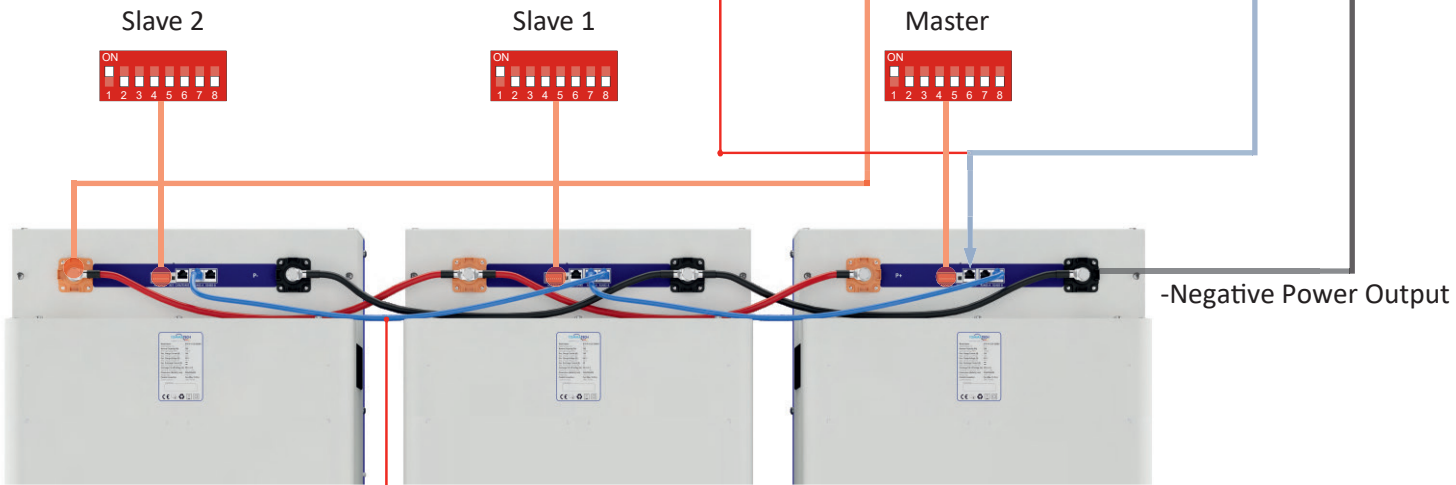








Figure 5.3

Parallel Communication Cable

**NOTE:** Before connecting the cables, the addressing settings should be configured according to the number of batteries to be used, as specified on page 10 (Figure 5.3).

## 6. V SERIES LFP LBP BOX CONTENTS

ITEM	DESCRIPTION	QUANTITY	PHOTOGRAPH
MODULAR SERIES LBP	51.2 V-280 Ah & LiFePO4 LBP	1	
FOR MULTIPLE CONNECTIONS PARALLELLING CABLE	RED (35 mm <sup>2</sup> ) BLACK (35 mm <sup>2</sup> ) Length: 600 mm	1	
BETWEEN BATTERIES COMMUNICATION CABLE	Ethernet LAN Cable Length: 1000 mm	1	
BATTERY INVERTER INTERMEDIATE COMMUNICATION CABLE	Ethernet LAN Cable Length: 1500 mm	1	
FIXING BRACKET	LBP FIXING	1	
USER MANUAL and WARRANTY CERTIFICATE	LBP USER Manual	1	

## 7. INSTALLATION

### 7.1. Installation Steps

**STEP 1:** The box should be opened while in a horizontal position as shown in Figure 7.1.



Figure 7.1

**STEP 2:** Carefully remove the contents of the box from the product packaging and ensure that the product contents are complete. The product packaging should be carefully preserved for any potential warranty or technical service situations. (Figure 7.2)



Figure 7.2

**STEP 3:** After the battery is removed from the box, it should appear as shown in Figure 7.3.



Figure 7.3

**STEP 4:** After determining the area where the battery will be installed, position the battery on the floor, ensuring there is enough space between the battery and the wall, particularly at the back, to allow a person to perform the installation. (Figure 7.4)



Figure 7.4

**STEP 5:** Position the batteries close to each other as shown in the figure, according to the number of batteries obtained. (Figure 7.5)



Figure 7.5

**STEP 6:** Use the Fixing Bracket shown in Figure 7.6 to secure the LBP to the wall.

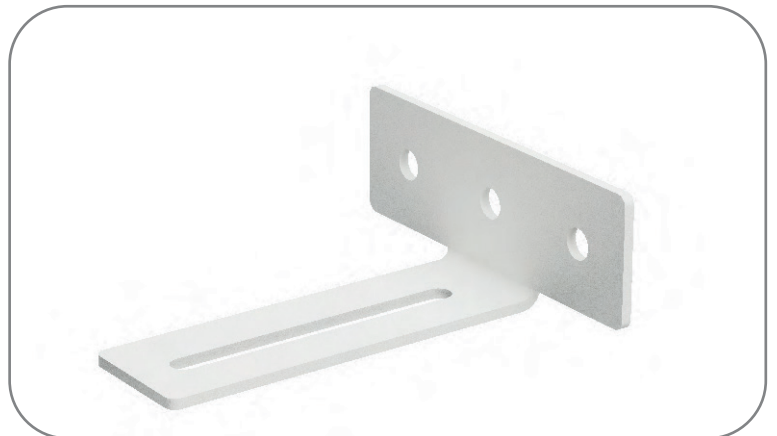


Figure 7.6

**STEP 7:** After determining the height measurement based on the battery, mount the LBP fixing plate to the wall using a drill. (Figure 7.7)

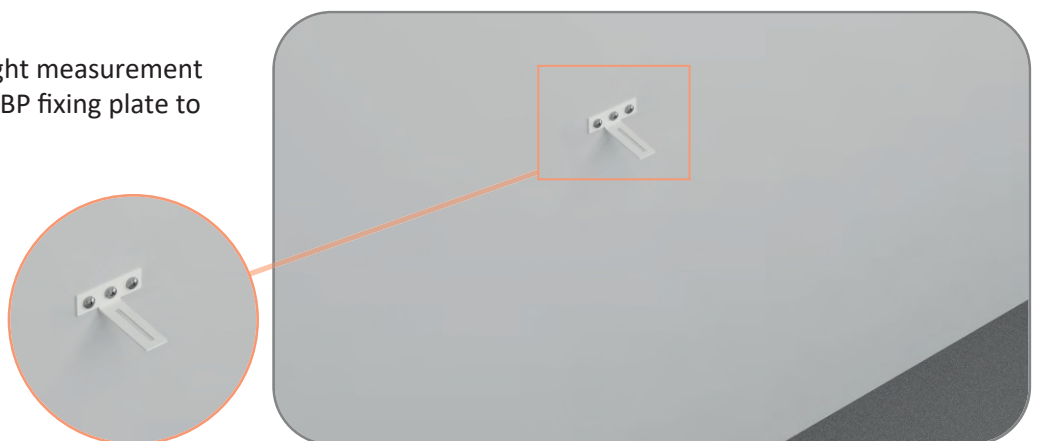


Figure 7.7

**STEP 8:** Before connecting the cables, refer to page 9 and configure the addressing settings for each battery according to the number of batteries to be used. (Figure 7.8)

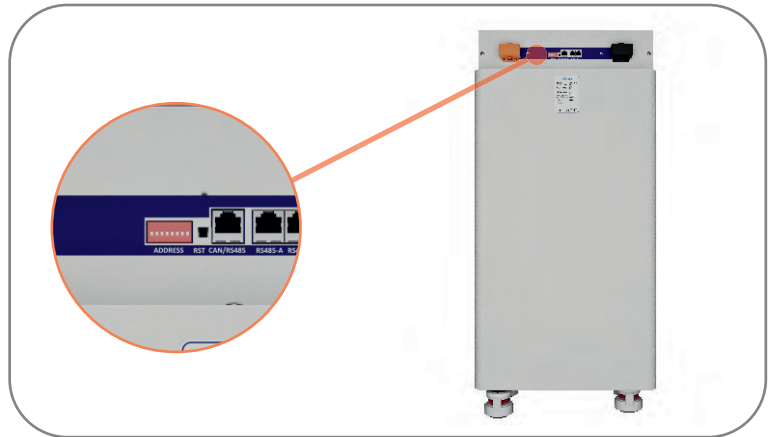


Figure 7.8

**STEP 9:** Connect the power cables between the LBPs using a wrench, as shown in Figure 7.9.

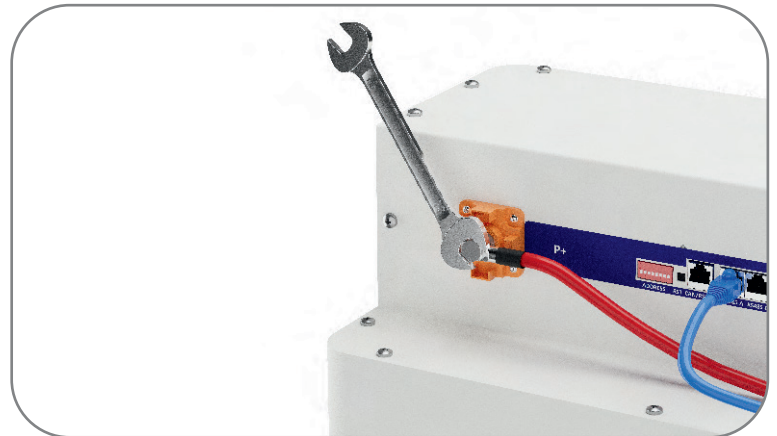


Figure 7.9

**STEP 10:** Connect the parallel connection power cables of the modules as shown in Figure 7.10.



Figure 7.10

**STEP 11:** Connect the RJ45 communication cables of the modules from the RS485B port of the first selected battery to the RS485A port of the next battery in sequence, from B to A, for each battery as shown on page 9. (Figure 7.11)

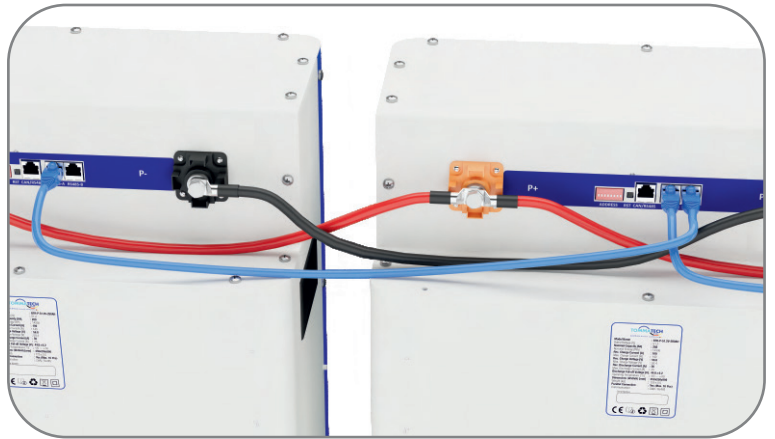


Figure 7.11

**STEP 12:** After the power cables are installed, the connector covers should be placed back in position. (Figure 7.12)

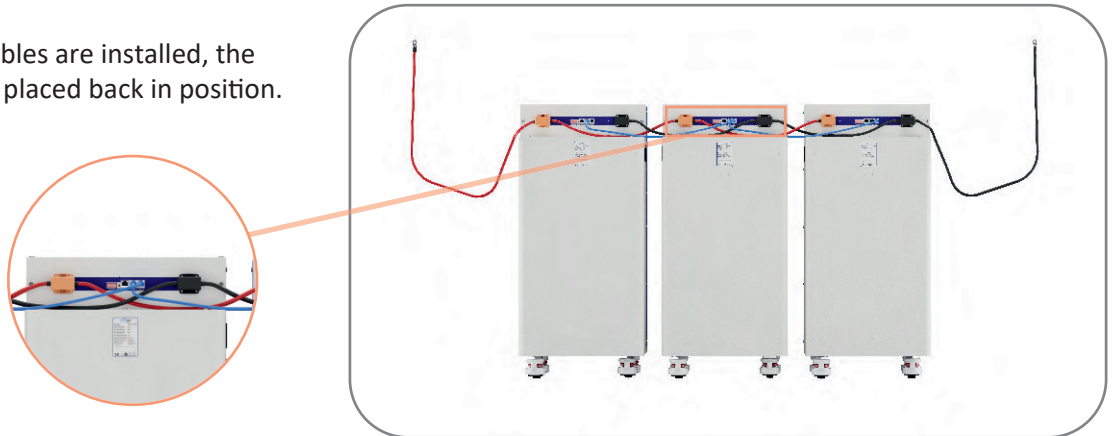


Figure 7.12

**STEP 13:** For communication between the selected master battery and the inverter, connect the communication cable to the CAN/RS485 port. (Figure 7.13)



Figure 7.13



**STEP 14:** To mount the fixing apparatus to the battery, remove the middle screw at the back using a screwdriver. (Figure 7.14)

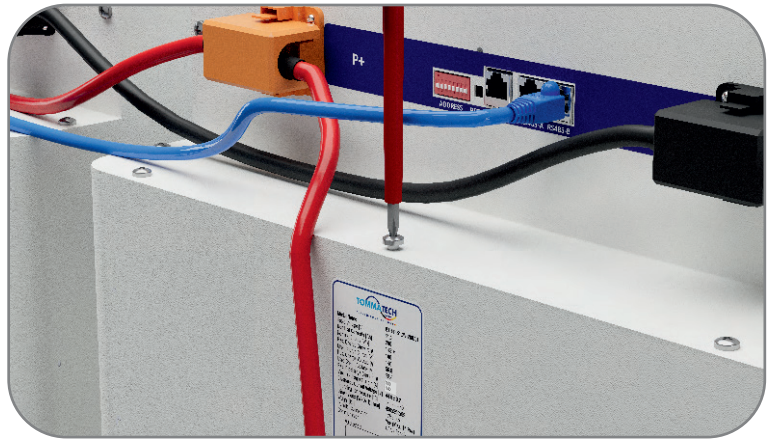


Figure 7.14

**STEP 15:** Place the LBPs in the predetermined position for securing. (Figure 7.15)



Figure 7.15

**STEP 16:** The fixing apparatus is positioned on the battery as shown in the figure. (Figure 7.16)



Figure 7.16

**STEP 17:** The fixing apparatus is mounted onto the battery at the desired level, as shown in Figures 7.17 and 7.18.

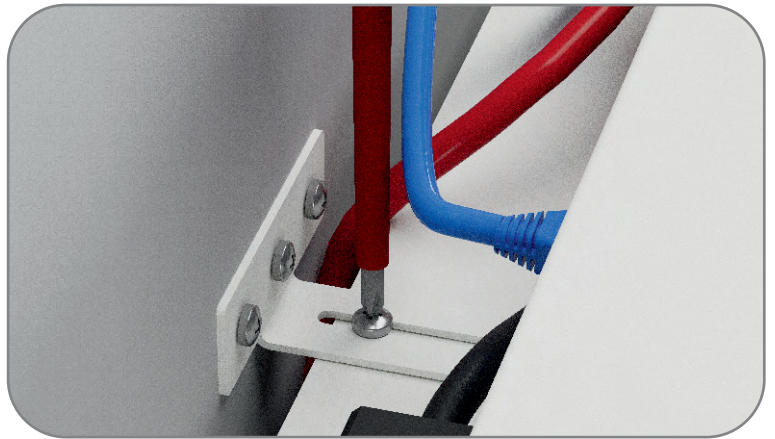


Figure 7.17

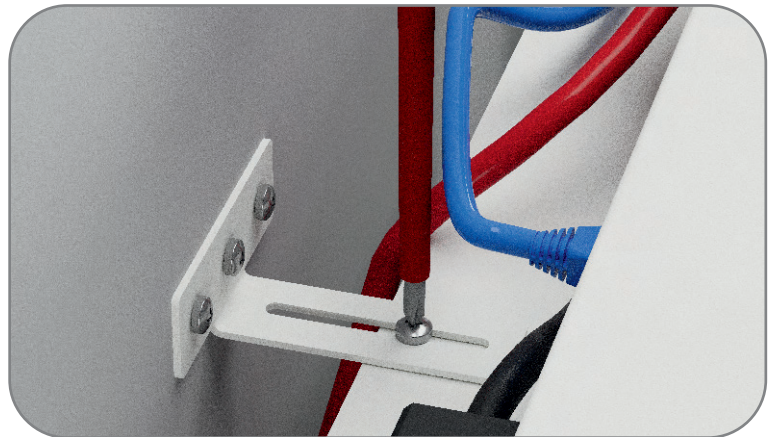


Figure 7.18

**STEP 18:** To secure the LBP to the floor, turn the red wheel shown in Figure 7.19 in the direction of the arrow until the rubber foot makes contact with the ground.



**ATTENTION:**

After completing the turning process, the rubber foot should make contact with the ground, and the wheel should remain elevated.

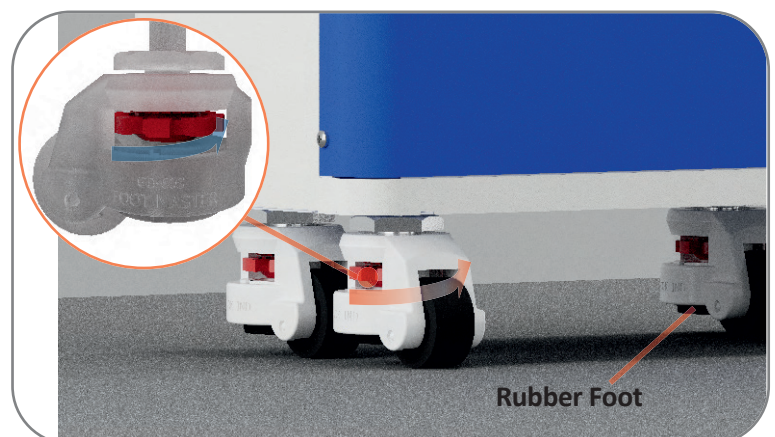


Figure 7.19







**STEP 19:** To activate the modules, press the start button, beginning with the slave modules. (Figure 7.20)



Figure 7.20

**STEP 20:** After completing all these steps, start the inverter. Check the communication status between the inverter and the battery through the inverter.

## 8. ÇALIŞMA VE ALARM GÖSTERGELERİ

BATTERY STATUS	MODE	OPERATING MODE	ALARM	LED LIGHTS			
							
Closed	Closed	OFF	OFF	OFF	OFF	OFF	OFF
Standby	Normal	Blinks	OFF	OFF			
Charging Mode	Normal	Blinks	OFF	Based on Battery Charge Status			
	Overcurrent Protection	Blinks	Glows Red				
	Overvoltage Protection	Blinks	Glows Red	OFF	OFF	OFF	OFF
	Overtemperature Protection	Blinks	Glows Red	OFF	OFF	OFF	OFF
Discharge Mode	Normal	Blinks	OFF	Based on Battery Charge Status			
	Alarm	Blinks	Blinks				
	High Current, Temperature, Overcurrent Protection	OFF	Glows Red	OFF	OFF	OFF	OFF
	Low Voltage Protection	OFF	Glows Red	OFF	OFF	OFF	OFF

## 8.1. Şarj Göstergesi

İTEM	CHARGE				DISCHARGE			
	L4 	L3 	L2 	L1 	L4 	L3 	L2 	L1 
Indicator Status	L4 	L3 	L2 	L1 	L4 	L3 	L2 	L1 
0-25%	OFF	OFF	OFF	Blinks	OFF	OFF	OFF	Glows Green
25%-50%	OFF	OFF	Blinks	Glows Green	OFF	OFF	Glows Green	Glows Green
50%-75%	OFF	Blinks	Glows Green	Sabit Yeşil	OFF	Glows Green	Glows Green	Glows Green
>75%	Blinks	Glows Green	Glows Green	Glows Green	Glows Green	Glows Green	Glows Green	Glows Green

## 9. TEST FEATURES OF THE MODULAR SERIES LFP LBP

### 9.1. Electrical Performance Test

ITEM	TEST PROCEDURE	RESULT
Nominal Voltage	Average Voltage Measurement During the Operation of a 51.2V Battery	51.2 V
Discharge Performance	The time taken for a fully charged battery to drop from 51.2 V to 40 V under standard discharge current	≥120 minutes
Storage	Measurement of the voltage loss of a 51.2 V battery after 1 month at $25 \pm 5 \text{ }^\circ\text{C}$	≥49.6 V
Cycle Count	Measurement of 80% capacity usability at 100% depth of discharge with standard charge (100A) and discharge current (100A) at $25 \pm 5 \text{ }^\circ\text{C}$	≥80% after 6000 cycles

### 9.2. Safety Test

ITEM	TEST PROCEDURE	RESULT
Short Circuit	A cable with a resistance of less than 5 mΩ was connected to the positive and negative terminals of a fully charged battery, and the short circuit condition was observed for 10 minutes. As a result of the test, the highest temperature recorded on the battery was 138°C, with no burning or explosion observed.	No burning or explosion was observed.
Penetration and Impact	When the battery was fully charged, an impact test was conducted using a steel needle with a diameter between $\varnothing$ 3mm and $\varnothing$ 8mm and speeds ranging from 10 mm/s to 40 mm/s. As a result of the test, punctures were observed on the outer layer of the battery, and the voltage dropped to zero.	No burning or explosion was observed.
Overcharge	The battery was discharged at 1C in an environment with a temperature of $25^\circ\text{C} \pm 5^\circ\text{C}$ until it reached 0 V. No burning or explosion was observed during the test.	No burning or explosion was observed.
Thermal Shock	After being fully charged at 1C, the battery was placed in a dry container and kept in an environment with a temperature of $150^\circ\text{C} \pm 2^\circ\text{C}$ for half an hour.	No burning or explosion was observed.

**10. FREQUENTLY ENCOUNTERED SITUATIONS AND SUGGESTED SOLUTIONS**

SITUATION	SUGGESTED SOLUTION
LBP is not fully charging.	The charging voltage setting is too low. The charging voltage for the LBP should be between 56.8 V and 57.6 V for the BTR-P-51.2 V - 280 Ah model.
Communication error from the LBP.	Check the address switch settings, and if no issue is found, inspect the RJ45 cable between the inverter and the battery. The corresponding RJ45 connections for the battery are specified in the user manual.
After the LBP is connected to the inverter, the inverter does not charge the LBP.	The voltage of the LBP has dropped. If the voltage value for the BTR-P-51.2 V - 280 Ah model falls below 44 V, the inverter may not be able to charge the battery.
The LBP discharges quickly.	The system may be consuming too much energy. You can add an additional lithium battery with the same product specifications to the system.
The LBP shuts itself down.	Check the current drawn by the inverter and ensure it complies with the maximum current limit. Verify the voltage of the LBP and ensure it is within the normal voltage range.
When the LBP is turned off, some batteries do not turn off.	The LBP can only be turned on and off via the main battery and does not turn off during the charging process. Refer to the 'LED Light States During Charging' section in the user manual.
It is unclear which LBP is the main LBP.	The main LBP can be any of the lithium batteries connected in parallel. This depends on your address switch settings. You can find the address switch settings in the user manual, with the top-listed setting indicating the address switch configuration for the main LBP.
If a battery from another brand with the same voltage and current values is added to the LBP, would it cause any issues?	You can only add batteries of the same model and brand with identical voltage and current values to the LBP. Adding a battery from a different brand may result in system errors that could lead to serious issues.
If the LBP touches the ground, would it cause any issues?	The LBP should be installed without any ground contact and positioned 20 cm above the ground. Protect it from moisture, liquid contact, scratches, and similar adverse effects.

*\*The situations and suggested solutions listed in the table are intended for general troubleshooting. If no solution is achieved for your lithium batteries after following the specified steps, please contact authorized customer service.*

## 11. MAINTENANCE

- If the LBP is used infrequently, it should be used at least once every three months and left with an SOC (State of Charge) between 30% and 50%.
- If the LBP will not be used for an extended period, check its voltage. If the measured voltage is lower than the nominal operating voltage, charge the battery.
- The LBP does not require any liquid to be added. Therefore, never attempt to open or interfere with the battery. Products that are opened or tampered with will no longer be covered under warranty.

## 12. PACKAGING AND STORAGE

When the LBP is packaged, ensure to check the production date and remember that the product must be charged within three months of this date with a state of charge (SOC) between 30% and 50%. The high-security LBP box surface should include details such as name, type, nominal voltage, quantity, gross weight, date, capacity, and impedance.





## WARRANTY CERTIFICATE

**Company Name: TOMMATECH GMBH**

**Head Office:**

**Address:** Bürgerplatz 5, 85748 Garching, Munich, Germany

**Phone:** +49 89 1250 36 860

**Email:** mail@tommatech.de

**Technical Service:**

**Address:** Antalya Organized Industrial Zone, 1st Section, Atatürk Boulevard No:20,

Döşemealtı – Antalya – Turkey

**Telefon:** + 90 242 229 00 54

**Telefon:** 444 20 02

**Faks:** + 90 242 229 00 74

**Product Information**

**Product Model:**

**Product Serial Number:**

**Warranty Period:** 5 YIL (60 AY)

**Maximum Repair Time:** 20 İş Günü

**Seller Company Information**

**Name:**

**Address:**

**Phone:**

**Email:**

**Invoice Date and Number:**

**Delivery Date and Location:**

**Signature:**

**Company Seal:**

**Note:** To ensure that the device sent to our company is evaluated under the warranty (during the product's warranty period), no hardware interventions must be performed. The device must be undamaged, the warranty seal must not be removed or damaged, and the product must be returned in its original packaging. Failure to comply with these conditions will result in the device being classified as tampered with and excluded from warranty coverage.

**CASES NOT COVERED BY WARRANTY:**

1. Damage to the batteries caused during transportation.
2. Damage resulting from interventions on the battery by unauthorized service centers.
3. Damage caused by incorrect polarity of battery connections.
4. Damage due to drawing current that exceeds the battery's discharge capacity.
5. Damage caused by charging the battery with a current exceeding its maximum charging capacity.
6. Damage due to charging the battery with a voltage exceeding the maximum charging voltage specified in the user manual.
7. Damage caused by short-circuiting the battery terminals.
8. Damage caused by contact between the positive (+) and negative (-) terminals with metallic objects.
9. Defects and damages due to improper assembly, maintenance, repair, or disassembly by unauthorized individuals.
10. Damage caused by incomplete insertion of battery connectors.
11. Damage resulting from opening and tampering with the battery by unauthorized individuals.
12. Damage caused by dropping the battery from a significant height.
13. Damage caused by striking the battery with objects such as hammers, shovels, or similar tools.
14. Damage due to series connections of batteries.
15. Damage from exposure to high currents or voltages.
16. Damage caused by contact with liquids.
17. Damage caused by use of the battery in extremely humid environments.
18. Damage caused by exposure to temperatures above or below the values specified in the user manual.
19. Damage caused by use of the battery outside the specifications listed in the user manual.
20. Damage caused by exposure to sunlight, fire, heating devices, or materials with high temperatures.
21. Damage caused by connecting the battery to AC devices without an appropriate inverter.
22. Damage caused by using the battery in devices such as televisions or washing machines with the battery.
23. Damage caused by connecting the battery directly from an AC source without a converter.
24. Damage caused by using the battery under risky conditions.
25. Damage caused by charging the battery below its nominal operating voltage.
26. Damage caused by exposure to fire or heat sources.
27. Damage caused by mixing batteries with batteries of different types, capacities, or production dates.
28. Damage caused by short-circuiting the battery.
29. Damage caused by using the battery while loads are connected or during current flow.
30. Damage caused by using the battery for purposes other than its intended operation and longevity of the battery.







