

BLVD (Battery Low Voltage Disconnect)

< Built-in Inrush Current Limiter (ICL) >

- ▶ **Function (1/3): Prevents lithium batteries from becoming over-discharged.**
(Maintains the battery charge level at approximately 5% or higher, preventing complete discharge and thereby preventing battery-related safety incidents)
- ▶ **Function (2/3): Built-in battery inrush current prevention function.**
(When a load device is connected to the lithium battery, the capacitor built into the load draws a momentary overcurrent (inrush current) from the battery, preventing the battery from shutting down.)
- ▶ **Feature (3/3): Can be used as a main power cutoff switch. (Interlocks with a key switch.)**

< Industrial / Indoor / Stationary >

Export HS Code: 8536.41.000 / Directly manufactured by Tabos (Made in Korea)



Standard



Communication Cable (U/I Signal Output), 2 m long, Connector & Cable (UL2464, Shielded, 4C, 22 AWG)

Optional Accessories



L-shaped

The customer is responsible for providing all other wires except for the communication cable.

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Revision History

■ **June 27, 2025:** The cut-off voltage was increased to 44.8V for the 50V model and to 22.4V for the 25V battery model.

This applies to units shipped on or after June 23, 2025.

Prior to that, the breakdown voltages were 43.4 V and 21.7 V, respectively.

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*Includes instructions on how to silence the buzzer

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0. Important Precautions

Intended Use of This Product:

While overcharging lithium batteries is dangerous, leaving a battery in a low-voltage state can alter the chemical composition inside the lithium battery cells.

This significantly increases the risk of battery safety incidents (such as fires). This product is designed to prevent such fire incidents.

Furthermore, while the battery's BMS cuts off power when the battery reaches a low voltage, this device isolates the battery from the load before the BMS intervenes,

maintaining a remaining charge of approximately 5%. This prevents changes in the chemical composition of the battery cells, enhancing safety and significantly helping to prevent fires. Furthermore, by preventing the battery from entering a low-voltage shutdown state, it facilitates battery charging.

This product fully incorporates the functionality of Tapos' existing "inrush current limiter."

Therefore, when using this product, there is no need to use a separate inrush current limiter, and you must not use one.

 Ensure there is sufficient space to install the product. In particular, since the wires are thick, ensure there is adequate routing space for them.

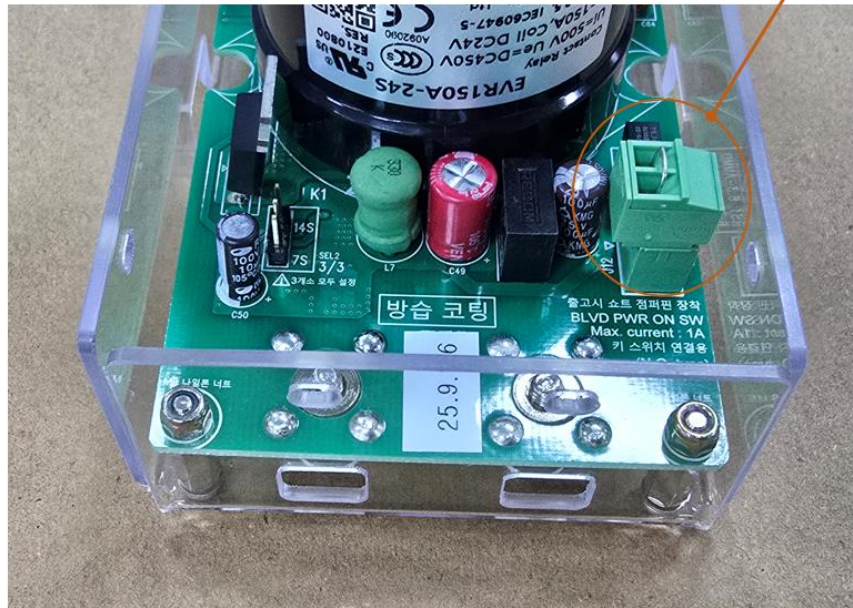
Installation Instructions

Install the product as shown below. Failure to do so will result in the inrush current limiter being completely ineffective.

The main switch must be installed exactly as shown in the correct installation diagram below.

< Installation Method_General Application >: General Situation / When using the BLVD as a main switch

공장 출하시 연결되어 있던 점퍼선을 빼고,
키 스위치를 연결하여 사용하십시오.
* 나사식 단자 : 사용전선 AWG22 및 그 이상 굵기 전선 사용



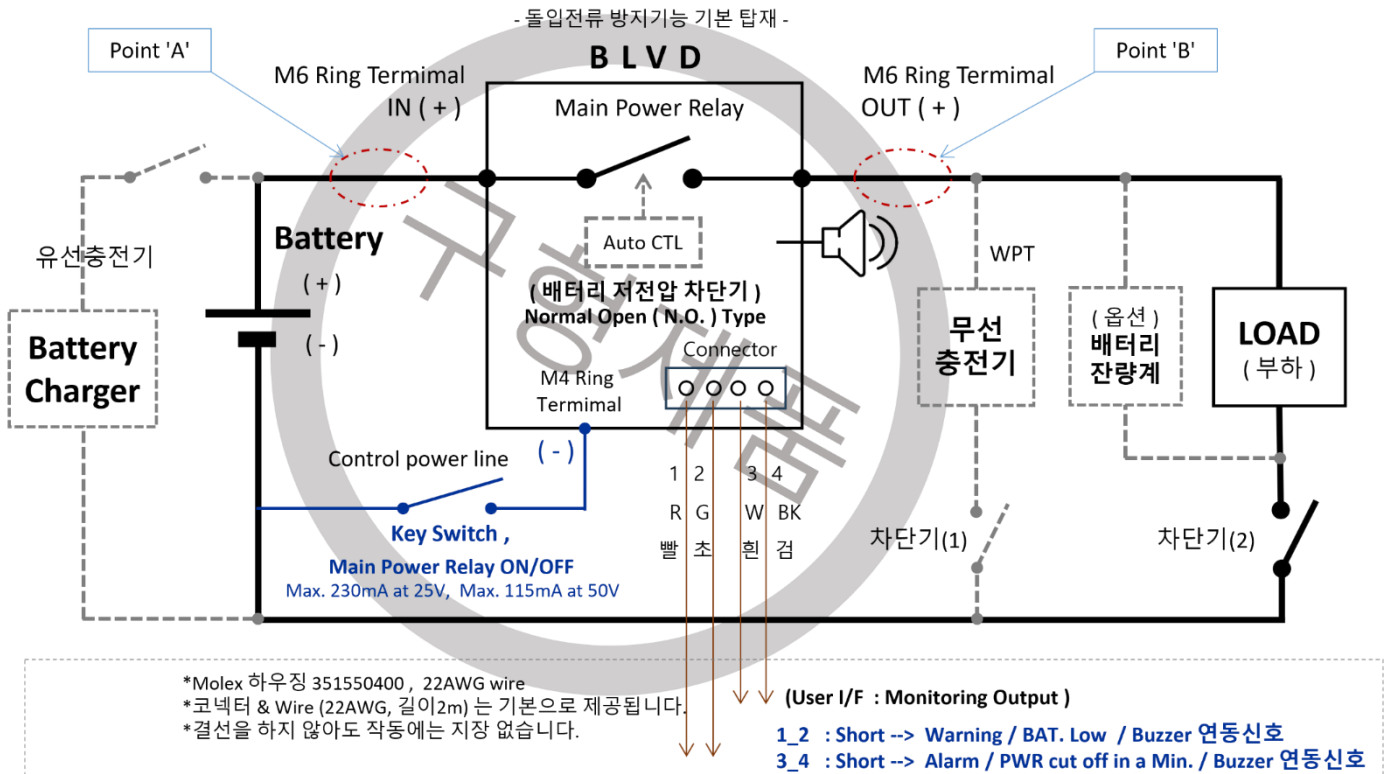
In the photo above, the connector for connecting the key switch is used to turn the (+) line—which supplies power to the BLVD’s control unit—on and off.

Some early models do not have a connector for connecting a switch, as shown in the photo above. If this connector is missing, connect the key switch to the (–) line.

〈 Reference – Installation Method 1/2 〉 :

When using the BLVD as a main switch (older models: produced up to December 2025)

/ Early versions of Tabos' BLVD did not include a connector for connecting a key switch. A connector was added in later models.



* 동작 프로세스 및 설치시 주의사항 :

BLVD (Main S/W)를 ON하기 전에 부하 단의 '차단기(1) 및 차단기(2)'는 미리 ON이 되어 있어야 한다.

그래야 돌입전류 방지 기능이 제대로 작동한다. 그러나 차단기 동작 순서에 관계없이 배터리 저전압 차단기능은 어느 경우든지 작동된다.

* Note2 : 위 회로에 추가로 차단기를 설치시 주의사항 :

Point 'A' 위치에 차단기를 추가하는 경우 : 전체적인 작동상 문제 없다. 또한 BLVD는 언제나 돌입전류 방지 기능을 수행한다.

Point 'B' 위치에 차단기를 추가하는 경우 : Point 'B' 차단기가 OFF되어 있고, BLVD 가 먼저 ON될 경우에는 돌입전류 방지기능이 작동 안됨.

• Operating Process and Installation Precautions:

Before turning ON the BLVD (Main S/W), 'Breaker (1) and Breaker (2)' on the load side must be turned ON in advance.

This ensures that the inrush current prevention function operates properly. However, regardless of the breaker operation sequence, the battery low-voltage disconnect function will operate in any case.

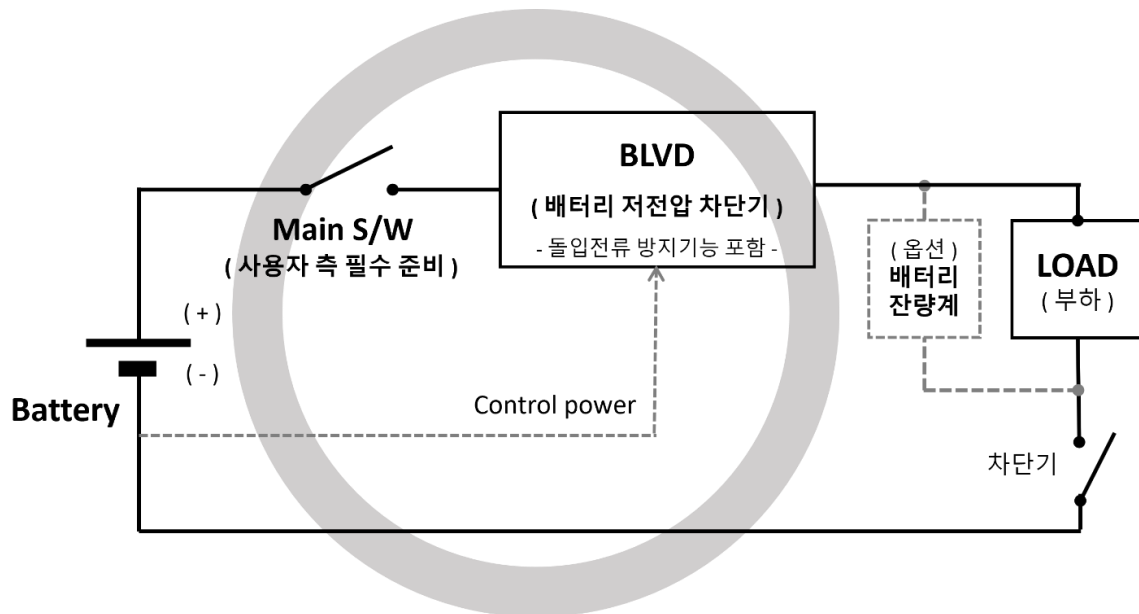
• Note2: Precautions when installing additional breakers to the above circuit:

When adding a breaker at Point 'A': There are no issues with the overall operation. In addition, the BLVD always performs the inrush current prevention function.

When adding a breaker at Point 'B': If the Point 'B' breaker is OFF and the BLVD is turned ON first, the inrush current prevention function will not operate.

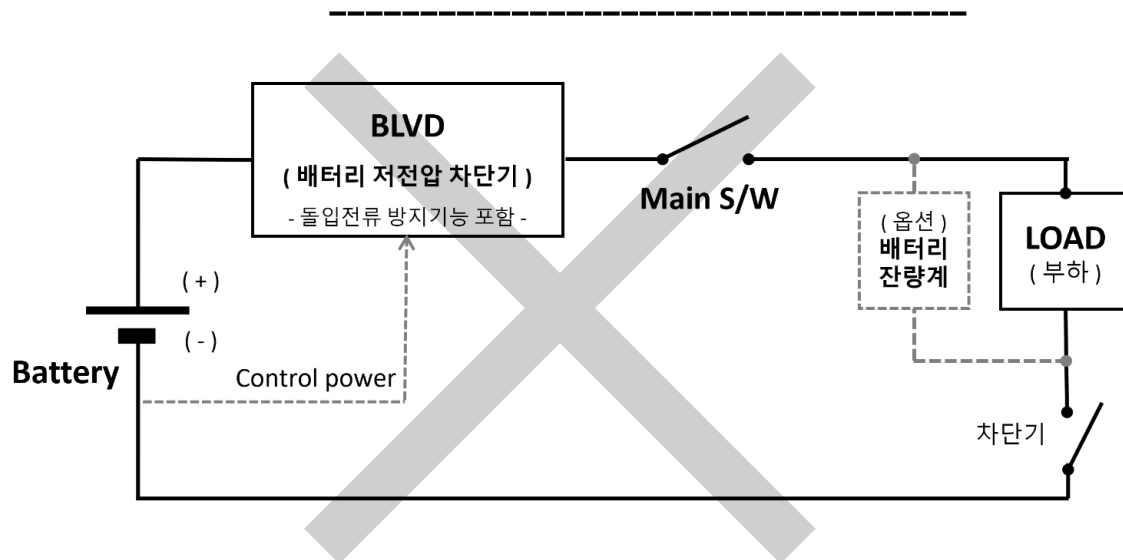
〈 Reference – Installation Instructions – 2/2 〉 :

When using the BLVD while operating a separate main circuit breaker.



However, the "load circuit breaker" must be turned ON before turning the Main S/W ON. This ensures that the inrush current protection function works properly. However, the battery low-voltage cutoff function operates in all cases.

(Possible Wiring Methods)



In this case, the BLVD provides battery low-voltage cutoff protection but does not provide inrush current protection.

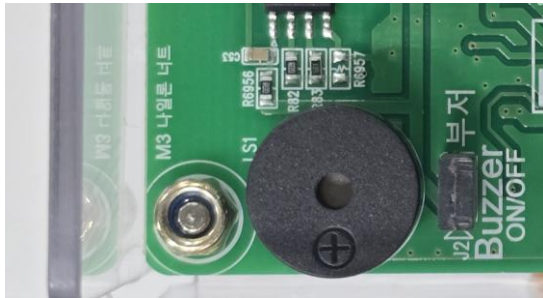
(Incorrect Wiring Method)

*Definition of Terms: Main S/W = Main Power Switch = Battery Disconnect Switch = Key Switch

⚠ When the battery voltage drops below the threshold, the buzzer attached to this unit will sound. If you do not wish to hear the buzzer for any reason, there is a jumper pin located directly next to the buzzer (a small, flat, cylindrical speaker) on the underside of the product's PCB. It is marked "Buzzer ON/OFF."

If you short-circuit this pin, the buzzer will sound; if you open the circuit (leave it open), the buzzer will not sound.

You can turn the buzzer on or off by connecting a manual switch to this pin or by using a PLC's SSR relay to control whether the pin is shorted or open.

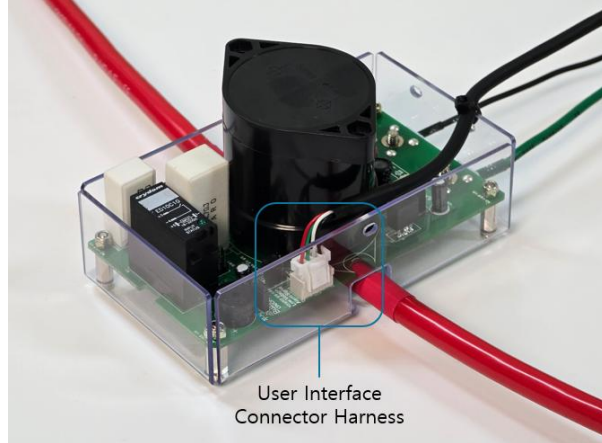


⚠ The communication line (U/I signal output) is not required for operation. This wire simply outputs two signals: CH_1: Low voltage—needs charging; CH_2: Battery voltage is too low—the relay will turn off in 1 minute.

Regardless of the signal output, this BLVD operates autonomously.

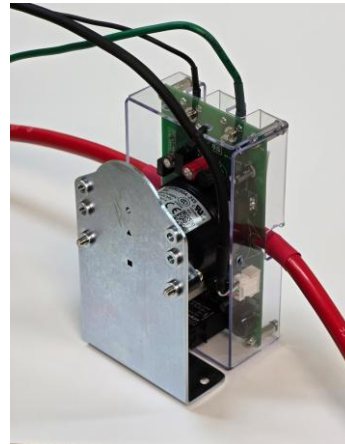
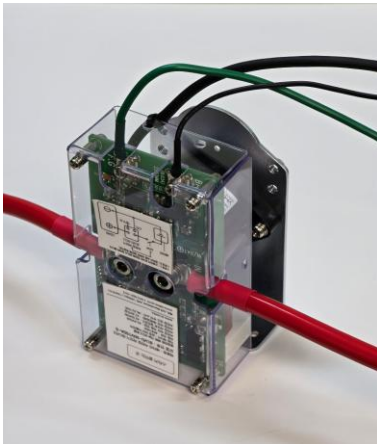
1. Product Photos and Installation Instructions

〈 Basic Product Photos 〉

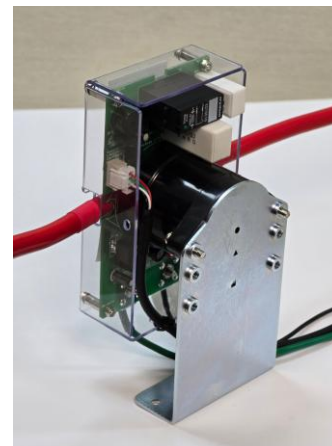


〈 When installing vertically using an L-bracket 〉

→ L-shaped brackets are sold as a separate option



← CASE 1: Over the bundle of
wires



← CASE 2: Below the wire
harness

2. Order Code Explanation and Option Notation

① ② ③ ④
 BLVD – 25V150A – S / L
 BLVD – 50V250A – S

No	Item	Description
①	Product Group	BLVD: Battery Low Voltage Disconnect
②	Battery Nominal Voltage & Current Rating	Battery Nominal Voltage = 25V, Maximum Disconnect Current = Max. 150A For 50V nominal voltage, maximum disconnect current = 250A
③	Product Sub-Number	S
④	Option Number	/L: Includes steel L-bracket (useful for vertical installation) Blank: Product does not include steel L-bracket (useful for vertical installation)

3. Certification Information

Certification for this product is provided by the power relay certifications listed below, which apply to this product.

Power Relay Model Number: EVR150A-48S or EVR150A-24S / Certifications: UL, CE, CCC

Power Relay Model: EVR250A-48S or EVR250A-24S / Certifications: UL, CE, CCC

4. Model Names and Specifications

* The model number on the label affixed to the shipped product does not include “/L.” If “/L” is indicated, it simply means that the product is shipped with an L-bracket already assembled.

* The rated current listed in the table below for applicable relays is based on a typical ambient temperature of 20°C with adequate ventilation; if cooling conditions are poor, the rated current must be reduced accordingly.

No	Model Name	Battery Voltage ----- BLVD Self-	Mounting Bolts (For ring terminal specifications)	Dimensions (mm), Weight (g)	Compatible Relays Specifications	Voltage, Current Operating Conditions	L-Bracket Included
1	BLVD-25V150A-S	25V (24V) -----	* Main power line: M6 * Ground wire: M4	71.7 (W) x 67.2 (H) x 124.4 (L), 480 g	Model: EVR150 Rated Current: 150 A	〈 Battery Low-Voltage Buzzer Alarm Voltage 〉: 23.8 or lower 〈 Battery Low-Voltage Shutdown Voltage 〉: 22.4 V or lower	X
2	BLVD-25V150A-S/L	230 mA	* (-) wire for control: M4	480 g + 150 g (bracket)	Rated Current: 170A	〈 Operating Voltage 〉 Minimum operating voltage: 23 VDC or higher	O
3	BLVD-25V250A-S	25V (24V) -----	(Same as above)	82.5 (W) x 78 (H) x 138.5 (L), 620 g	Model: EVR250 Rated current: 250 A	〈 Battery Low-Voltage Buzzer Alarm Voltage 〉: 23.8 or lower 〈 Battery Low-Voltage Shutdown Voltage 〉: 22.4 V or lower	X
4	BLVD-25V250A-S/L	230 mA		620 g + 200 g (bracket)	Rated Current: 500 A	〈 Operating Voltage 〉 Minimum operating voltage: 23 VDC or higher	O
5	BLVD-50V150A-S	50V (48V) -----	(Same as above)	71.7 (W) x 67.2 (H) x 124.4 (L), 480 g	Model Name: EVR150 Rated current: 150 A	〈 Battery Low Voltage Buzzer Alarm Voltage 〉: 47.6 or lower 〈 Battery Low-Voltage Shutdown Voltage 〉: 44.8 V or lower	X
6	BLVD-50V150A-S/L	115 mA		480 g + 150 g (bracket)	Rated Current: 170 A	〈 Operating Voltage 〉 Minimum operating voltage: 48 VDC or higher	O
7	BLVD-50V250A-S	50V (48V) -----	(Same as above)	82.5 (W) x 78 (H) x 138.5 (L), 620 g	Model Name: EVR250 Rated current: 250 A Rated Current: 500 A	〈 Battery Low Voltage Buzzer Alarm Voltage 〉: 47.6 or lower 〈 Battery Low-Voltage Shutdown Voltage 〉: 44.8 V or lower	X
8	BLVD-50V250A-S/L			620 g + 200 g (bracket)		〈 Operating Voltage 〉 Minimum operating voltage: 48 VDC or higher 〈 Current 〉 Up to 150A under continuous load for 1 hour. For a continuous 24-hour load, use up to	O

						175A (70%).	
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(1) Estimated State of Charge (SOC) at low-voltage cutoff = 4% to 8% (the SOC increases if the load current is high at the time of cutoff). This applies to both the 25V and 50V models.

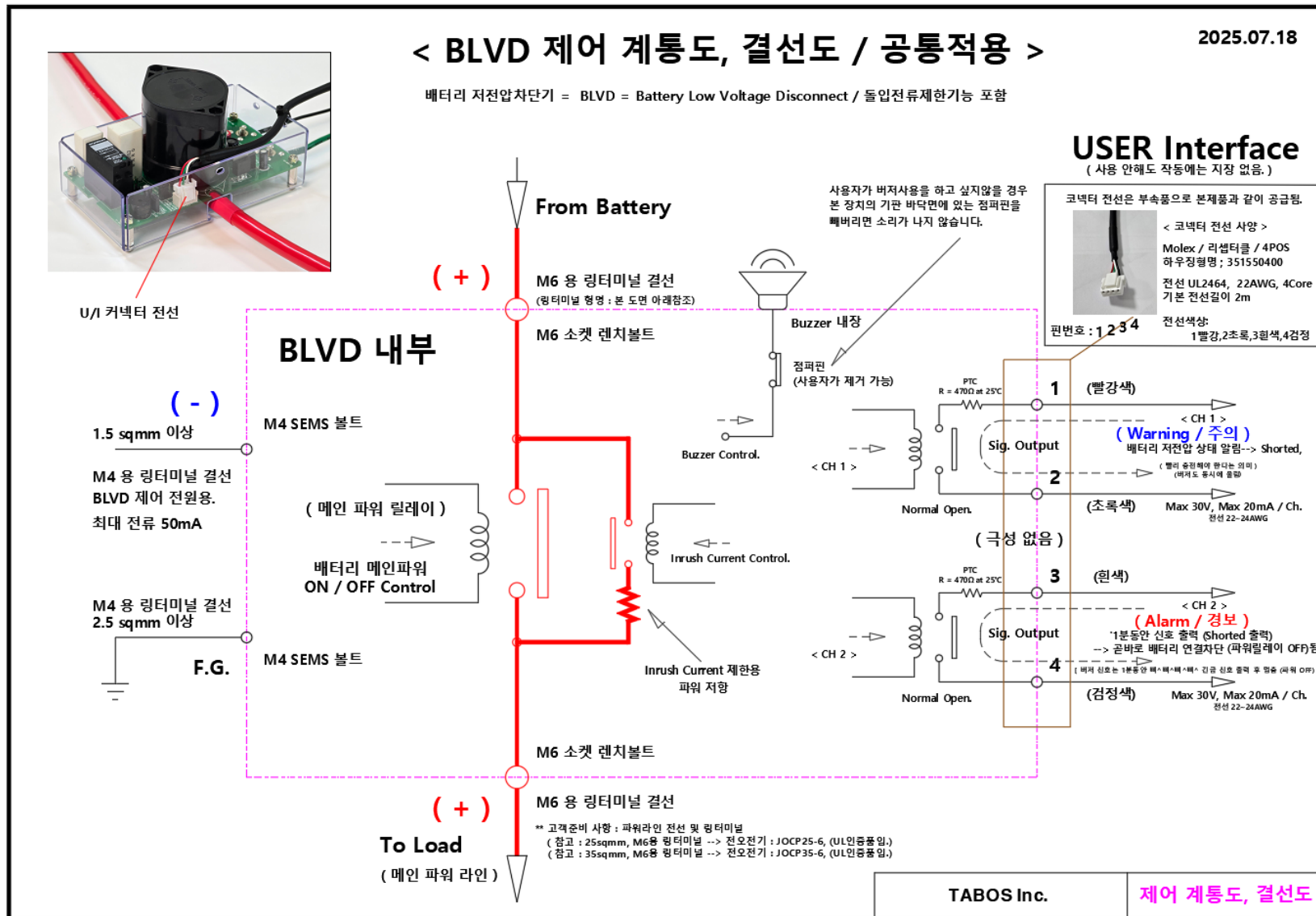
(2) Operation details by voltage level: For 25V and 50V batteries, respectively: (Low-voltage warning buzzer alarm deactivated: 23.8V and 47.6V or higher), (Low-voltage warning buzzer alarm: 23.1V and 46.2V or lower),

(Recovery voltage at which the relay turns ON again: 23.1V and 46.2V or higher), (Low-voltage output cutoff operating voltage: 22.4V and 44.8V or lower), (Power-saving mode: 21.0V and 42V or lower)

(3) Electrical Characteristics of the Applied Relay: For the EVR150 relay, the rated breaking current is 150A, and the maximum allowable current in the ON state is up to 170A. The term “rated breaking current of 150A” means

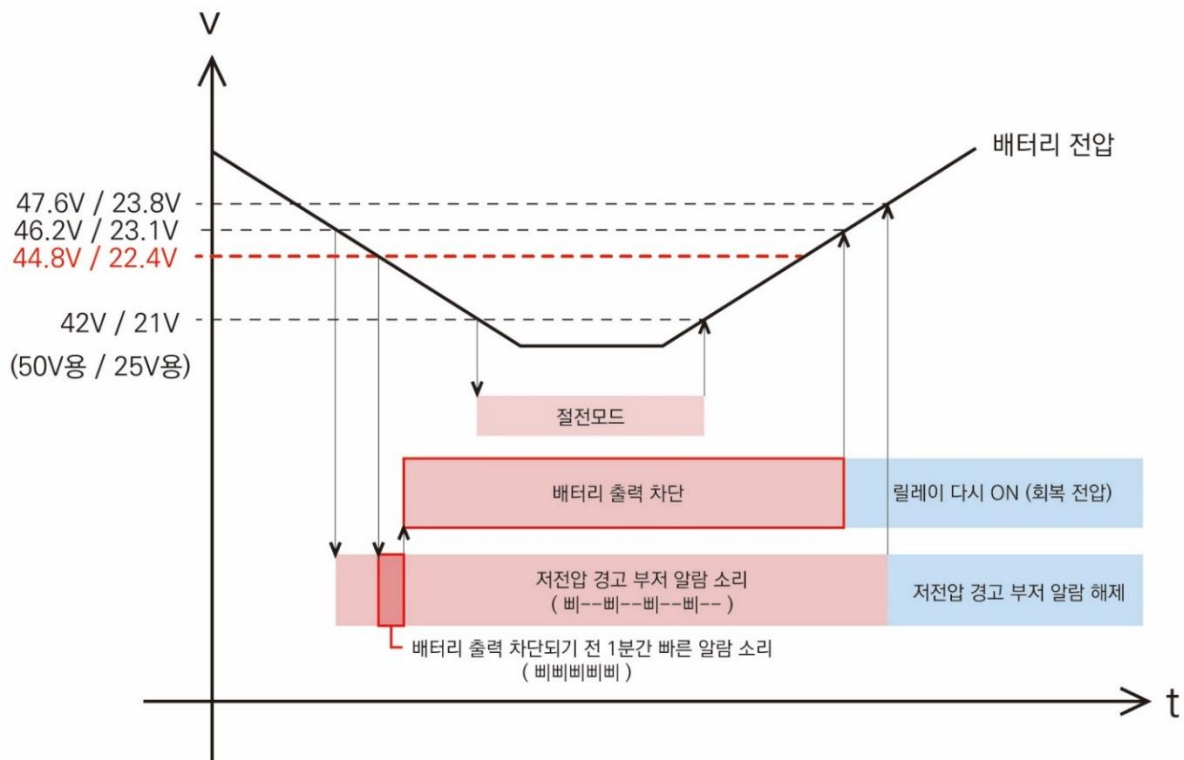
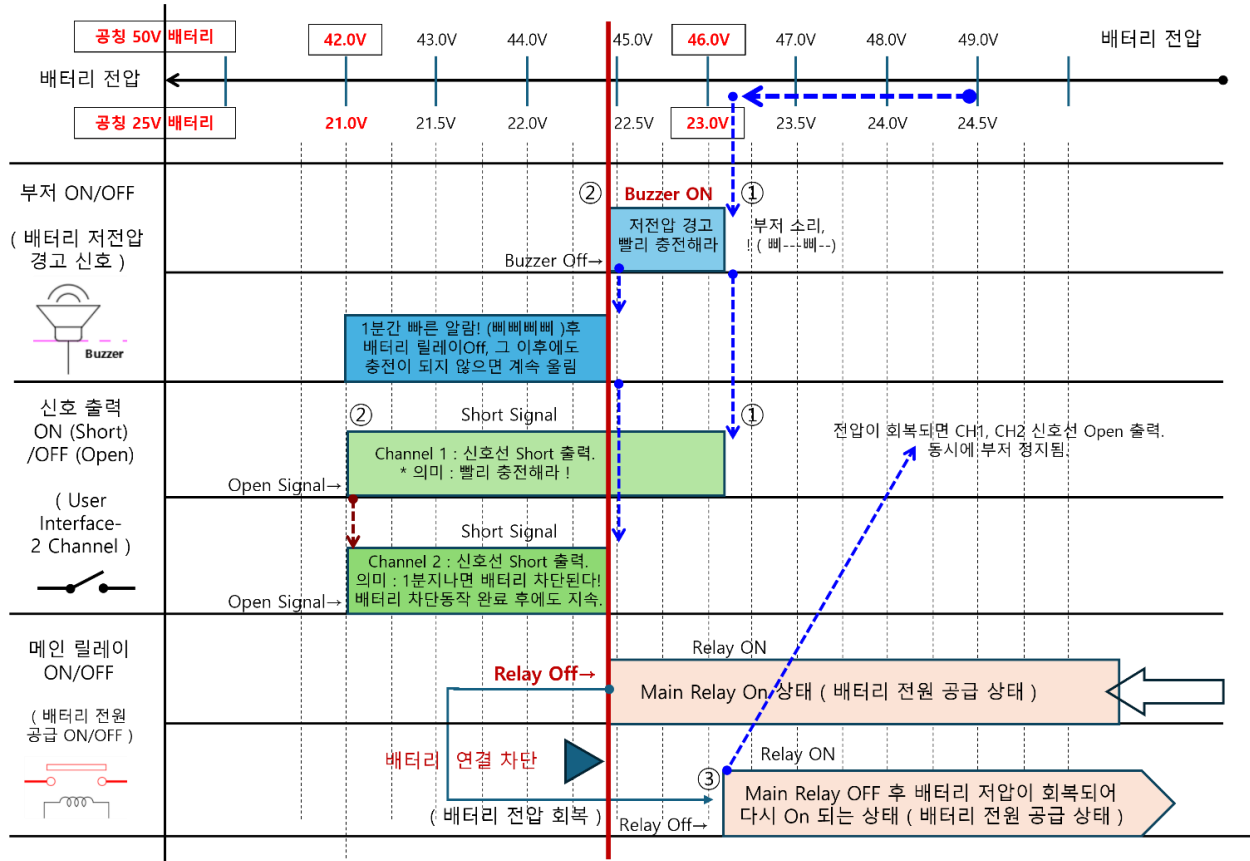
means that even if this relay is turned OFF while 150A is flowing, there will be no impairment to its performance.

5. Control System Diagram and Wiring Diagram (User Interface Hardware Description)



6. Product Operation Sequence (Flow Chart) and User Interface

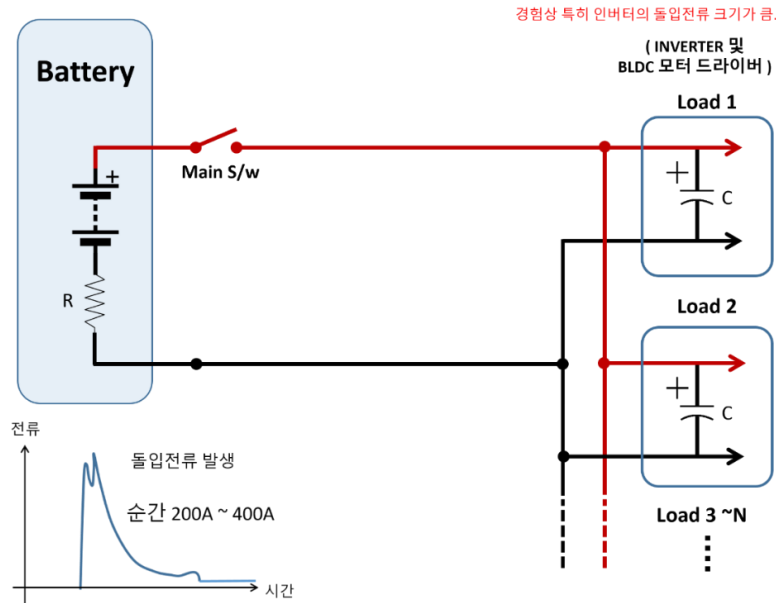
Signal Output Description



7. Inrush Current Limitation Mechanism, an Additional Feature of This Product

1) Principles of Inrush Current Generation and Limitation Methods

[Figure 1] (below) Typical Block Diagram

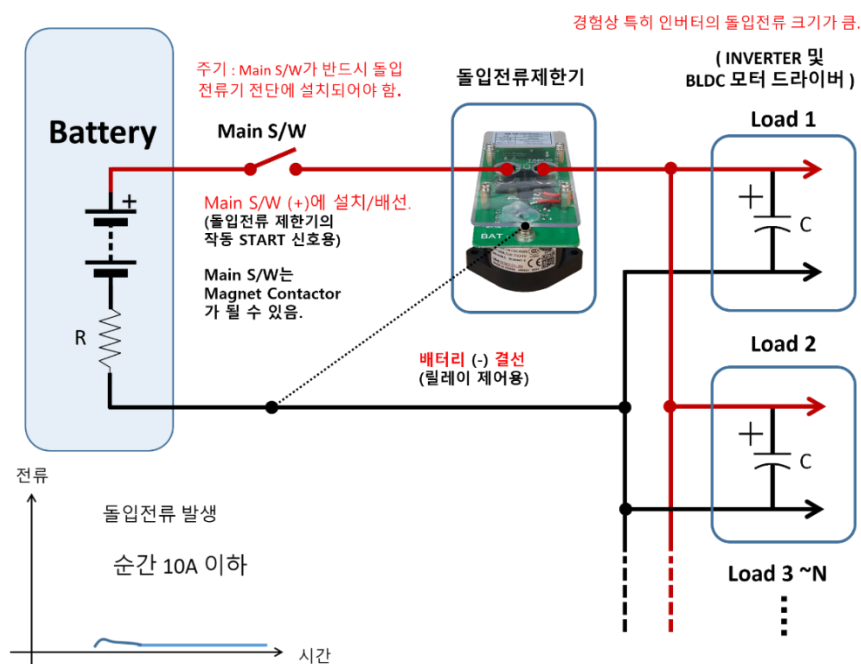


[Figure 2] (Below) Schematic Diagram with Inrush Current Limiter Installed



Note: Install between the power switch and the load, as shown in the diagram below.

Explanation: The point at which power is supplied to the inrush current limiter is critical. Since it must function at the exact moment power is applied to the load that causes inrush current, it must be



[Figure 1] above shows the connection diagram between the battery built into an electric vehicle (AGV) and the load devices (such as motor controllers).

When the main power switch on the AGV is turned OFF or the battery is disconnected, the capacitor (C) inside the load device discharges on its own within a few seconds. Subsequently, when the power switch is turned ON again or the battery is reconnected to the load device, battery current is rapidly drawn into the capacitor built into the load device within a short period of time. This phenomenon is known as inrush current. When electricity is rapidly discharged from the battery, the battery BMS (Battery Management System) interprets this as an overcurrent or short circuit and cuts off the output. If this phenomenon occurs repeatedly, it can shorten the lifespan of the BMS.

This “inrush current limiter” is used to resolve the issues described above.

The insertion point of the inrush current limiter on the electrical schematic is shown in [Figure 2].

[Note 1] Can inrush current issues occur in systems that use lead-acid batteries?

Lead-acid batteries rarely experience this inrush current issue.

This is because lead-acid batteries have significantly higher internal resistance than lithium-ion batteries, preventing rapid discharge.

Due to their high internal resistance, they cannot be charged or discharged rapidly, and the heat generated by this internal resistance shortens their lifespan.

Lithium-ion batteries have significantly lower internal resistance than lead-acid batteries, which gives them the advantages of a longer service life and the ability to support rapid charging and discharging.

[Note 2] Under what circumstances does inrush current typically occur?

◇ In particular, in-rush current is especially high when the load is equipped with an inverter or a DC-DC converter.

(This is because large-capacity capacitors are installed at the input terminals inside the load devices.)

◇ When there are many motor shafts and multiple motor controllers are connected in parallel, resulting in a large total capacitance

◇ It occurs particularly frequently in battery-swap systems (where the load device and battery are frequently disconnected and reconnected).

[Note 3] Under what circumstances should this product be used?

◇ When using inverters (DC-AC) and DC-DC converters as load devices.

◇ When three or more BLDC motor drives are used as load devices.

◇ Situations where the connection between the battery and the load device is frequently established and disconnected (ON/OFF), such as when replacing the battery.

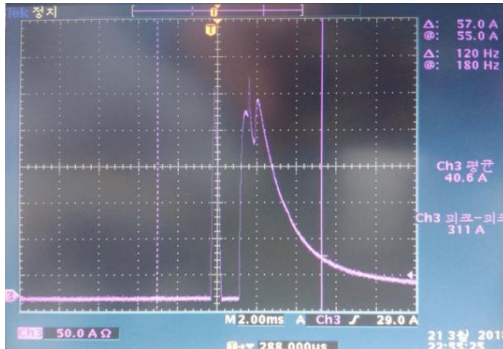
[Note 4] Reference for External Wiring of Motor Controllers / Excerpt (Roboteq FBL 2360 Motor Driver Manual)



2) Measured results of inrush current reduction when using this product

: Inrush current reduced to approximately 1/40 of the original value when applied

(Case 1): When driving 10 BLDC motors in the several-hundred-watt class

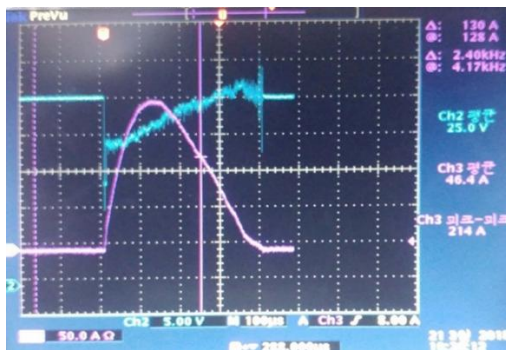


Without this product: Maximum inrush current of 311A
current of 8.2A

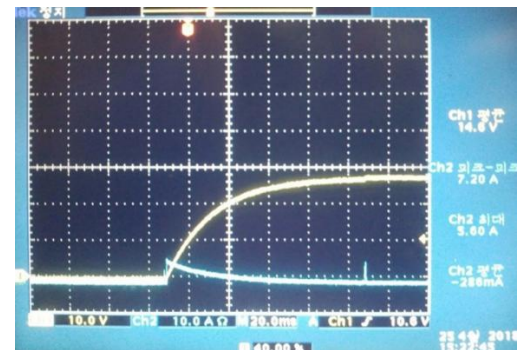


With this product: Maximum inrush

(Example 2): When driving one 2 kW BLDC motor



Without this product: Maximum inrush current of 214A
Maximum inrush current of 5.6A



With this product:

8. Product photos and mechanical drawings → Download 3D and 2D drawings from the Tabos website.

8-1) Model: BLVD_150A, BLVD_250A Visual size comparison



(Left): BLVD_150A, (Right): BLVD_250A

8-2) Model: BLVD-25V(50V)-150A-S

< 본체도면 및 사용설명 > (수평 설치)

명칭: 배터리 저전압차단기 (돌입전류제한기능 포함)

2025.04.24

BLVD-25V150A-S, BLVD-50V150A-S



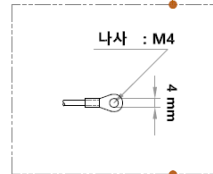
UI (User Interface)용 커넥터 전선

(-) from Battery (for control power)

F.G. (Frame Ground)

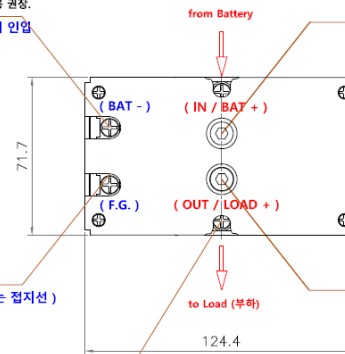
(SEMS, M4-10, 스크루, 전선굵기 1.5sq 정도)
본 전선에 흐르는 전류는 50mA 이하 수준
그러나 전선의 강도를 유지하기 위해 최소 1.5 sqmm 이상 사용 권장.

단자 C (본 장치(PCB) 전원 공급용 배터리 (-) 단자에서 인입)



(SEMS, M4-10, 스크루, 전선굵기 2.5sq 이상, 접지전선)

단자 D (프레임 그라운드, 써지 전압 발생시노이즈 빼는 접지선)

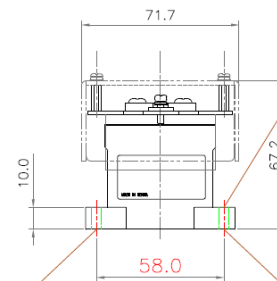
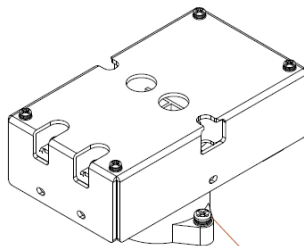


(SEMS, M6-12, 소켓볼트, 메인 전기가 흐르는 단자)
단자 A (배터리측 (+) 단자와 상호 연결)

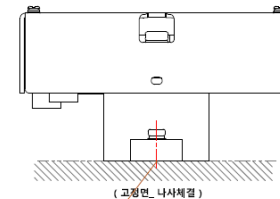


단자 B (부하측 (+) 단자와 상호 연결)

(SEMS, M6-12, 소켓볼트, 메인 전기가 흐르는 단자)



양쪽 / 체결 구멍 : $\square$ 4.8



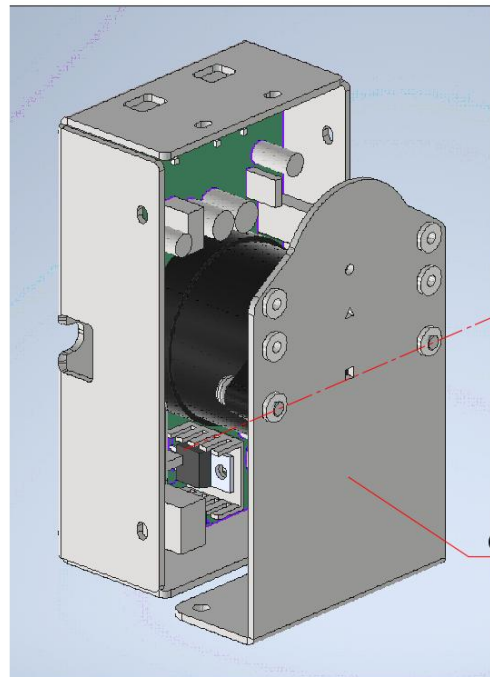
TABOS Inc.

수평설치, 기구도면

< 수직 설치 / 옵션형 > 명칭: 배터리 저전압차단기 (돌입전류제한기능 포함)
BLVD-25V150A-S/L , BLVD-50V150A-S/L
(별도 L형 브라켓 이용)
(L형 브라켓 --> 별도판매)

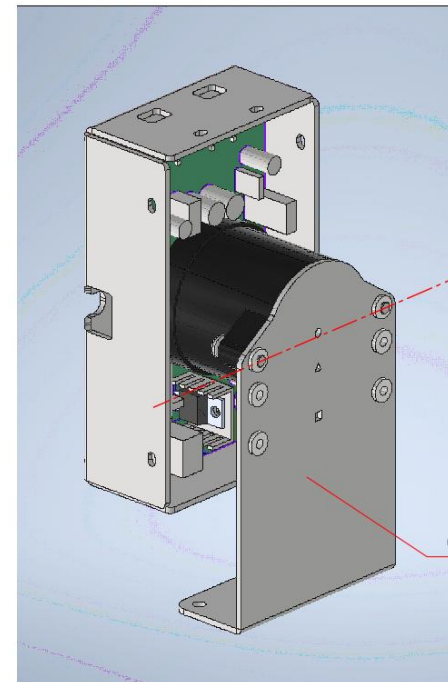
2025.04.24

L 브라켓 체결구멍 --> 1단, 2단, 3단 높이 조절 가능.



(L형 브라켓)

아랫 라인 체결구멍에 고정시



(L형 브라켓)

윗 라인 체결구멍에 고정시

TABOS Inc.

수직설치, 3D이미지

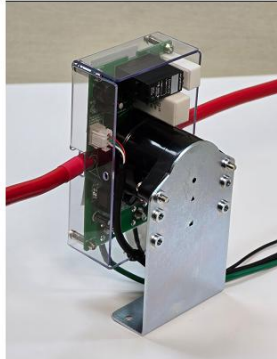
< 수직 설치 / 옵션형 > 명칭: 배터리 저전압차단기 (돌입전류제한기능 포함)

2025.04.24

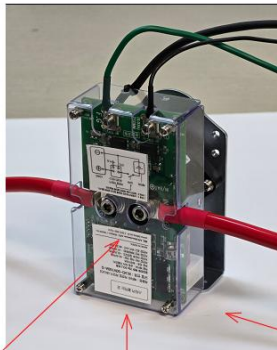
(별도 L형 브라켓 이용)
(L형 브라켓 --> 별도판매)

BLVD-25V150A-S/L , BLVD-50V150A-S/L

CASE 1 : 전선방향이 아래로 장착한 사례



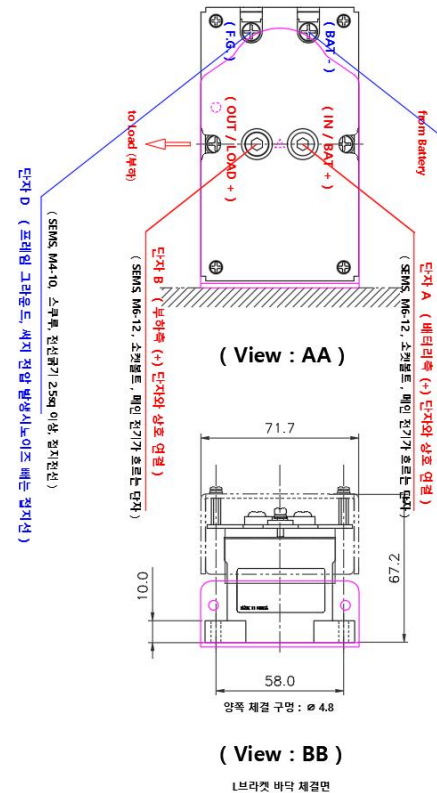
CASE 2 : 전선방향이 위로 장착한 사례



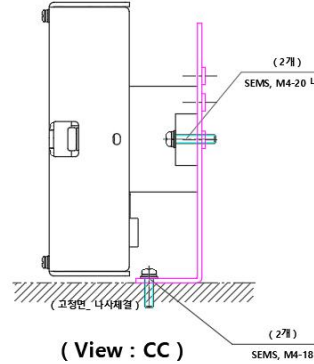
(View : AA)

(View : BB)

(View : CC)



단자A 및 단자B의 배터리 및 부하측 결선이 바뀌어도 됨. 단선 릴레이라서 방향성은 없음.



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수직설치,기구도면

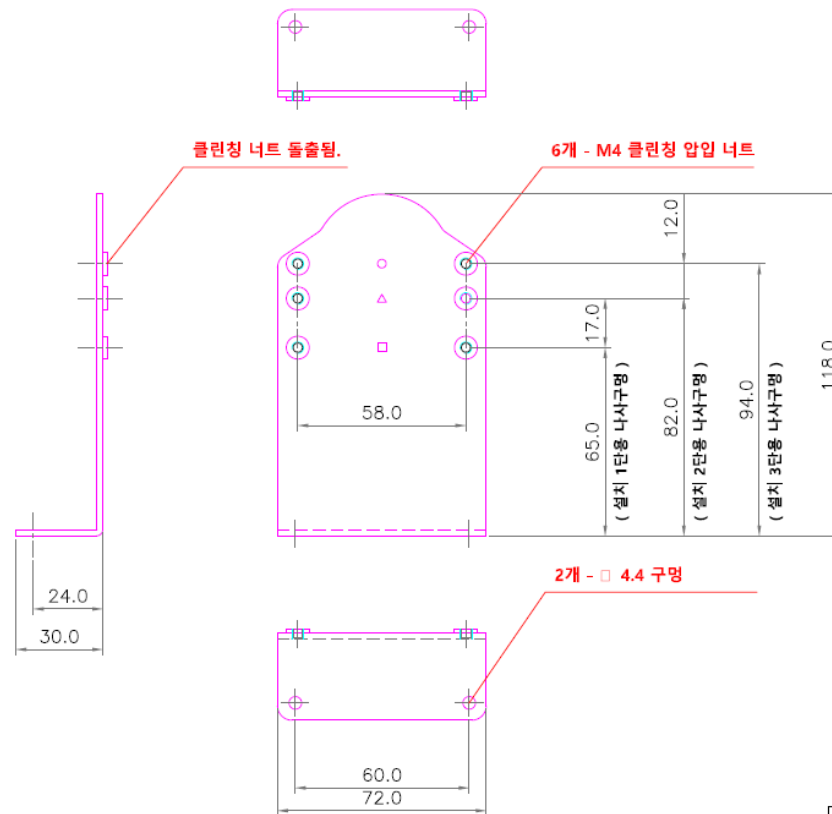
제품 모델 번호 (L 브라켓) : BLVD-150A-L-BRK-A

(용도 : BLVD-25V150A-S , BLVD-50V150A-S 용 수직장착 브라켓)

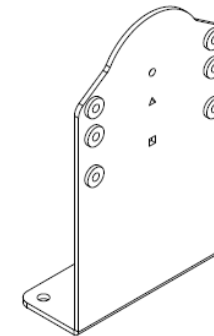
재질 : 철판 (SS41) , 2.0 T, 아연도금 (백색 또는 칼라)

2025.04.24

(별도 판매품)



참고용 사시도



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L브라켓,기구도면

8-3) Model: BLVD-25V(50V)-250A-S

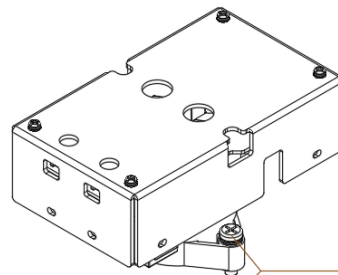
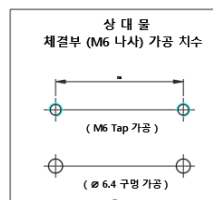
< 본체도면 및 사용설명 > (수평 설치)

명칭: 배터리 저전압차단기 (돌입전류제한기능 포함) BLVD-25V250A-S , BLVD-50V250A-S

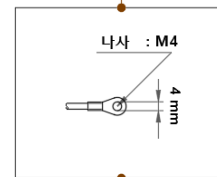
2025.04.25



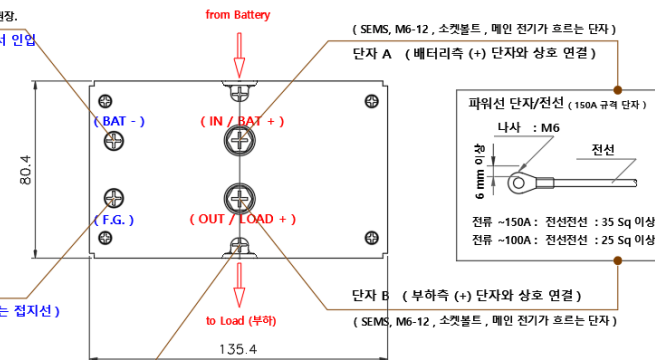
UI (User Interface)용 커넥터 전선
(-) from Battery (for control power)
F.G. (Frame Ground)



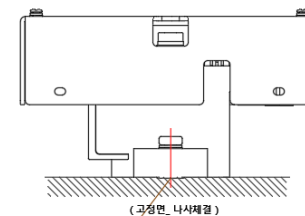
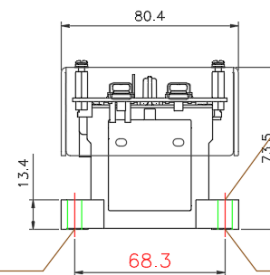
(SEMS, M4-10, 스크루, 전선굵기 1.5sq 정도)
본 전선에 흐르는 전류는 50mA 이하 수준
그러나 전선의 강도를 유지하기 위해 최소 1.5 sqmm 이상 사용 권장.
단자 C (본 장치(PCB) 전원 공급용 배터리 (-) 단자에서 인입)



(SEMS, M4-10, 스크루, 전선굵기 2.5sq 이상, 접지전선)
단자 D (프레임 그라운드, 써지 전압 발생시노이즈 배는 접지전선)



2 - Ø6.4 Hole
(원형 파워 릴레이 양쪽에 나 있는 체결 구멍)
추천 나사 : SEMS, M6-20



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수평설치,기구도면

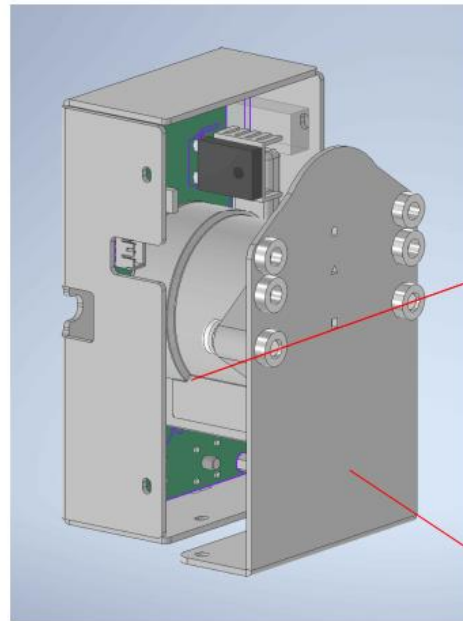
2025.04.25

< 수직 설치 / 옵션형 > 명칭: 배터리 저전압차단기 (돌입전류제한기능 포함)

(별도 L형 브라켓 이용)
(L형 브라켓 --> 별도판매)

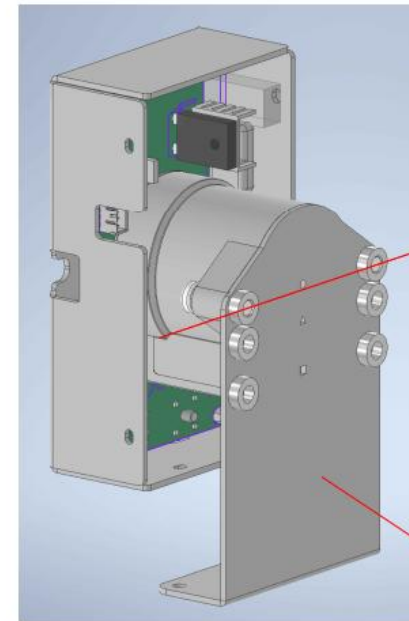
BLVD-25V250A-S/L , BLVD-50V250A-S/L

L 브라켓 체결구멍 --> 1단, 2단, 3단 높이 조절 가능.



(L형 브라켓)

아랫 라인 체결구멍에 고정시



(L형 브라켓)

윗 라인 체결구멍에 고정시

TABOS Inc.

수직설치, 3D이미지

9. (Note) Size comparison photo between this product and TAVOS's Inrush Current Limiter (ICL)



(Left)

(Right)



(Left)

(Right)

In the photo above

(Left_Low-Voltage Circuit Breaker) : BLVD-25V(50V)-150A-S,

(Right_Inrush Current Limiter): CL-25V(50V)150A-S