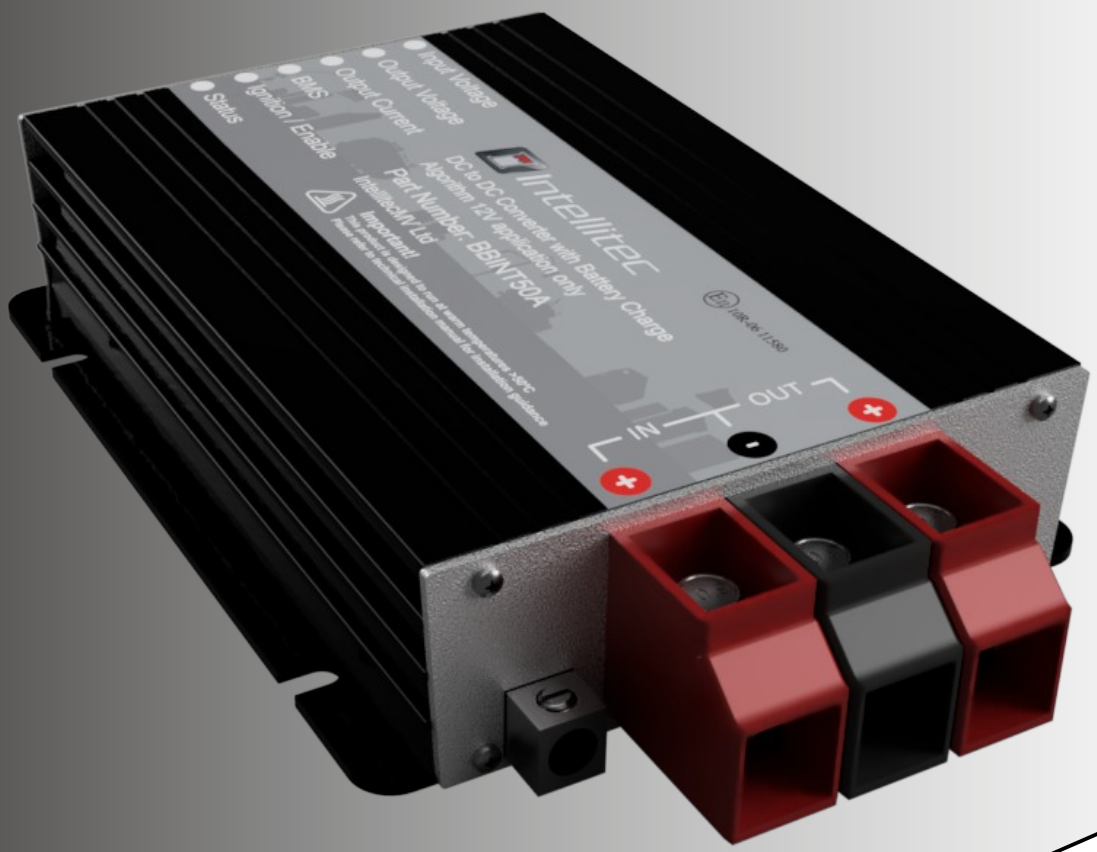
Intellitec



BBINT Series User's Manual

BBINT50A
DC/DC Converter

V0.10 11/07/2024 JH

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1. Safety Instruction

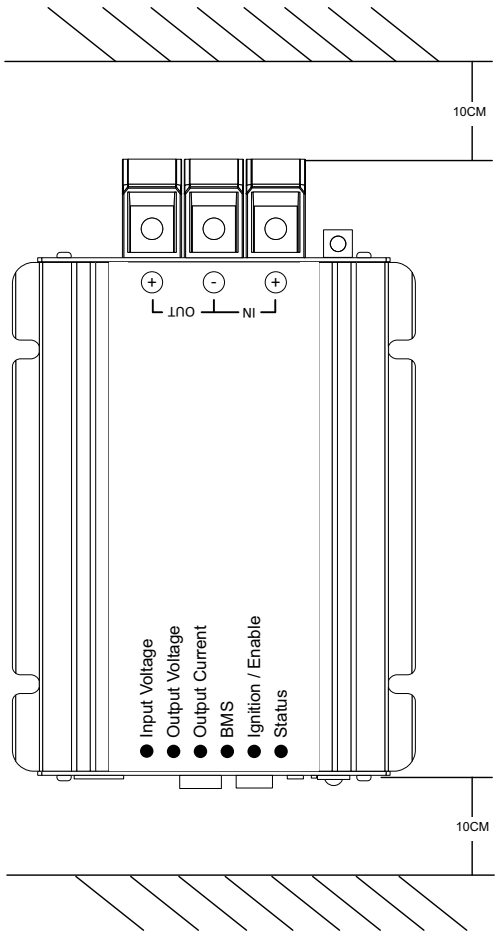
WARNING

Please read the user manual carefully before use and follow the instructions in the manual.

1-1 General Safety

1. Do not expose the product to rain, snow, water mist or dusty environments to prevent danger and malfunctions. Do not cover or block the ventilation holes of the product. Keep a distance of at least 10 cm around the Charger to allow air to circulate to help dissipate heat.

   As shown below



   Do not Install near flammable materials. Use appropriate length and cross section size of cables (for details, see sections 4). Using inappropriate sized cables can damage the product.

2. This product contains internal components that may cause arcing or sparking. To avoid fire or explosion, do not install it in an enclosed space with batteries or flammable materials. (Including any space containing gasoline-powered machinery, fuel tanks, fittings, accessories, and other fuel system components) Do not install in the same location as a battery that could emit explosive gasses. The gasses produced by a battery being charged can be extremely corrosive and explosive. Prolonged exposure may damage the product.

3. If the chemicals inside the battery come into contact with your skin or clothing, wash immediately with plenty of soap and water. If the battery fluid gets into your eyes,wash your eyes with plenty of water for at least 20 minutes, and seek medical attention immediately.
4. Do not smoke or generate sparks near the battery.
5. When using metal tools, do not drop on the battery. If you accidentally drop it on the battery, the battery may spark or cause a short circuit in the battery, which can cause the battery to explode.
6. When installing the battery, remove metal items such as rings, bracelets, necklaces, and watches. The short-circuit current caused by short-circuit of batteries is very high, can burn and welding metals causing severe burns.

1-2 Installation

Installation environmental requirements

1. Dry - Do not place the product near water or in a humid environment that is prone to condensation.
2. Temperature - Suitable for environments from -20 ° C to + 60 ° C.
3. Safety - Do not install in the same location as a battery that could vent explosive gasses and do not install it near fire sources, flammable materials, fuel, generator equipment. Avoid prolonged exposure to the gas atmosphere of the battery.
4. Ventilation - Leave a minimum of 10 cm clearance around the charger.
5. Dustproof - Do not install in dusty, wet, grinding or other harsh environments.
6. Avoid excessively long and under sized cable runs.

2. General Information

2-1 Warranty

The warranty period of this product is two years. This is a return to base warranty. Please contact Intellitec MV for a Return Authorisation Number (RMA). Intellitec MV Ltd. is responsible for any warranty repairs. Please note warranty will only be accepted if the product has been used in the correct manner as intended. Misuse including water, foreign objects, dust pollution, corrosion, tampering or deliberate damage, will void warranty, and Intellitec MV Ltd will not be responsible for any repairs. Product failures caused by misuse will be a chargeable repair.

2-2 Disclaimer

Our products are subject to continual development and improvement. Therefore, additions or modifications to the products may cause changes to the technical data and functional specifications. No rights can be derived from this document. Please consult our sales representative for current Terms & Conditions of Sale.

3. Product Description

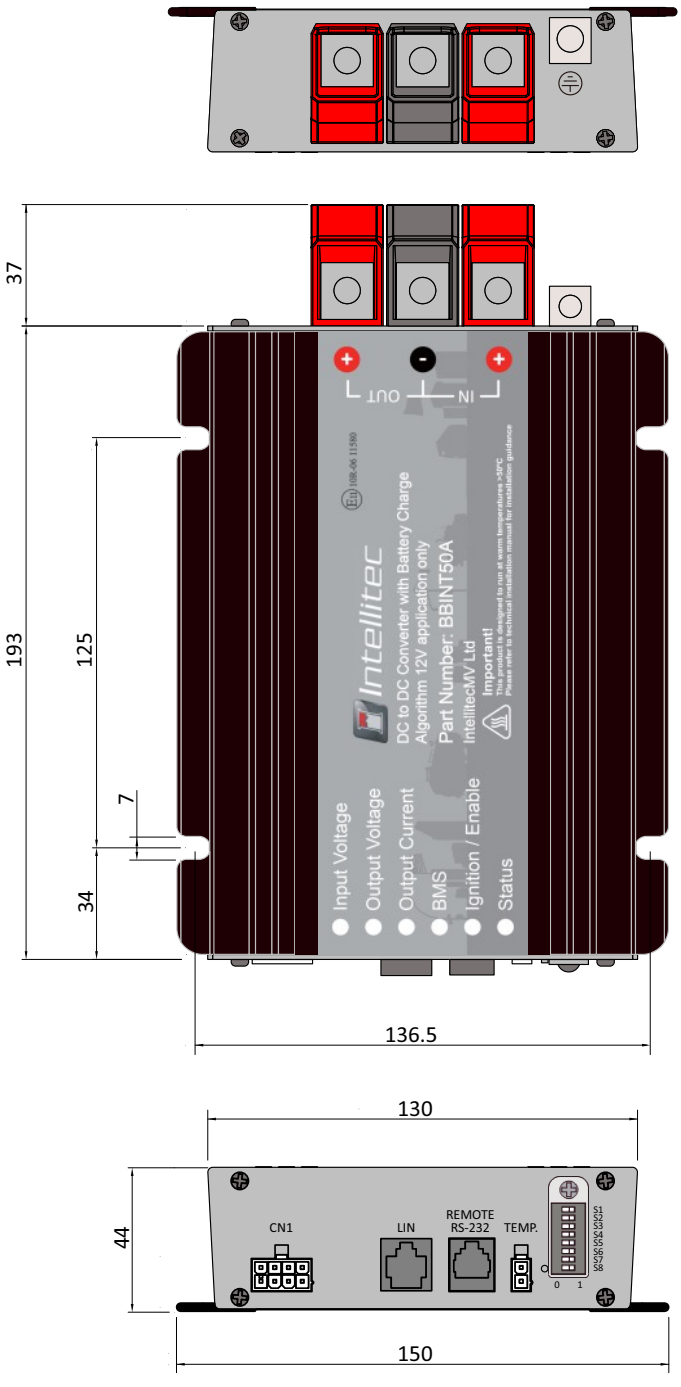
The BBINT50A charger converters a DC (battery) voltage to a regulated DC voltage. It can be used as a:

- 2-Stage battery charger or
- 3-Stage battery charger or
- DC power supply.

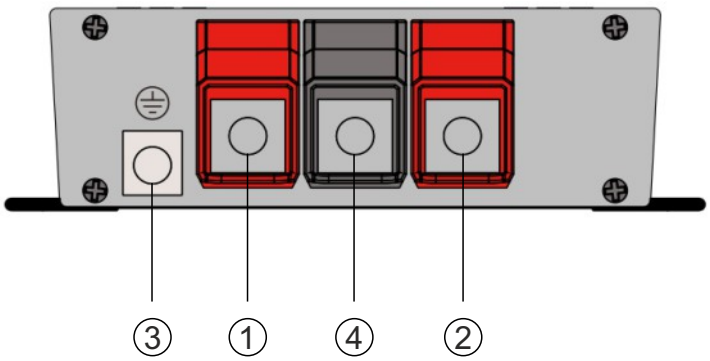
The BBINT50A can only be used in installations with a negative ground.

3-1 Dimensions

Unit: mm

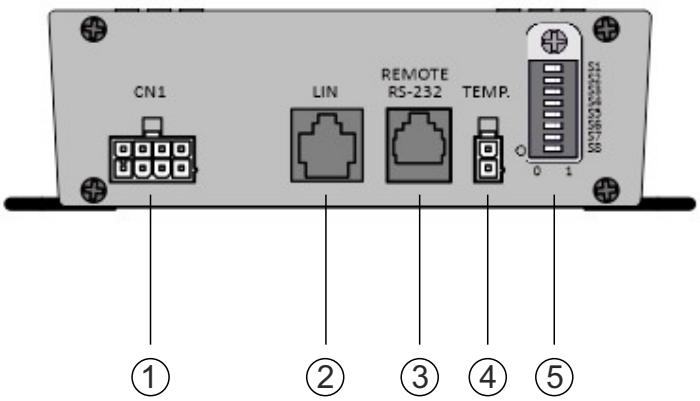


Front Panel



Front Panel	
1	INPUT
2	OUTPUT
3	PE
4	COMMON NEGATIVE

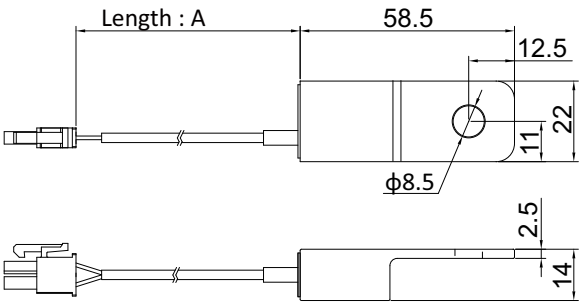
Rear Panel



Rear Panel	
1	CN1
2	LIN (For Future Use)
3	Remote Port (Programming Port)
4	Battery Temperature Sensor
5	DIP Switches

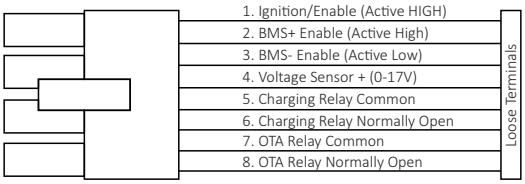
3-2 Optional Accessories

- Battery Temperature Sensor (Not included, to be ordered separately) part no. APP-TEMP

Description	Diagram
Temperature Sensor (Optional) part no. APP-TEMP	 unit:mm

Length (max)	
A	4600mm

- Fitting Kit k449 inc 8 Way Molex Mini Fit Jr including 30cm Terminated cables/tails.

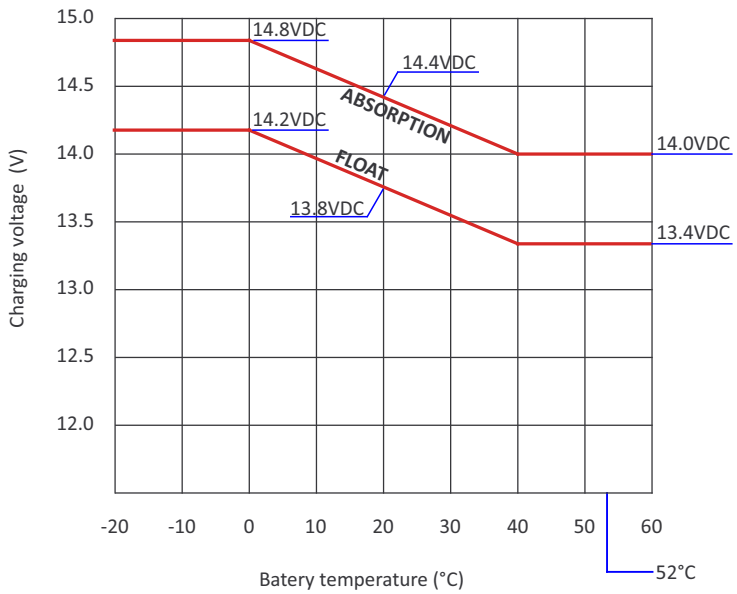


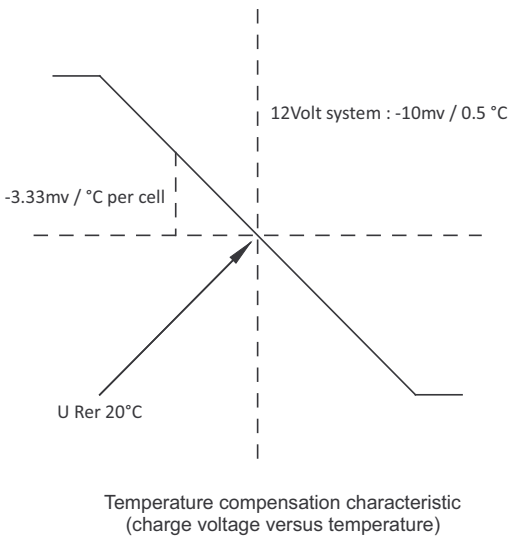
Fitting Kit k449 would only be required if the installer did not have access to the crimping tools required to terminate the provided connector.

- Programming Cable (Part NO. K447). The programming cable is to be used in conjunction with Intellitec's battery to battery charger GUI, which is available to download at the hyperlink below:

https://www.intellitecmv.com/pages/downloads

Charging Curve with Battery Temperature Compensation





Temperature compensation characteristic
(charge voltage versus temperature)

* If at 20°C - Absorption = 14.4V and Float = 13.8V
Please refer to graph for adjusted temperature compensated values

3-3 Features

- The converter can be fully programmed by DIP Switches or by RS-232 using Intellitec MV GUI software BBINT50, downloadable from Intellitec MV Website
- Built-in battery rescue (pre-charging) function
- Compatible with Lead Acid, LiFePO4, Gel and AGM batteries
- High efficiency and high reliability
- Withstand 2G vibration test
- Advanced Protection Features

  - Input / Output Reversed Polarity Protection by fuse
  - Input Over & Under Voltage Protection
  - Output Over Voltage / Short Circuit Protection
  - Internal Over Temperature Protection

• Built-in Buck Boost Converter (12V to 12V)
• Voltage / Temperature Compensation with Battery Temperature Sensor (Optional)
• Low temperature cut off and heater control for LifePo4 (requires temperature sensor)

3-4 Specification

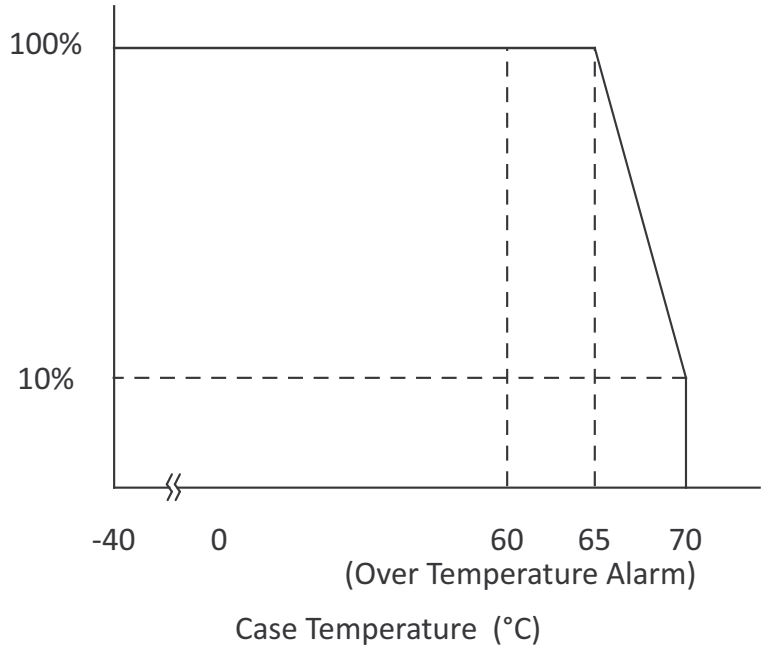
MODEL		BBINT50A
OUTPUT	Rated Power	750W
	Absorption Voltage DIP S1	0 : 14.4V ±1% 1 : 14.7V ±1%
	Float Voltage DIP S2	0 : 13.5V ±1% 1 : 13.8V ±1%
	Recharge Voltage DIP S3	0 : 12V ±1% 1 : 12.8V ±1%
	Charge Current DIP S4	0 : 100% 1 : De-Rating 50%
	Charging Control DIP S6 & S5	00 : Charger 1 : bulk->absorption->float->recharge 01 : Charger 2 : bulk->absorption->OFF->recharge 10 : Power Supply 1 : Constant Voltage by DIP S2 11 : Power Supply 2 : Constant Voltage by DIP S3
	Level DIP S7	N/A
	Battery Type	Lead Acid/LiFePO4/Gel/AGM/Program(DIP S8)
	Fused Internally	35A x 2 (Internal protection for the unit)
INPUT	Voltage Range	10V ~ 17V ±1%
	Efficiency (Max.)	92%
	Parasitic Curent (Ignition OFF)	< 5mA
	Type	Battery / Alternator / DC Source
	Fused Intenally	35A x 3 (Internal protection for the unit)

MODEL		BBINT50A
Environment	Working Temperature	12V :-20 ~ +60℃ (De-rating by case temperature)
	Storage Temperature	-40 ~ +85℃
	Relative Humidity	95% , non condensing
	Vibration	IEC68-2-6
Safety & EMC	Safety Standards	EN62368
	EMC Standards	Meets CE
	E-mark	E11 / 10R06/00*11580*00
Protection	Output Battery Reverse	Polarity reversed protection by fuse
	Output Battery Under Voltage	<10V Rescue charge
	Output Battery Over Voltage	>17V Shutdown
	Output Battery Over Temperature	>52℃ +-5℃ Shutdown by battery temperature sensor
	Output Short Circuit	3 seconds continuous output <1 , after shutdown
	Input Reverse	Polarity reversed protection by fuse
	Input Under Voltage	<10V Shutdown
	Input Over Voltage	>17V Shutdown
	Charger Over Temperature	Alarm by case temperature 60℃ De-rating by case temperature 65℃ Shutdown by case temperature 70℃
Others	Dimension(WxDxH)	130mm x 193mm x 44mm
	Weight (KG)	1.4KG

NOTE:
A reverse polarity connection on the input or output terminals will damage the unit voiding the warranty.

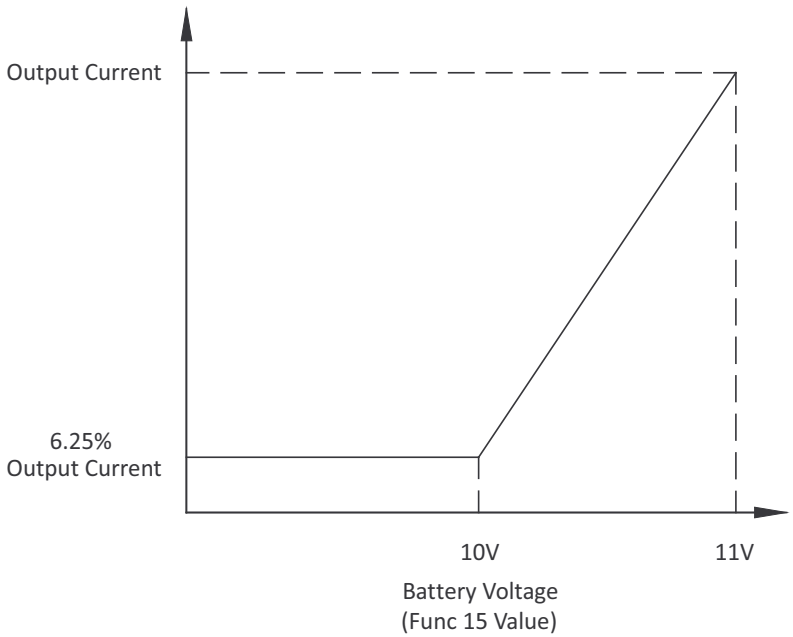
Charger Curve VS Case Temperature De-rating Curve:

Charging Curve



Rescue (precharging) Curve:

Charging Curve



When the battery is below 10V the output current will be reduced to 6.25% of the output current settings.
i.e. .. with a charge current set at 50A, the output current will be limited to approximately 3A. The unit will exit rescue mode when the battery voltage has risen to above 11V at which point the unit will return to a full charge current again. The rescue (pre-charging) mode is to prepare the battery for the charge ahead and helps reduce any stress or further damage caused by the complete discharge of the battery.

This will not repair damage caused by the complete discharge.

4. Installation Instructions

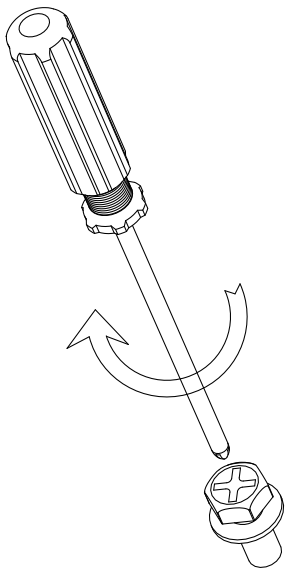
Installation Steps:

1. Place and mount the BBINT50A, see chapter 5
2. Connect the BBINT50A, see chapter 6
3. Configure the BBINT50A, see chapter 7

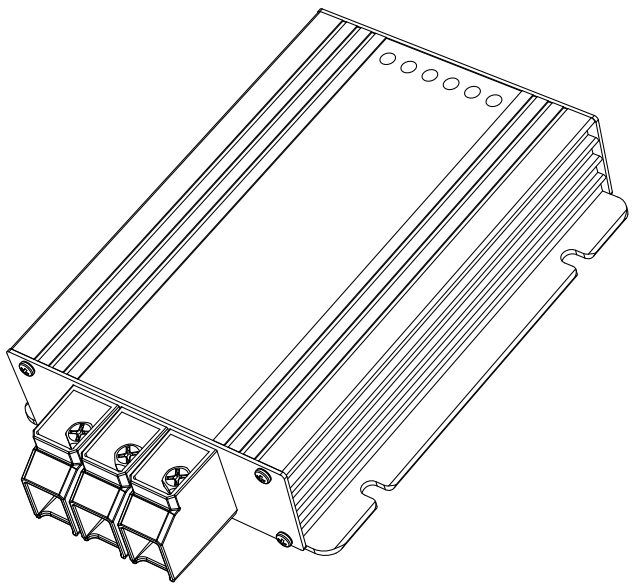
CAUTION
Read the entire manual before installing the BBINT50A. Keep the manual in a safe location for future reference.

- Operating temperature range: -20 up to +60 ºC, >40 ºC derating power [-4 up to +140 ºF, >40 ºF derating power].
- Never use the BBINT50A at a location where there is danger of gas or dust explosions. Never Mount the BBINT50A in such a way that airflow through the heatsink is obstructed. This device requires a minimum of 10cm of clearance on every side.
- Do not install the BBINT50A in the same compartment as gassing batteries. Do not mount in the same area as batteries that might release corrosive sulphur fumes or explosive gasses.
- Be sure that the output of the supplying source is switched off during installation. Also be sure that no load is connected to the batteries during installation, to prevent hazardous situations.
- Use cables with an appropriate size, see the following table.

Recommended cable sizes DC input/output			
Models	Minimum cable size Input	Minimum cable size Output	Cable length
BBINT50A	16 mm² [AWG 6]	16 mm² [AWG 6]	0 - 5m
BBINT50A	25 mm² [AWG 4]	25 mm² [AWG 4]	5 - 10m

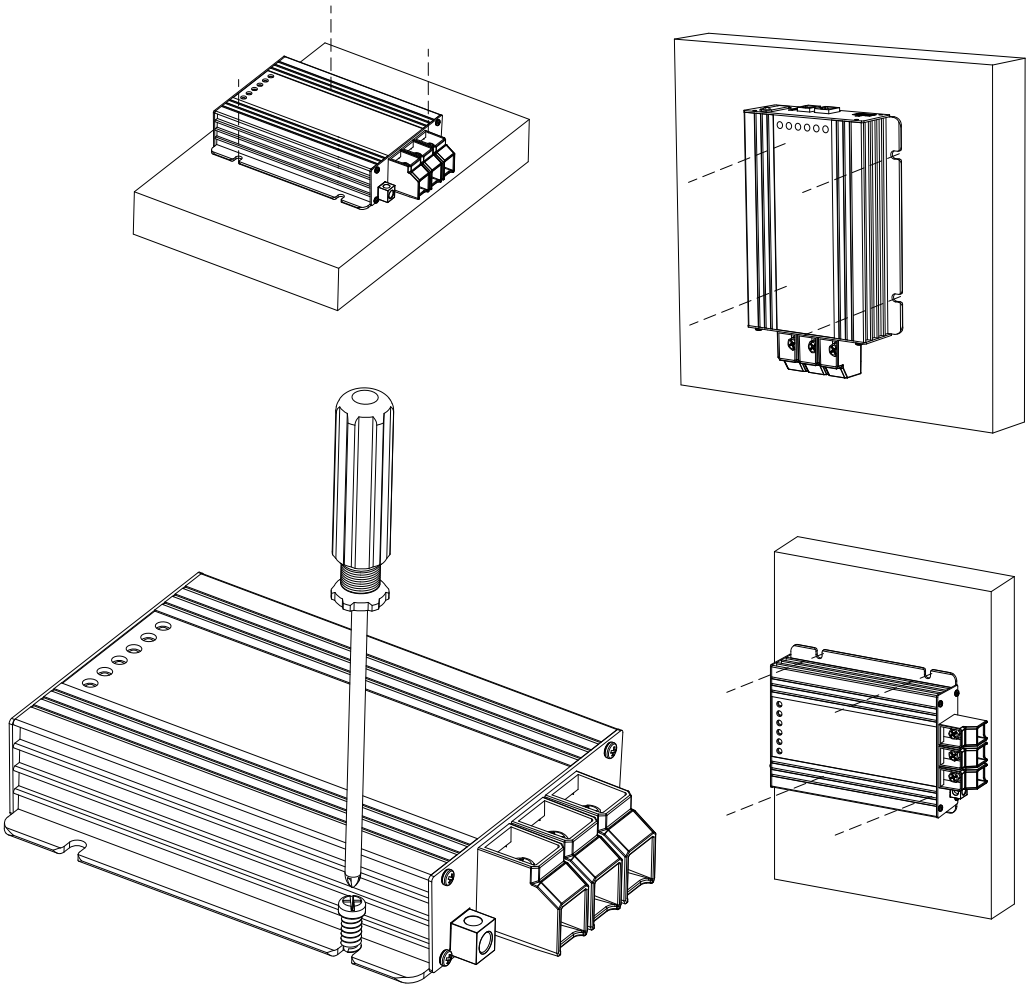


Min. 3 Nm – max. 5 Nm



5. Placement and Mounting

Mount the BBINT50A with four M6 screws (7/32") to a solid flat surface.

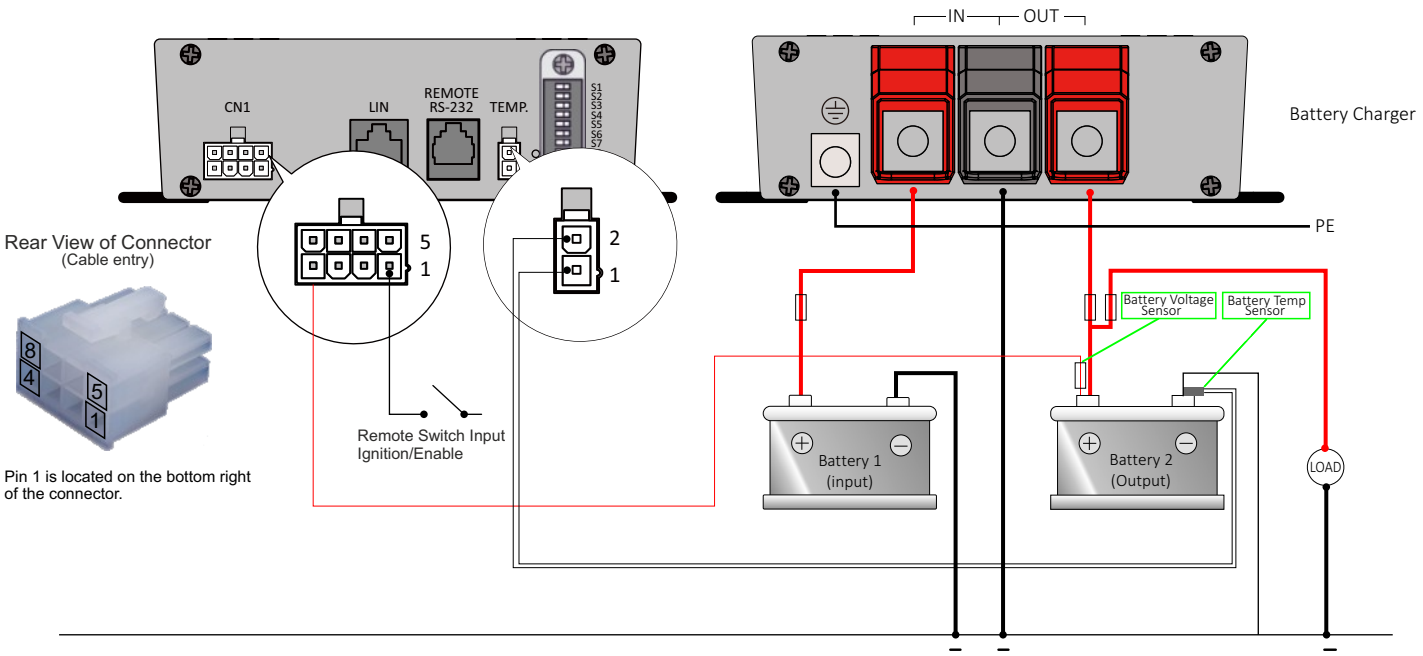


6. Connection

- BBINT50A as a battery charger, see installation drawing A.
- BBINT50A as a stabilised DC power supply, see installation drawing B.
- Use properly sized fuses and wiring.

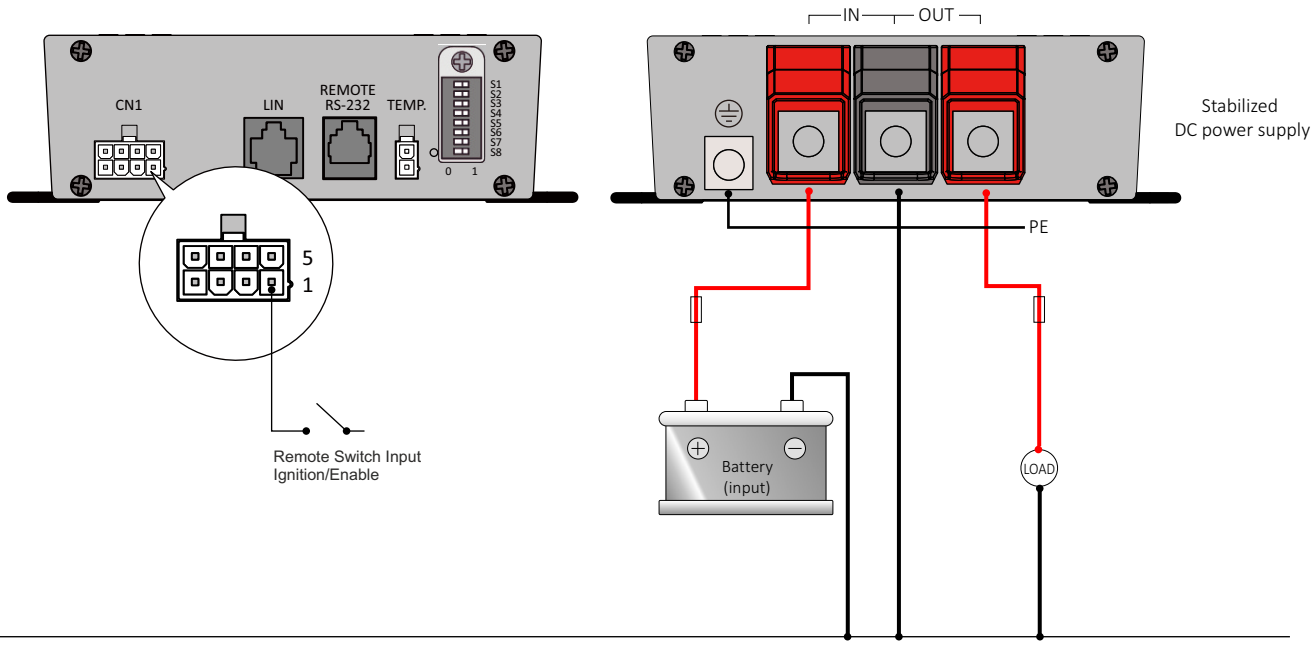
Ensure the fuses are sized correctly to the cable size used

Installation Drawing A



Ensure sufficient sized cable is used to common both Input Battery and Output Battery Negatives together

Installation Drawing B



7. Configuration

7-1 Default Settings

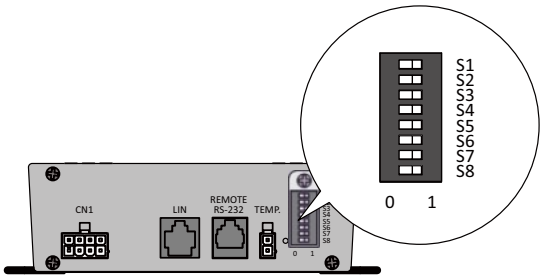
The default settings for the module are taken from the internal programming, and **not the dip switches.** In order to configure the module using the dip switches, ensure dip switch 8 is in position 1. Dip switch 8 is the toggle for the configuration settings, with 0 being the internal programmed settings, and 1 being the dip switch settings (see 7-2 dip switches). The internal programmed settings that the module will arrive with can be found in the table below. Please note that the dip switches provide basic parameter settings, while the GUI software offers more advanced options. A programming cable (Part No.K447) will be required in order to use the GUI software, which can either be purchased from Intellitec or made using the instructions on page 14 section 7-3.

7-2 Dip Switches

The BBINT50 settings can be adjusted in two ways:

- By DIP switches (Basic parameters);
- Via RS-232/Intellitec MV GUI software (Basic parameters+advanced features/custom settings).

This chapter only describes the DIP switch settings
Ensure DIP SW 8 is in position‘1' when using DIP switch settings.



Use a small screwdriver to carefully set the required settings. You may need to remove the BBINT cables (or Terminator) to be able to access the DIP switches. For an overview of the various DIP switch settings, see the following three tables, where a 0 indicates OFF or↓ and a 1 indicates ON or↑.

S1	Absorption Voltage
0	14.4V
1	14.7V

S2	Float Voltage
0	13.5V
1	13.8V

S3	Recharge Voltage
0	12V
1	12.8V

S4	Charge Current
0	100%
1	De-rating 50%

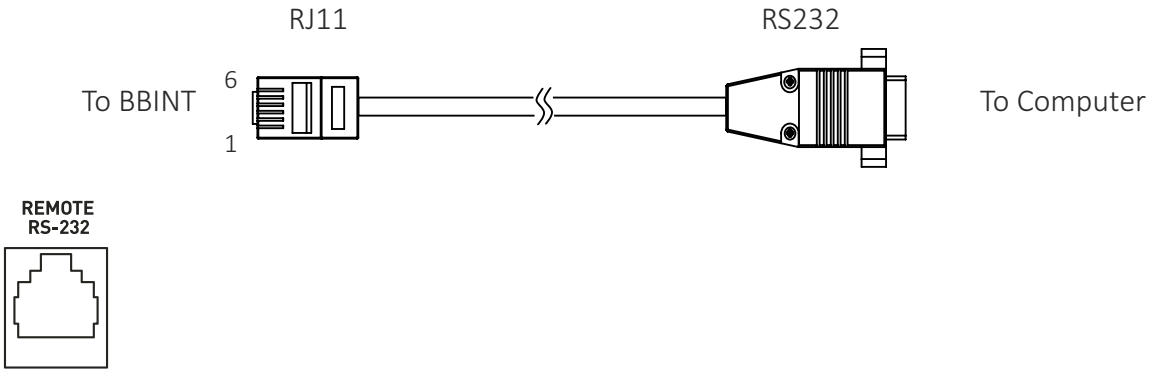
S6	S5	Mode	Charging Control
0	0	Charger mode 1	bulk→absorption→float→recharge
0	1	Charger mode 2	bulk→absorption→OFF→rechage (LiFePO4)
1	0	POWER mode 1	Constant Voltage by DIP S2
1	1	POWER mode 2	Constant Voltage by DIP S3

S7	NA
0	
1	

S8	Setting
0	To Use Rs232 Programmed Settings
1	To Use DIP S1-S7 Settings

7-3 RS-232 Programming:

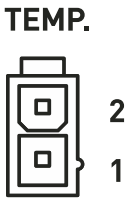
Please follow below drawing to make a communication cable. Alternatively this cable can be purchased through Intellitec MV



BBINT50A		RJ11 to RS232				RS232 to USB	
RJ11 (Female)		RJ11(Male)		RS232(Female)		RS232(Male)	
PIN	Description	PIN	Description	PIN	Description	PIN	Description
1	5VP	1	N/A	N/A		N/A	
2	GND	2	GND	5	GND	5	GND
3	RX	3	RX	3	RxD	3	TxD
4	TX	4	TX	2	TxD	2	RxD
5	PON SIG	5	N/A	N/A		N/A	
6	N/A	6	N/A	N/A		N/A	

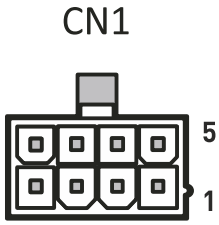
Temp:

1	Temp.
2	GND



CN1:

1	Ignition/Enable (Active HIGH)
2	BMS+ Enable (Active HIGH)
3	BMS- Enable (Active LOW)
4	Voltage Sensor + (0-17V)
5	Charging Relay Common *
6	Charging Relay Normally Open *
7	OTA Relay Common
8	OTA Relay Normally Open



* Charger mode 2 : If the battery temperature is lower than 10 C, and the optional temperature sensor is installed, the relay (CN1-PIN5 & 6) will close.(LiFePo4 for Heat Mat Control)

8. Operation

8-1 Battery Charger Operation Modes

Mode	Explanation
Charging	The BBINT50A is in charging mode if it meets the switch-on conditions (see DIP switch / BBINT settings)
Standby	The BBINT50A goes into standby when is does not meet the switch-on conditions (see DIP switch / BBINT settings) Or Switched off by the on / off button on in the BBINT50A menu or by a BBINT50A event
Sleep (low no-load power consumption)	The BBINT50A enters sleep mode when the sleep delay has passed, to reduce the no-load power consumption Every 5 seconds, the BBINT50A scans if the configured battery charger meets the switch-on conditions
Alarm	Possible error, connect BBINT50 and analyze the situation

8-2 LED Indicators

The status of the unit can be determined by the LED's. With the following information.
A green LED states that all conditions are ok.
An orange LED will state the operating status depending on the flash speed.
A red LED will state the error status depending on the flash speed.

Use the following table to understand the meaning of the diagnostic LED's
Display LED:

Input Voltage	LED1	Status
Green LED Solid		Normal
Orange LED Slow Flash		Under Voltage Alarm
Orange LED Fast Flash		Over Voltage Alarm
Red LED Slow Flash		Under Voltage Protection Shutdown
Red LED Fast Flash		Over Voltage Protection Shutdown

Output Voltage	LED2	Status
Green LED Solid		Normal
Orange LED Slow Flash		Under Voltage Alarm
Orange LED Fast Flash		Over Voltage Alarm
Red LED Solid Flash		Short Circuit Protection Shutdown
Red LED Fast Flash		Over Voltage Protection Shutdown

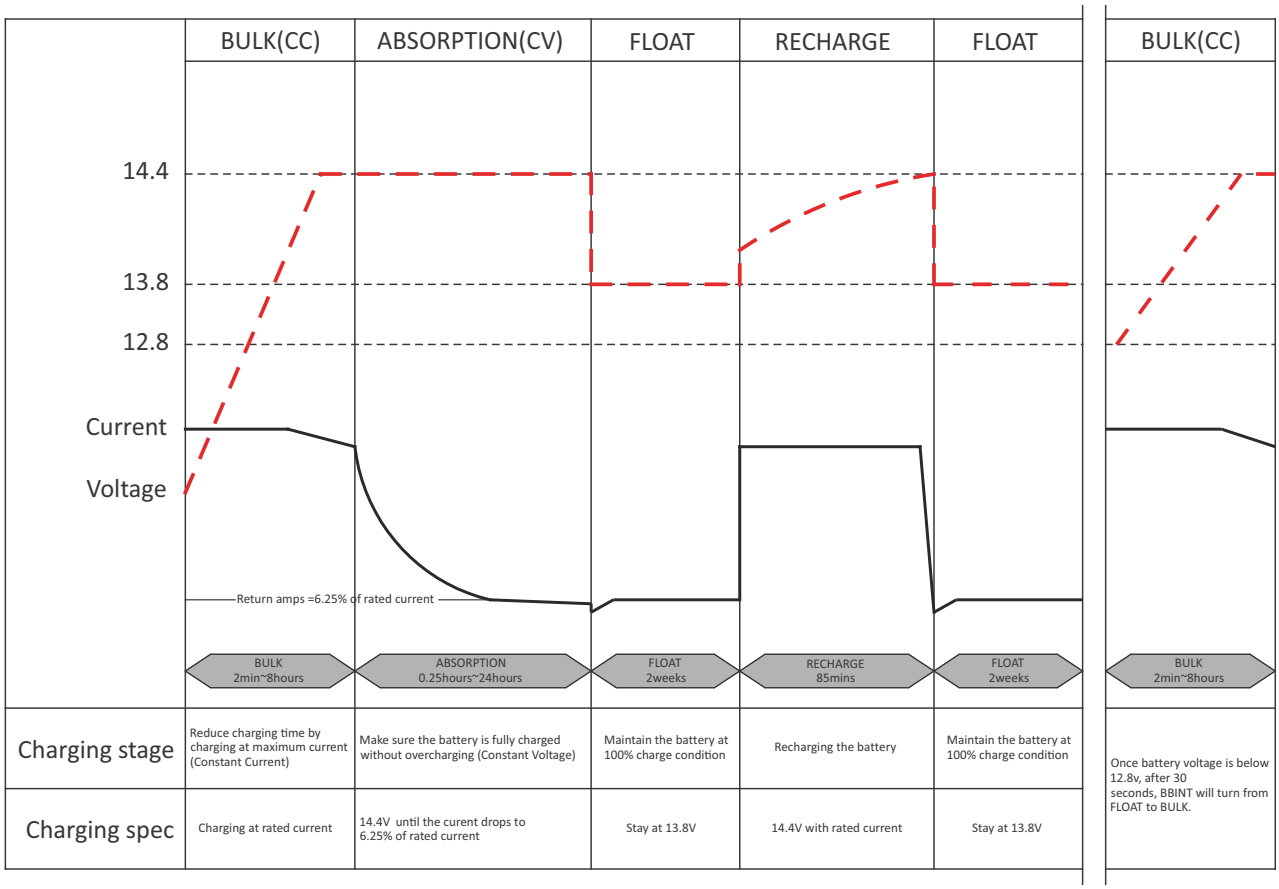
Output Current	LED3	Status
Green LED Solid		C.V. & Float
Orange LED Solid		C.V. & Absorption
Orange LED Slow Flash		C.C. & Bulk
Orange LED Fast Flash		C.C. & De-rating
No light		Charging OFF

BMS	LED4	Status
Green LED Solid		FUNC14 Setting 1 BMS+ > FUNC17 or BMS- Input to GND
Red LED Solid		FUNC14 Setting 1 BMS+ < FUNC17-0.3V & BMS- Input floaating
No light		FUNC14 Setting 0 (Default)

Ignition	LED5	Status
Green LED Solid		Ignition Input Action
No light		Ignition Input no signal

Error	LED6	Status
Green LED Solid		Normal
Orange LED Solid		Input or Output Abnormal Alarm
Orange LED Slow Flash		Battery Abnormal Temperature Alarm
Orange LED Fast Flash		Charger Over Temperature Alarm
Red LED Solid		Input or Output Abnormal Protection Shutdown
Red LED Slow Flash		Battery Abnormal Temperature Protection Shutdown
Red LED Fast Flash		Charger Over Temperature Protection Shutdown

8-3 Charging Curve



Charging stage	Reduce charging time by charging at maximum current (Constant Current)	Make sure the battery is fully charged without overcharging (Constant Voltage)	Maintain the battery at 100% charge condition	Recharging the battery	Maintain the battery at 100% charge condition	Once battery voltage is below 12.8v, after 30 seconds, BBINT will turn from FLOAT to BULK.
Charging spec	Charging at rated current	14.4V until the curent drops to 6.25% of rated current	Stay at 13.8V	14.4V with rated current	Stay at 13.8V	

9. Trouble Shooting

Malfunction	Possible cause	Check / Confirm
No output voltage/ current	No input voltage	Check settings
	Input voltage is too low	Check input voltage / configuration
Output voltage is too low	Batteries load is larger than battery charger can supply.	Reduce the batteries load.
	Wrong setting	Check settings
Charger current is too low	Batteries almost fully charged	Nothing, this is normal when the battery is almost fully charged.
	High ambient temperature	1. The charge current is automatically reduced if ambient temperature is higher than 60degC. 2. Check settings
	Unit is in rescue (Pre-charging mode due to a too low battery voltage.	
Batteries not fully charged	Charge current is too high	Reduce the batteries load.
	Charge time is too short	Check the charger with higher capacity.
	Battery temperature is too low	Check the battery temperature sensor.
	Defective/old battery	Check battery and replace if necessary.
	Wrong setting	Check settings
Batteries are too warm	Defective battery (short circuit in cell)	Check battery and replace if necessary.
	Battery temperature is too high	Check the battery temperature sensor.
	Charge voltage is too high	Check settings