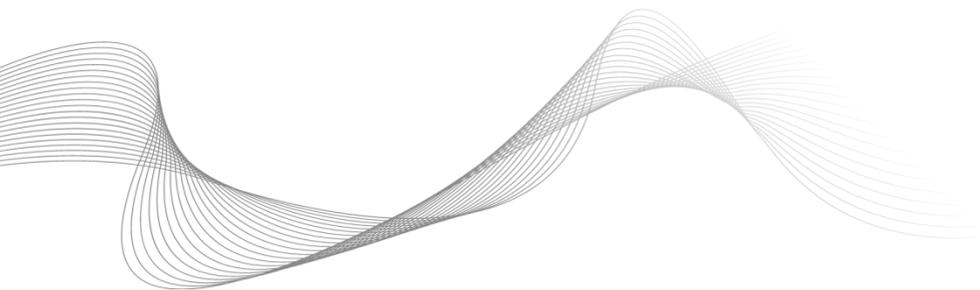


COTEK



CX Series User's Manual ***Manuel utilisateur série CX***

Advanced Converter / Charger
Chargeurs de batterie multiphases

Legal Provisions

Copyrights 2017 COTEK Electronic IND. CO. All Rights Reserved.

Any part of this document may not be reproduced in any form for any purpose without the prior written permission of COTEK Electronic IND. CO. For the conditions of the permission to use this manual for publication, contact COTEK Electronic IND. CO., LTD. In all related COTEK product activities, Neither COTEK Electronic IND. CO., LTD. nor its distributors or dealers be liable to anyone for indirect, incidental, or consequential damages under any circumstances. Specifications are subject to change without notice. Every attempt has been made to make this document complete, accurate and up-to-date. COTEK Electronic IND. CO., LTD reserve the right to make changes without notice and shall not be responsible for any damages, including indirect, incidental or consequential damages, caused by reliance on the material presented, including, but not limited to, omissions, typographical errors, arithmetical errors or listing errors in the content material. All trademarks are recognized even if these are not marked separately. Missing designations do not mean that a product or brand is not a registered trademark.

Dispositions légales

Copyrights 2017 COTEK Electronic IND. CO. tous droits réservés.

Aucune partie de ce document ne peut être reproduite, quelle qu'en soit la manière et quel qu'en soit le but, sans autorisation préalable écrite de COTEK Electronic IND. CO. Pour obtenir l'autorisation de publier ce manuel, adressez-vous directement à COTEK Electronic IND. CO., LTD. Pour l'ensemble des activités COTEK, ni COTEK Electronic IND. CO., LTD. ni ses distributeurs ou revendeurs ne sauraient être tenus responsables, d'aucune manière, de tout dommage direct, indirect ou accessoire. Les caractéristiques peuvent être modifiées sans notification préalable. Tout a été mis en œuvre pour que ce document soit complet, précis et à jour. COTEK Electronic IND. CO., LTD. se réserve le droit d'apporter des modifications sans notification et ne saurait être tenu responsable de tout dommage direct, indirect ou accessoire causé par l'utilisation de ce contenu, y compris mais non limité à des omissions, des coquilles, des erreurs de calcul ou de description. Toutes les marques sont protégées même sans indication spécifique. L'absence de logo ne signifie pas que le produit ou la marque ne sont pas protégés.

Table of Content

| | |
|--|-----------|
| 1. Important Safety Information | 1 |
| 1-1. General Safety Precautions | 1 |
| 1-2. Battery Precautions | 2 |
| 2. Features | 3 |
| 2-1. Battery Charging Curve | 4 |
| 2-2. Specification | 6 |
| 2-3. Mechanical Drawings | 9 |
| 3. Product Description | 13 |
| 3-1. Configurations | 13 |
| 3-2. S1 Setting | 14 |
| 3-3. Charging Status LED Indicator | 15 |
| 3-4. Failure Indicator | 15 |
| 3-5. Pin Assignment of CN2 – For Alarms Signal & Fan Control | 16 |
| 3-6. Sleep Mode | 16 |
| 3-7. Pin Assignment of CN3 – For Temperature sensor & Remote control | 16 |
| 3-8. Pin Assignment of CN4 – For Remote control | 17 |
| 3-9. Pin Assignment of ESB Connectors – For CX1215/1225/1235 | 17 |
| 3-10. Temperature Compensation | 17 |
| 3-11. Rescue Battery Curve | 18 |
| 3-12. Battery Charger Selection (Reference only) | 19 |
| 3-13. Battery Voltage setting suggestion | 19 |
| 3-14. Fan speed duty description | 20 |

| | |
|--|-----------|
| 4. Installing Converter / Charger | 21 |
| 4-1. Battery charger connection diagram | 23 |
| 5. Trouble Shooting | 27 |
| 6. Warranty Statement | 28 |
| 6-1. Warning | 28 |
| 6-2. Warranty | 28 |

1. Important Safety Information



Warning!

Before installing or using CX series power converter, you need to read following safety information carefully.

1-1. General Safety Precautions

- 1-1-1. For indoor use, do not expose CX-Series Battery Charger to water, mist, snow, or dust. To reduce the risk of fire, do not cover or obstruct the ventilation enclosure.
- 1-1-2. To avoid the risk of fire and electric shocks, make sure that existing wiring is in good electrical condition and not undersized.
- 1-1-3. Do not charge non-rechargeable batteries.
- 1-1-4. Disconnect the AC Grid before making or breaking the connections to the battery.
- 1-1-5. Only the AC cord with IEC socket is allowed to plug to the battery charger.
- 1-1-6. Never charge a frozen battery.
- 1-1-7. If the AC cord is damaged do not attempt to use. It must be replaced or repaired by a qualified person.
- 1-1-8. Corrosive substances may escape from the battery during charging and damage delicate surfaces. Please store and charge in a suitable area.

1-2. Battery Precautions

- 1-2-1. If battery acid contacts your skin or clothing, wash it out with soap and water immediately.
- 1-2-2. If battery acid contacts your eyes, wash it out with cold running water for at least 20 minutes and get medical attention immediately.
- 1-2-3. Never smoke or make a spark or flame in the vicinity of the battery.
- 1-2-4. Do not drop metals on the battery.
The resulting sparks or short-circuits on the battery or other electrical parts may cause an explosion.
- 1-2-5. Remove personal metal items such as rings, bracelets, necklaces, and watches when operating with lead-acid batteries. It may cause short circuit and very high temperature, which can melt metal items.

2. Features

- Universal AC input with active PFC
- Compatible with Lead Acid, Li-ion, Gel and AGM batteries
- Support remote controller CR-1 as optional accessory
- Voltage / temperature compensation
- 2 stage fan speed control (Sleep mode)
- Output power OK signal
- Output alarm signal
- High efficiency and high reliability
- Built-in battery rescue function
- Built-in Extra Second Battery (ESB) output function
- Protection Short Circuit / Over Voltage / Over Temperature / Brown-out Protection
- Withstand 2G vibration test

2-1. Battery Charging Curve

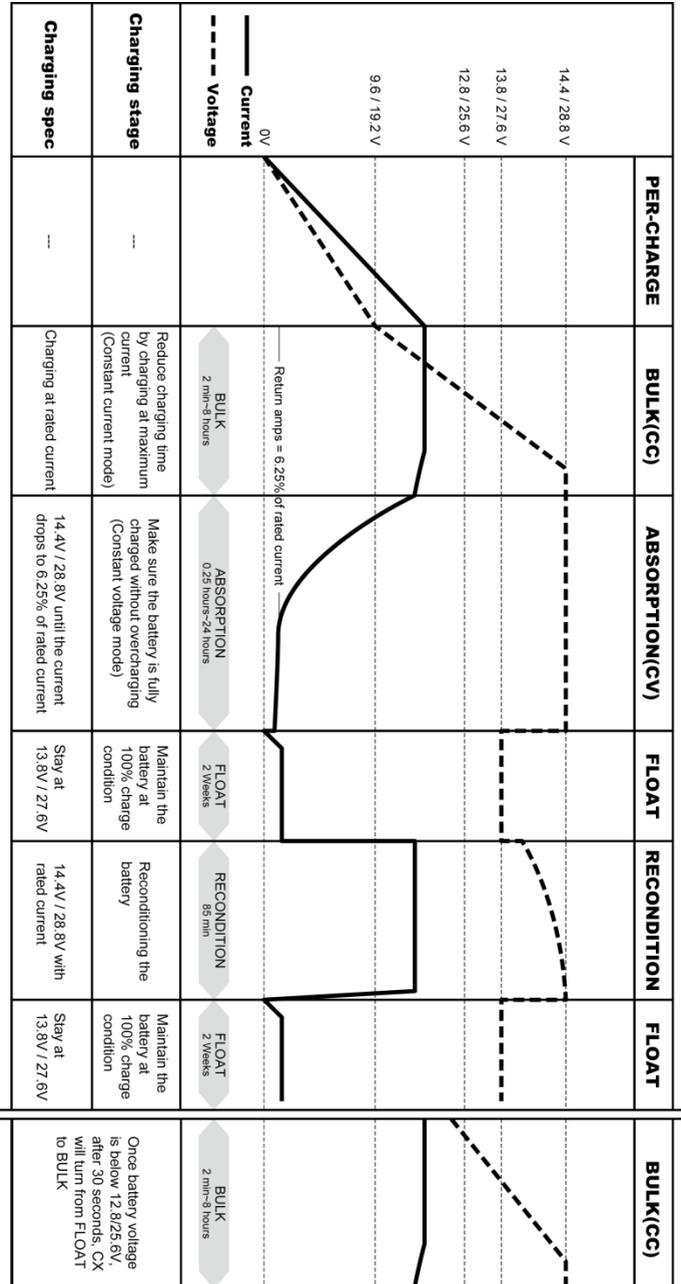


Figure 1. CX series Battery Charging Curve

2-1-1. Bulk Stage (Constant Current)

At the beginning of the charging process, the flat battery is charged at constant current (maximum charge current) until the battery voltage reaches the set charging voltage (Refer to 3-2 charging mode setting).

2-1-2. Absorption Stage (Constant Voltage)

The absorption charging duration will depend on the battery status.

Before moving to absorption stage, charger will wait for two minutes then charging at constant voltage until the battery is fully charged.

Once the battery is fully charged or the charging current is below 6.25% of the rated charging current for 15 minutes, then the absorption stage ends.

2-1-3. Float Stage

After absorption stage, the battery charger switches to float stage, maintains the battery at 100% charge without overcharging or damaging the battery. This means the charger can be left connected to the battery continuously.

2-1-4. Recondition stage

Every 14 days, the battery charger switches back to Bulk stage for 85 minutes in order to revive the battery. This prevents any fatigue symptoms such as sulphation.

2-2. Specification

| Model | | CX1215 | CX1225 | CX1235 | CX1250 | CX1280 |
|-----------------------------|-------------------------------|---|----------|---------------|---------------|---------------|
| Output | Battery Type | Lead Acid / Li-ion / Gel / AGM | | | | |
| | Standard Boost Charge Voltage | 14.4V / 14.7V (Select by S1 DIP switch) | | | | |
| | Standard Float Charge Voltage | 13.8V / 13.5V (Select by S1 DIP switch) | | | | |
| | Main Rated Current | 15A | 25A | 35A | 50A | 80A |
| | Main Output | 1 | 2 | 2 | 3 | 3 |
| | ESB Output | 1 | 1 | 1 | -- | -- |
| | ESB Output Voltage / Current | 13.8V/2A | 13.8V/2A | 13.8V/2A | -- | -- |
| | Battery Charging Mode | 3-stage charging capability IUOU | | | | |
| | Isolation Type | Use active power MOSFET on each output terminal | | | | |
| Single Output Current Limit | 15A | 25A | 35A | 40A | 40A | |
| Input | Nominal Voltage | 100~240VAC (100~120VAC only for UL458) | | | | |
| | Voltage Range | 90~264VAC (90~132VAC only for UL458) (Refer to 2-2-2 de-rating curve) | | | | |
| | Frequency Range | 47~63Hz | | | | |
| | Power Factor (Typ.) | PF > 0.92 at full load | | | | |
| | Efficiency (Typ.) at 230Vac | 87% | 87% | 87% | 87% | 87% |
| Protection | Short Circuit | Current is reduced to < 1A continued 30sec., will operate 30 seconds then turn off | | | | |
| | Over Voltage | 17.5V \pm 1%, protection type: shut down output (recovery after resetting AC power ON) | | | | |
| | Over Temperature | Charger Over Temperature 100 \pm 5°C detected by heat sink 52 \pm 5°C (Optional temperature sensor) Auto recovery after heat sink temperature goes down to 50 \pm 5°C | | | | |
| Function | Alarm Signal | NC. / NO. Relay contact output (Please reference Alarms signal & Fan control) | | | | |
| | Temp. Compensation | 12V : -10mv / 0.5°C with COTEK temperature sensor 24V : -20mv / 0.5°C with COTEK temperature sensor | | | | |
| | Sleep Mode | By Remote Controller and S1-4 DIP switch (Please refer to section 3-2) | | | | |
| | Remote Controller | Support COTEK Remote Controller CR-1 (Refer to section 3-6 and 3-7) | | | | |
| Environment | Working Temperature | -20~40°C (Refer to 2-2-2 de-rating curve) | | | | |
| | Working Humidity | 20~90% RH non-condensing | | | | |
| | Temperature Coefficient | \pm 0.03% (0~50°C) | | | | |
| | Vibration | 10~500Hz, 2G 10min. / 1cycle period for 60min. each along X, Y, Z axes. | | | | |
| Safety & EMC | Safety Standards | Certified EN 60335-1, EN 60335-2-29, UL458 (only for CX1235/1250/1280) | | | | |
| | Withstand Voltage | I/P-O/P: 4242VDC, I/P-FG: 1768VDC, O/P-FG: 707VDC | | | | |
| | Isolation Resistance | I/P-O/P: 100M Ohms / 500VDC | | | | |
| | EMC Standards | Certified EN 55022; EN 61204-3; EN 55014-1 Certified EN 61000-3-2; EN 61000-3-3; EN 61204-3; EN 61000-6-3 Certified EN 55024; IEC 61000-4-2, 3, 4, 5, 6, 8, 11; ENV 50204; EN 61000-6-1; EN 55014-2 | | | | |
| Others | Dimension (WxHxD) | 183x72x243 mm | | 183x72x263 mm | 213x77x272 mm | 213x77x312 mm |
| | Packing | 1.6 kg | 1.7 kg | 1.9 kg | 3.1 kg | 4.0 kg |

| Model | | CX2415 | CX2425 | CX2440 |
|-----------------------------|-------------------------------|---|---------------|---------------|
| Output | Battery Type | Lead Acid / Li-ion / Gel / AGM | | |
| | Standard Boost Charge Voltage | 28.8V / 29.4V (Select by S1 DIP switch) | | |
| | Standard Float Charge Voltage | 27.6V / 27V (Select by S1 DIP switch) | | |
| | Main Rated Current | 12.5A | 25A | 40A |
| | Main Output | 2 | 3 | 3 |
| | ESB Output | -- | -- | -- |
| | ESB Output Voltage / Current | -- | -- | -- |
| | Battery Charging Mode | 3-stage charging capability IUOU | | |
| | Isolation Type | Use active power MOSFET on each output terminal | | |
| Single Output Current Limit | 12.5A | 25A | 40A | |
| Input | Nominal Voltage | 100~240VAC (100~120VAC only for UL458) | | |
| | Voltage Range | 90~264VAC (90-132VAC only for UL458) (Refer to 2-2-2 de-rating curve) | | |
| | Frequency Range | 47~63Hz | | |
| | Power Factor (Typ.) | PF > 0.92 at full load | | |
| | Efficiency (Typ.) at 230Vac | 90% | 90% | 90% |
| Protection | Short Circuit | Current is reduced to < 1A continued 30sec., will operate 30 seconds then turn off | | |
| | Over Voltage | 35V ±1%, protection type: shut down output (recovery after resetting AC power ON) | | |
| | Over Temperature | Charger Over Temperature 100 ±5°C detected by heat sink | | |
| | | 52±5°C (Optional temperature sensor) Auto recovery after heat sink temperature goes down to 50±5°C | | |
| Function | Alarm Signal | NC. / NO. Relay contact output (Please reference Alarms signal & Fan control) | | |
| | Temp. Compensation | 12V : -10mv / 0.5°C with COTEK temperature sensor 24V : -20mv / 0.5°C with COTEK temperature sensor | | |
| | Sleep Mode | By Remote Controller and S1-4 DIP switch (Please refer to section 3-2) | | |
| | Remote Controller | Support COTEK Remote Controller CR-1 (Refer to section 3-6 and 3-7) | | |
| Environment | Working Temperature | -20~40°C (Refer to 2-2-2 de-rating curve) | | |
| | Working Humidity | 20~90% RH non-condensing | | |
| | Temperature Coefficient | ±0.03% (0~50°C) | | |
| | Vibration | 10~500Hz, 2G 10min. / 1cycle period for 60min. each along X, Y, Z axes. | | |
| Safety & EMC | Safety Standards | Certified EN 60335-1, EN 60335-2-29, UL458 (only for CX2425/2440) | | |
| | Withstand Voltage | I/P-O/P: 4242VDC, I/P-FG: 1768VDC, O/P-FG: 707VDC | | |
| | Isolation Resistance | I/P-O/P: 100M Ohms / 500VDC | | |
| | EMC Standards | Certified EN 55022; EN 61204-3; EN 55014-1 Certified EN 61000-3-2; EN 61000-3-3; EN 61204-3; EN 61000-6-3 Certified EN 55024; IEC 61000-4-2, 3, 4, 5, 6, 8, 11; ENV 50204; EN 61000-6-1; EN 55014-2 | | |
| Others | Dimension (WxHxD) | 183x72x243 mm | 213x77x272 mm | 213x77x312 mm |
| | Packing | 1.6 kg | 2.9 kg | 3.9 kg |

2-2-1. Charging Current vs. Temperature De-rating Curve

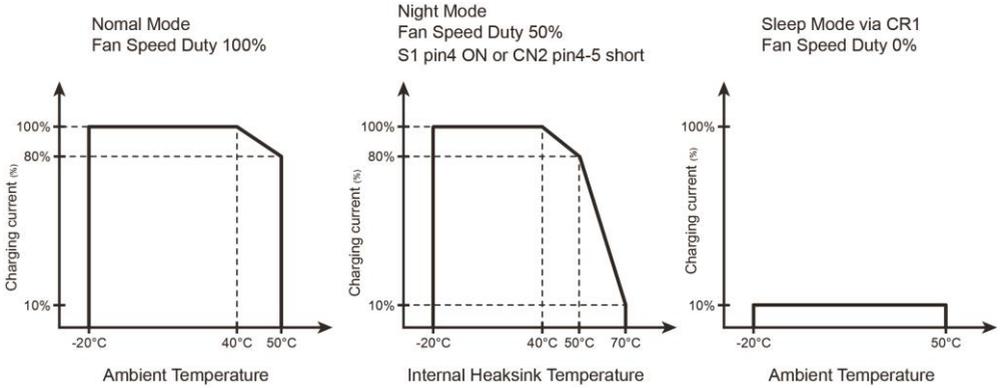


Figure 2. Charging current vs. temperature de-rating curve

2-2-2. Charging Current vs. Input Voltage Temperature De-rating Curve

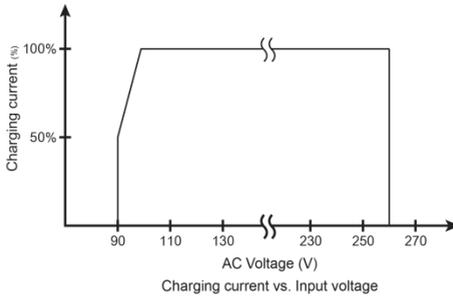


Figure 3. Charging current vs. Input voltage temperature de-rating curve

2-3. Mechanical Drawings

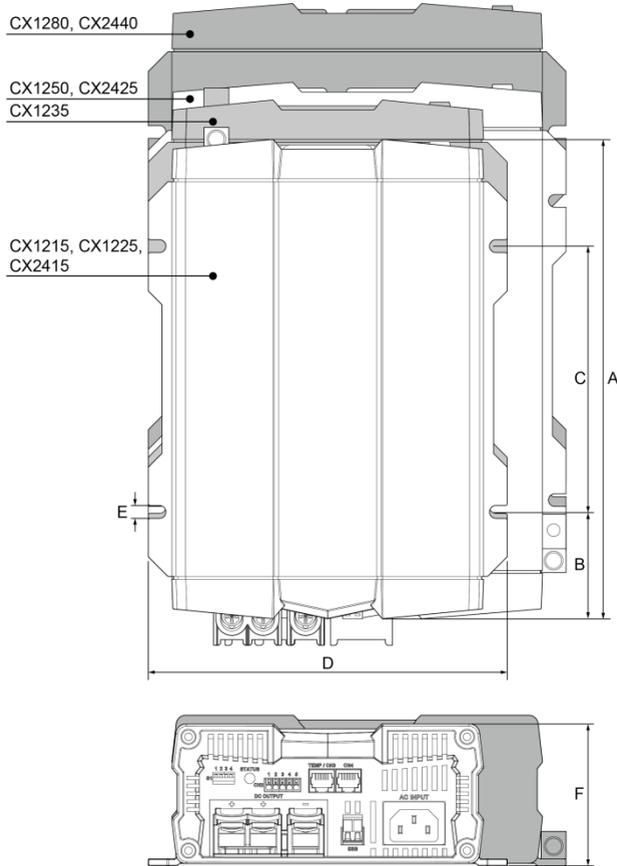


Figure 4. Mechanical Drawings

| Model | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) | F (mm) |
|---------------|--------|--------|--------|--------|--------|--------|
| CX1215 | 243 | 54.2 | 135.0 | 183 | 6.5 | 72 |
| CX1225 | 243 | 54.2 | 135.0 | 183 | 6.5 | 72 |
| CX1235 | 263 | 56.7 | 150.0 | 183 | 6.5 | 72 |
| CX1250 | 272 | 60.2 | 152.0 | 213 | 6.5 | 77 |
| CX1280 | 312 | 65.2 | 182.0 | 213 | 6.5 | 77 |
| CX2415 | 243 | 54.2 | 135.0 | 183 | 6.5 | 72 |
| CX2425 | 272 | 60.2 | 152.0 | 213 | 6.5 | 77 |
| CX2440 | 312 | 65.2 | 182.0 | 213 | 6.5 | 77 |

2-3-1. CX1215 / 1225 / 1235 / 2415 (Front Panel)

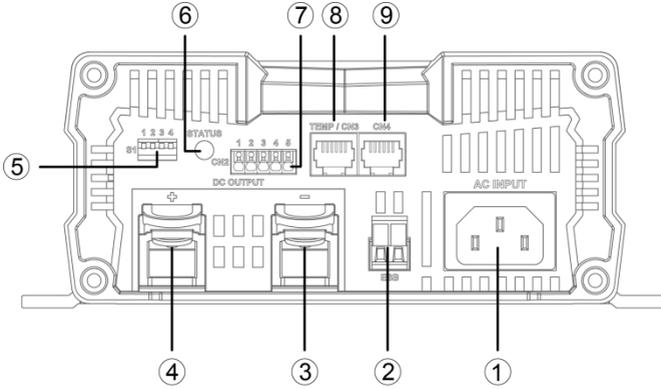


Figure 5. CX1215 front panel

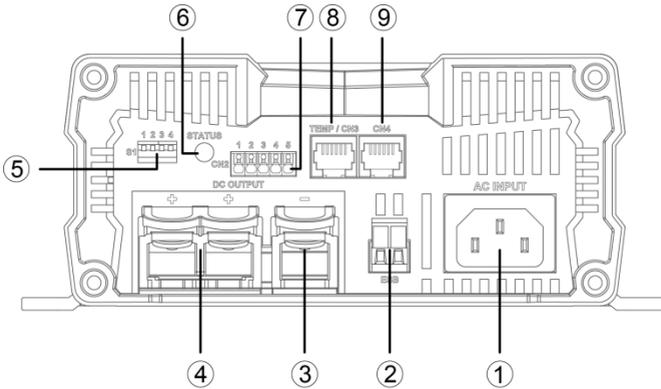


Figure 6. CX1225/1235/2415 front panel

| Front panel | | | |
|-------------|---|---|------------|
| ① | AC Inlet (IEC) | ⑥ | Status LED |
| ② | ESB connector (only CX 1215/1225/1235) | ⑦ | CN2 |
| ③ | DC output - | ⑧ | TEMP/CN3 |
| ④ | DC output + | ⑨ | CN4 |
| ⑤ | Dip Switch 1 (S1) | | |



Note: For detail description on item 5 (Dip Switch S1), please refer to section 3-2

2-3-2. CX1215 / 1225 / 1235 / 2415 (Rear Panel)

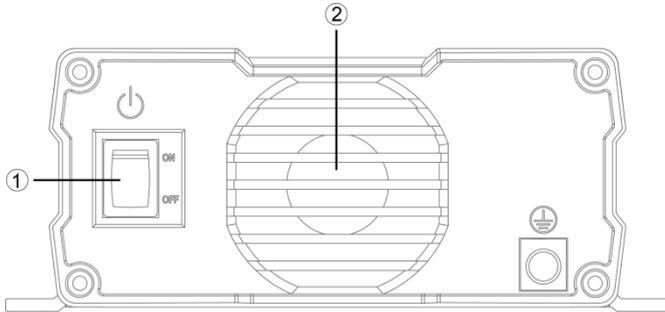


Figure 7. CX1215/1225/1235/2415 rear panel

| Rear panel | | | |
|------------|--------------|---|-----|
| ① | Power Switch | ② | Fan |

2-3-3. CX1250 / 1280 / 2425 / 2440 (Front Panel)

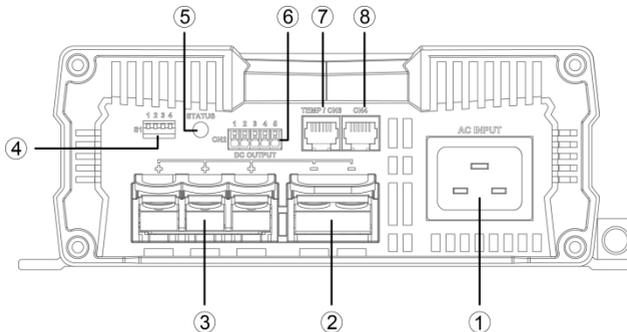


Figure 8. CX1250/1280/2425/2440 front panel

| Front panel | | | |
|-------------|-------------------|---|------------|
| ① | AC Inlet (IEC) | ⑤ | Status LED |
| ② | DC output - | ⑥ | CN2 |
| ③ | DC output + | ⑦ | TEMP/CN3 |
| ④ | Dip Switch 1 (S1) | ⑧ | CN4 |



Note: For detail description on item 4 (Dip Switch S1), please refer to section 3-2

2-3-4. CX1250 / 1280 / 2425 / 2440 (Rear Panel)

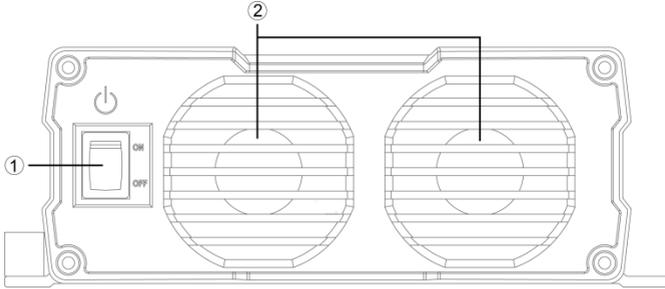


Figure 9. CX1250/1280/2425/2440 rear panel

| Rear panel | | | |
|------------|--------------|---|-----|
| ① | Power Switch | ② | Fan |

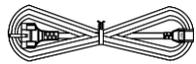
3. Product Description

Below models are available with COTEK Advanced Battery Charger CX Series:

| Model | No. of supply battery | Support ESB (Extra Second Battery) |
|-----------------|-----------------------|---------------------------------------|
| CX1215 | 1 | Yes |
| CX1225 / CX1235 | 2 | Yes |
| CX1250 / CX1280 | 3 | No |
| CX2415 | 2 | No |
| CX2425 / CX2440 | 3 | No |

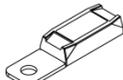
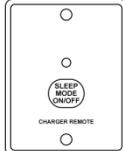
3-1. Configurations

3-1-1. Standard Accessory

| Number | A | B | C | D |
|-------------|---|---|---|---|
| Description | Copper Bus | | Screw | AC Power Cable |
| Diagram |  |  |  |  |

| Quantity per | CX 1215 | CX 1225 | CX 1235 | CX 1250 | CX 1280 | CX 2415 | CX 2425 | CX 2440 |
|--------------|---------|---------|---------|---------|---------|---------|---------|---------|
| A | x | 1pcs | 1pcs | x | x | 1pcs | x | x |
| B | x | x | x | 1pcs | 1pcs | x | 1pcs | 1pcs |
| C | x | 2pcs | 2pcs | 3pcs | 3pcs | 2pcs | 3pcs | 3pcs |
| D | 1pcs |

3-1-2. Optional Accessory

| Number | A | B | C |
|-------------|---|---|---|
| Description | Ring Terminal | Battery Temp Sensor | Remote |
| Diagram |  |  |  |

| Number | CX 1215 | CX 1225 | CX 1235 | CX 1250 | CX 1280 | CX 2415 | CX 2425 | CX 2440 |
|--------|---------|---------|---------|---------|---------|---------|---------|---------|
| A | 2pcs | 3pcs | 3pcs | 5pcs | 5pcs | 3pcs | 5pcs | 5pcs |
| B | 1pcs |
| C | 1pcs |

3-2. S1 Setting

3-2-1. Dip switch setting

| Status | 1 | 2 | 3 | 4 | 12V / 24V CC/CV | 12V / 24V Float |
|---|-----|-----|-----|-----|--------------------|--------------------|
| CC turn to CV voltage | ON | X | OFF | X | 14.4V / 28.8V | --- |
| | OFF | X | OFF | X | 14.7V / 29.4V | --- |
| Float voltage | X | ON | OFF | X | --- | 13.5V / 27.0V |
| | X | OFF | OFF | X | --- | 13.8V / 27.6V |
| Power Mode (Current limit output voltage) | OFF | OFF | ON | X | 13.2V / 26.4V | |
| | OFF | ON | ON | X | 13.8V / 27.6V | |
| | ON | OFF | ON | X | 14.4V / 28.8V | |
| Remote | ON | ON | ON | X | --- | --- |
| Sleep Mode | X | X | X | ON | --- | --- |
| | X | X | X | OFF | --- | --- |

X: Not Applicable

---: By Default setting

3-2-2. Default setting

| Model | 12V Series | 24V Series |
|------------|------------|------------|
| CC/CV | 14.4V | 28.8V |
| Float | 13.8V | 27.6V |
| Power Mode | Off | Off |
| Remote | Off | Off |
| Fan | Full Speed | Full Speed |

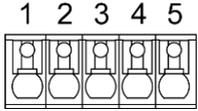
3-3. Charging Status LED Indicator

| Charging status | LED Status | |
|-----------------|---------------------------------------|-----------|
| Bulk-1 | Orange fast | ----- |
| Bulk-2 | Orange slow | - - - - - |
| Absorption-1 | Orange solid | ===== |
| Absorption-2 | Green solid | ===== |
| Float | Green flash | |
| | LED color change by the status change | |

3-4. Failure Indicator

| Failure status | LED Status | | Description |
|-----------------|-----------------------|-----------|---|
| Input or Output | Red solid | ===== | Output current is reduced to <1V |
| | | | AC I/P unstable |
| | | | Output FUSE blown |
| Temperature | Red fast | ----- | Battery over heat (the indicator is available only when COTEK temperature sensor is connected) |
| | | | Battery under heat (the indicator is available only when COTEK temperature sensor is connected) |
| | | | Charger over heat (Heat Sink) |
| Battery voltage | Red slow | - - - - - | Battery over voltage |
| | | | Battery under voltage or output under voltage in C.C. mode. |
| Fan abnormality | Red light flash twice | | Fan abnormality |
| ESB Failure | Red slow every 2 sec. | - - - - - | ESB no output / output short |

3-5. Pin Assignment of CN2 – For Alarms Signal & Fan Control

| | | |
|---|--------------------|---|
| 1 | Normally closed |  |
| 2 | Normally open | |
| 3 | COM | |
| 4 | Sleep mode control | |
| 5 | GND | |

| | |
|-----------|----------------|
| 4-5 Short | Sleep mode on |
| 4-5 Open | Sleep mode off |

3-6. Sleep Mode

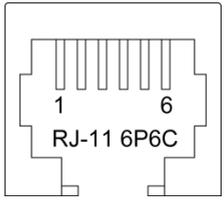
| # | CR-1 | CN2 ^{*1} | Sleep Mode | Fan Speed |
|---|------|-------------------|--------------------|---|
| A | OFF | OFF | OFF | Fan will operate according to heat sink temperature and loads condition |
| B | OFF | ON | ON | Fan operates at 50% duty |
| C | ON | ON | ON (deep sleep) | Fan stop |
| D | ON | OFF | ON (deep sleep) | Fan stop |

After 8 hours to use CR-1^{*2} to start Sleep Mode, then the sleep mode will stop. Please use the CN2 to determine the Sleep Mode ON/OFF.

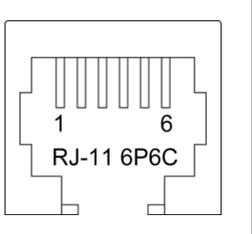
*1 : Please refer to 3-5.

*2 : CR-1 is the CX remote controller, and sleep mode can be set by this remote controller.

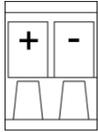
3-7. Pin Assignment of CN3 – For Temperature sensor & Remote control

| | | |
|---|----------|---|
| 1 | R_VCC |  |
| 2 | GND | |
| 3 | TEMP | |
| 4 | BAT- | |
| 5 | DATA I/O | |
| 6 | NC. | |

3-8. Pin Assignment of CN4 – For Remote control

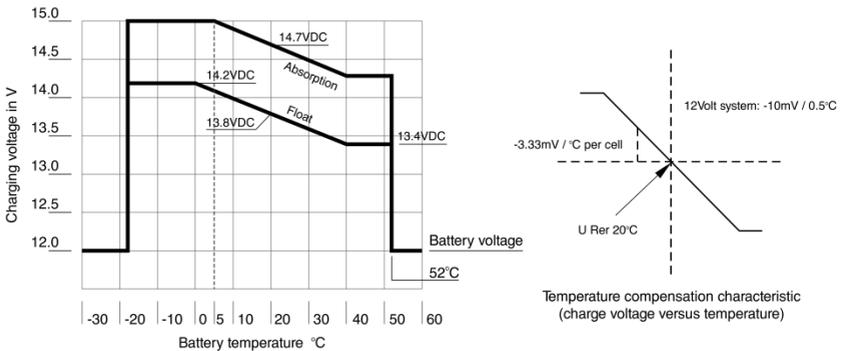
| | | |
|---|----------|---|
| 1 | R_VCC |  |
| 2 | BAT- | |
| 3 | NC. | |
| 4 | BAT- | |
| 5 | DATA I/O | |
| 6 | NC. | |

3-9. Pin Assignment of ESB Connectors – For CX1215/1225/1235

| | | |
|---|-----|---|
| + | VCC |  |
| - | GND | |

3-10. Temperature Compensation

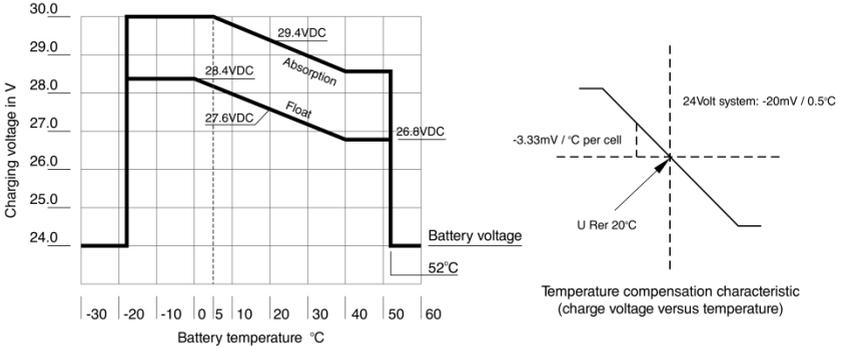
- CX12XX series model



※ In the CV=14.7V and float=13.8V situation.
Please follow this rule in other situations.

Figure 10. CX12xx model Temperature Compensation

- CX24XX series model



※ In the CV=29.4V and float=27.6V situation.
Please follow this rule in other situations.

Figure 11. CX24xx model Temperature Compensation

3-11. Rescue Battery Curve

In case of battery over discharge (when battery voltage lower than 10V), CX battery charger will reduce the charging current to prevent further damage on the battery.

The following curve is only applicable for Lead-acid & AGM battery.

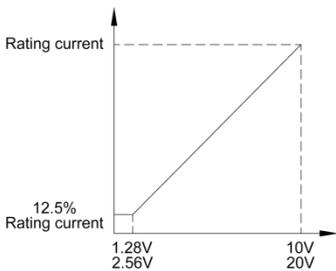


Figure 12. Lead-acid & AGM battery curve

3-12. Battery Charger Selection (Reference only)

- 12 Volt Battery

| COTEK Model | Battery capacity range | Estimated charging time |
|---------------|------------------------|-------------------------|
| CX1215 | 50~80Ah | 6~24 |
| CX1225 | 80~125Ah | 6~24 |
| CX1235 | 125~175Ah | 6~24 |
| CX1250 | 175~250Ah | 6~24 |
| CX1280 | 250~400Ah | 6~24 |

The above suggested battery charger selection is based on battery capacity multiply 0.2~0.3. Example: 100Ah battery
 * $0.2 / 0.3 = 20A \sim 30A$ in this case please select CX1225.

- 24 Volt Battery

| COTEK Model | Battery capacity range | Estimated charging time |
|---------------|------------------------|-------------------------|
| CX2415 | 50~80Ah | 6~24 |
| CX2425 | 80~125Ah | 6~24 |
| CX2440 | 125~200Ah | 6~24 |

The above suggested battery charger selection is based on battery capacity multiply 0.2~0.3. Example: 100Ah battery
 * $0.2 / 0.3 = 20A \sim 30A$ in this case please select CX2425.

3-13. Battery Voltage setting suggestion

- GEL TYPE (Max. Voltage of 14.1 / 28.2 Volt)
- AGM TYPE (Max. Voltage of 14.4 / 28.8 Volt)
- Lead-Acid (Max. Voltage of 14.8 / 29.6 Volt)

3-14. Fan speed duty description

The fan determined by load and heat sink temperature.

1. Fan speed 100%: comply with one of the following conditions
 - a. Load $\geq 75\%$
 - b. Load $\geq 50\%$ and heat sink temperature $\geq 50^{\circ}\text{C}$
 - c. Heat sink temperature $\geq 75^{\circ}\text{C}$
2. Fan speed duty 50%:
 - a. Heat sink temperature $\geq 67.5^{\circ}\text{C}$
or
 - b. Set CX to sleep mode by setting DIP4 (Refer to 3-2) when
 1. a, b, or c applies
3. Fan speed duty 0%:
 - a. Load $< 75\%$ and heat sink temperature $< 35^{\circ}\text{C}$
or
 - b. Sleep mode turned on by CR-1

4. Installing Converter / Charger

When selecting the installation location, observe the following instructions:

- Do not install the charger in following situations:
 - ✧ In wet environments
 - ✧ In dusty environments
 - ✧ In the vicinity of combustible materials
 - ✧ In areas where there is a danger of explosions
- The place of installation must be well ventilated. A ventilation system must be available for installations in small, enclosed space. The clearance around the device must be at least 25cm.
- The air inlet on the underside and the air outlet on the back of the device must remain clear.
- For ambient temperatures higher than 40 °C (such as in engine or heating compartments, or direct sunlight), the heat from the charger under load can lead to reduced output.
- The charger must be installed on a level and sufficiently sturdy surface.
- Do not install the charger in the same area as the batteries.
- Do not install the charger above batteries, because they can emit corrosive sulphur fumes that will damage the device.



Notice!

Before drilling any holes, make sure that no electrical cables or other parts of the vehicle can be damaged by drilling, sawing and filing.

For installation and mounting you will need the following tools:

- Pen for marking
- Drill bit set
- Drill
- Screwdriver

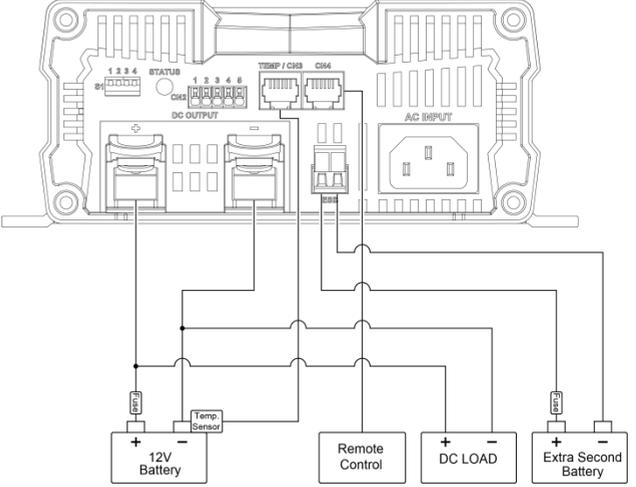
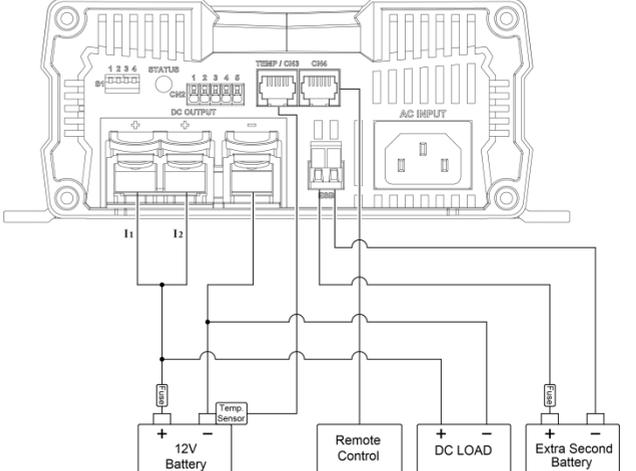
To secure the charger in place you will need:

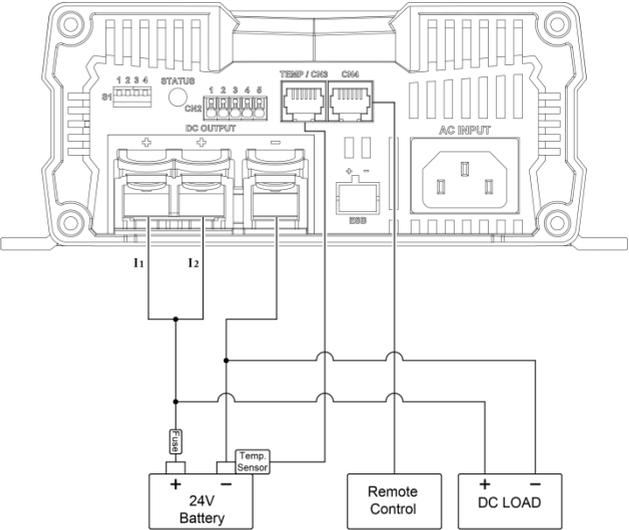
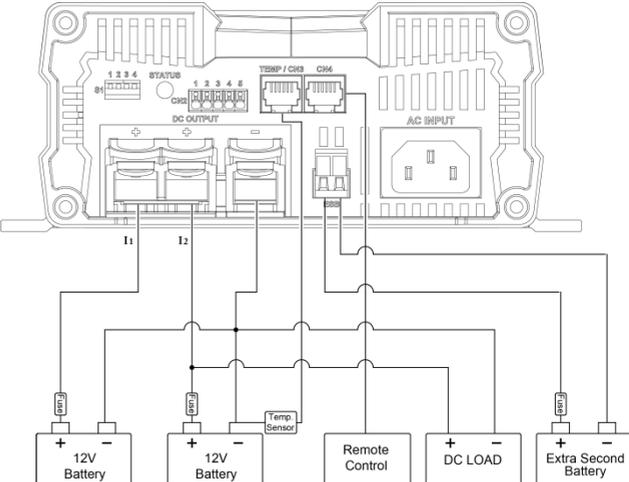
- Machine bolts (M4) with washers and self-locking nuts or
- Self-tapping screws or wood screws

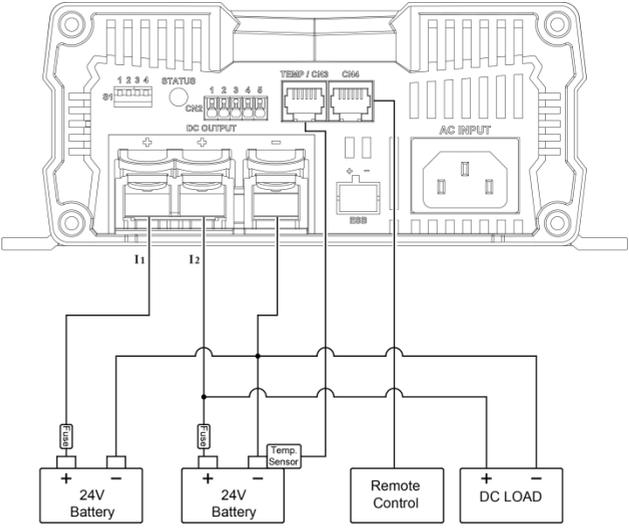
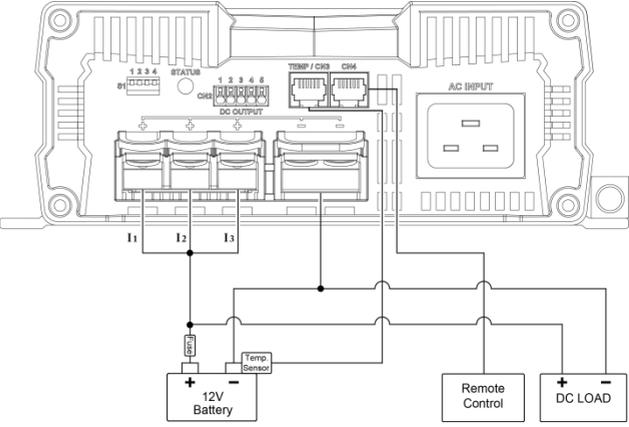
Fasten the charger as follow:

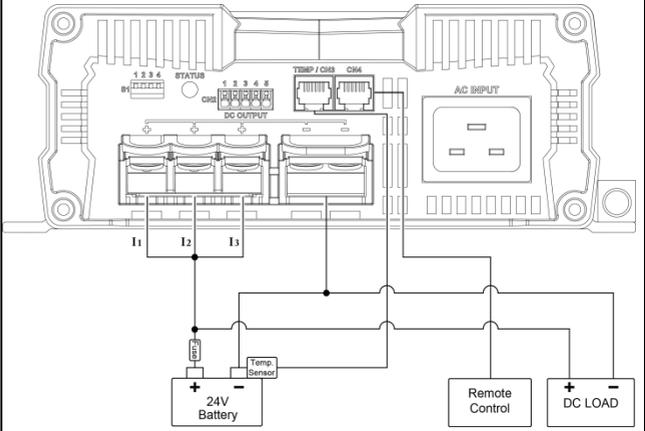
- Hold the charger against the installation location
- Mark the fastening points
- Fasten the charger with one screw through each hole in the holders

4-1. Battery charger connection diagram

| Model | Description | Connection diagram |
|--|---|--|
| <p>CX1215</p> | <p>15A MAX</p> |  <p>Fuse Voltage : 32V, Fuse Current : 23A</p> |
| <p>CX1225 CX1235</p> | <p>• I1+I2 CX1225 : 25A MAX CX1235 : 35A MAX</p> |  <p>CX1225 Fuse Voltage : 32V, Fuse Current : 40A CX1235 Fuse Voltage : 32V, Fuse Current : 50A</p> |

| Model | Description | Connection diagram |
|--|--|--|
| <p>CX2415</p> | <p>• I1+I2 12.5A MAX</p> |  <p>Fuse Voltage : 32V, Fuse Current : 23A</p> |
| <p>CX1225 CX1235</p> | <p>• I1 or I2 CX1225 : 25A MAX CX1235 : 35A MAX</p> |  <p>CX1225 Fuse Voltage : 32V, Fuse Current : 40A CX1235 Fuse Voltage : 32V, Fuse Current : 50A</p> |

| Model | Description | Connection diagram |
|--|--|---|
| <p>CX2415</p> | <p>• I1 or I2 12.5A MAX</p> |  <p>Fuse Voltage : 32V, Fuse Current : 23A</p> |
| <p>CX1250 CX1280</p> | <p>• I1+I2+I3 CX1250 : 50A MAX CX1280 : 80A MAX</p> |  <p>CX1250 Fuse Voltage : 32V, Fuse Current : 80A CX1280 Fuse Voltage : 32V, Fuse Current : 125A</p> |

| Model | Description | Connection diagram |
|--|---|---|
| <p>CX2425 CX2440</p> | <p>• I1+I2+I3 CX2425 : 25A MAX CX2440 : 40A MAX</p> |  <p>CX2425 Fuse Voltage : 32V, Fuse Current : 40A CX2440 Fuse Voltage : 32V, Fuse Current : 80A</p> |

5. Trouble Shooting

| LED display | Cause | Remedy |
|-------------------------|---|--|
| Red, slowly flashing | Battery under voltage or battery overload | Check the battery. Switch the battery charger off and on again. |
| | Defective battery | Replace the battery |
| Red, rapidly flashing | Overheating | Improve the ventilation of the battery charger or battery. Make sure that no ventilation openings are covered. If necessary, reduce the ambient temperature. |
| Red, permanently lit | Short circuit or reversed polarity | Connect the battery charger with the correct polarity. Rectify the short circuit. Check if the fuse has blown and replace it if necessary. |
| Red, double flash | Fan fault | Check the fan for dirt or damage. |
| Red, slow, every 2 sec. | Fault at the starter battery connection | Check the starter battery connection for a short circuit. |

6. Warranty Statement

6-1. Warning



Warning!

Do not open or disassemble the Converter / Charger. Attempting to do so may cause risk of electrical shock or fire.

6-2. Warranty

We guarantee this product against defects in materials and workmanship for a period of 24 months from the date of purchase. In case you need to repair or replace any defective power inverters, please contact COTEK local distributor.

This warranty will be considered void if the unit has been misused, altered, or accidentally damaged. COTEK is not liable for anything that occurs as a result of the user's fault.