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PRODUCT SPECIFICATION

CRT-310 SERIES MOTOR CARD READER



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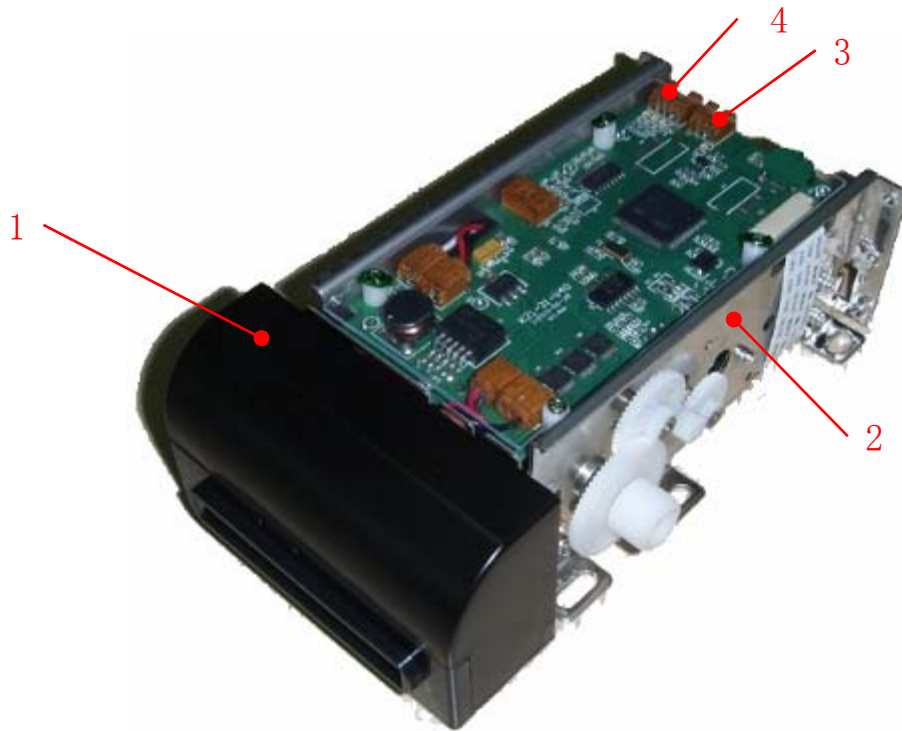
Revisions

Version	Date	Content
4.0-RS232	2010.07.09	Initial release

CREATOR


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CRT-310 Basic Structure




- 1 – Bezel component (optional)
- 2 - Card transportation mechanism and read/write operation components
- 3 – RS232 interface
- 4 – 4 PIN power supply interface

Warning: Power supply above 15V DC will damage the reader!

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1. General View


CRT-301-(R04) is motorized card encoder which support Magnetic/IC/RF card operation.

Main Features:

- 3 in 1: IC card and RF card read/write; magnetic card read only.
- Automatic card insertion/ejection
- Diversified card transportation methods
- Bezel options: Mechanic and electric shutter for choose
- Accessories options: Power off protect board, DC 24V to 12V transfer board, PSAM board;
- Fault tolerance
- Long lifetime: Over 500,000 cycles lifetime for most of component;
- Customized service (e.g.: Customized reader which is compliance to PC/SC standard and able to operate CPU card)


2. Functions

- Support IC card & RF card read/write and magnetic card read only function. About card specification please refer to according ISO card standard
- Automatic card in, out and capture control function
- Agile card transportation methods
- RS232 interface
- Fault tolerance: Abnormal cards or power off disposal


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3. Technical Information

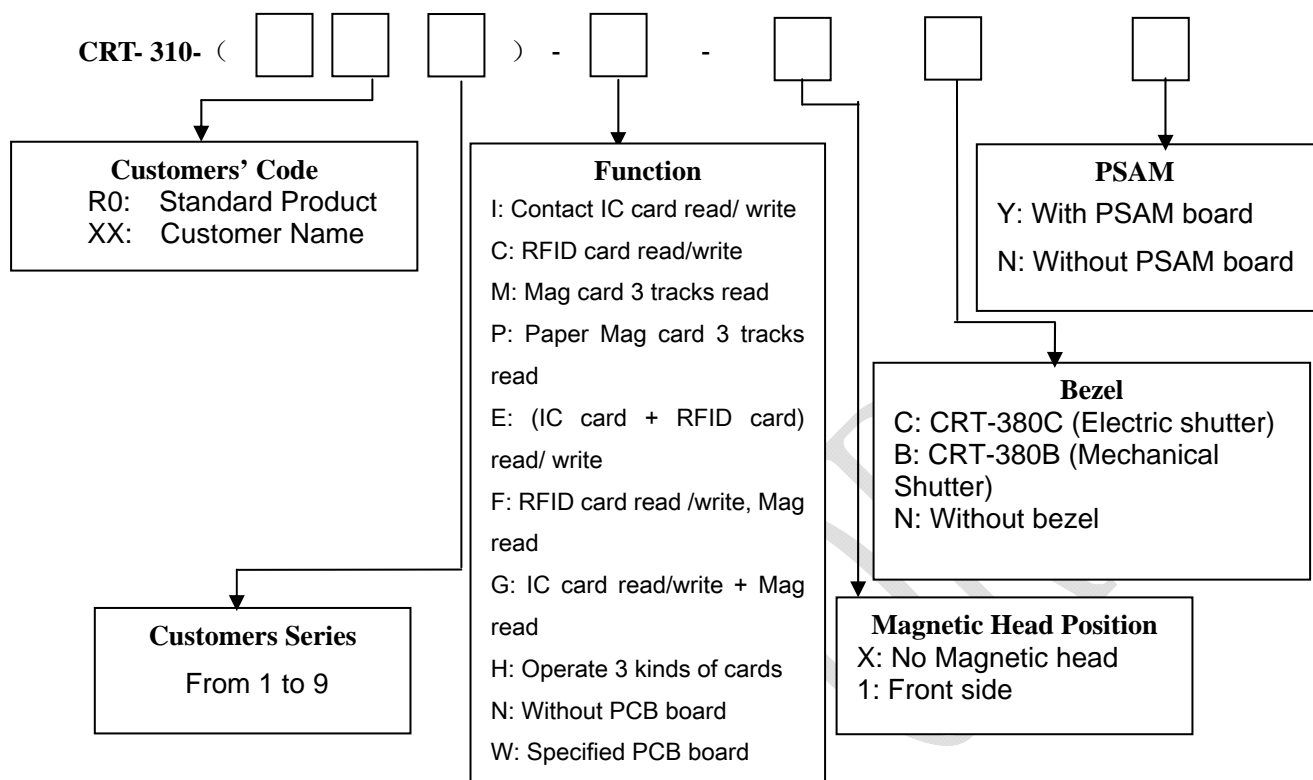
- **Voltage**
DC 12V±5%
- **Power consumption**
Static current: 110mA
Peak current: <1.5A
- **Card transportation speed**
Approx 70cm/s
- **Communication interface**
RS232
- **Card dimension specification**
Width: 53.92~54.18 mm Length: 85.47~85.90 mm
Thickness: 0.4mm~1.2mm (Ex-works default setting 0.8mm)
- **N.W.**
410g Approx
- **Dimension**
Please refer to section 'Dimension Drawing'.
- **Card reading capability**
Support read of Q card (TC-JS, TC-JT, JC-JI, TC-A) and 30% magnetic card with weak magnetism.
- **Reliability**
A. Vibration: No defect in all items of the characteristics under normal condition after exposed 15min. each on X, Y and Z directions of 2mm amplitude, from 10 to 50Hz/min vibrate.
B. Shock: No defect in all items of the characteristics under normal condition after shock one time on X, Y and Z directions of 294M/S², 11ms peak acceleration shock.
- **Life time**
Transportation mechanism: 500,000 cycles Min. (Card moved from the front side to the rear side, then from the rear side to the front side of the reader)
Magnetic head: 1,000,000 pass Min.
IC card contact carrier and contact: 300,000 time Min.

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- **Power off mode**
Power off mode will be launched when power supply voltage is lower than 10V for a period that is longer than 50 ms.
- **Failure rate**
Magnetic card: < 1/1,000 (15~25°C, 35~60%RH, perfect and standard card)
IC card: < 1/1,000, (15~25°C, 35~60%RH, perfect and standard card)
RFID card: < 1/1,000, (15~25°C, 35~60%RH, perfect standard card)
- **Abnormal card description**
Allowance of card warp: 2mm max.
- **MTBF**
> 10 X10⁴ hrs (Electronic components only)
Note: 250 times/day, 25 days/month, 300 hrs/month
- **Environment**
Operation: 0°C-50°C, 0~90% RH (non-condensing)
Storage: -25°C~80°C, 0~95% RH (non-condensing ,dried before usage)
Normal environment: 15~25°C, 35~60%RH
- **Online download**
Support IAP online download
- **RoHS**
RoHS standard compliant
- **IC card standard**
ISO-7816 and EMV standard certified
e.g. (AT24C01, 24C02, 24C256, SLE4447, SLE4428, CPU T=0/T=1)
- **RF card support type**
ISO14443-3 compliant (TYPE A: e.g. S50,S70,UL etc)
Compliance to ISO14443-4 (TYPE A CPU, TYPE B CPU e.g. Mifare plus, Mifare DesFire etc)
- **Magnetic card support type**
Physical characteristics: ISO7810 and 7811 standard compliant
Card dimensions: ISO ISO7810ID-1- type card compliant
Embossing: ISO7811-1, -3 compliant
Recording format: ISO7811-2, -4, -5, -6 complaints

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4. Model NO. Specification and Accessories



Standard accessories:

Item	No.	Quantity	Note
4PIN power supply cable	L14-333-153	1	4PIN connector, length 1.5m (red and yellow wire each, 2 black wire)
USB cable	L10-001-103	1	mini USB, length 1.0M

Optional accessories:

DC24V/DC12V transfer board	CRT-301A
PSAM board (with 4 SAM slots)	CRT-303B


CRT-310 Bezel Options:

CRT-380C

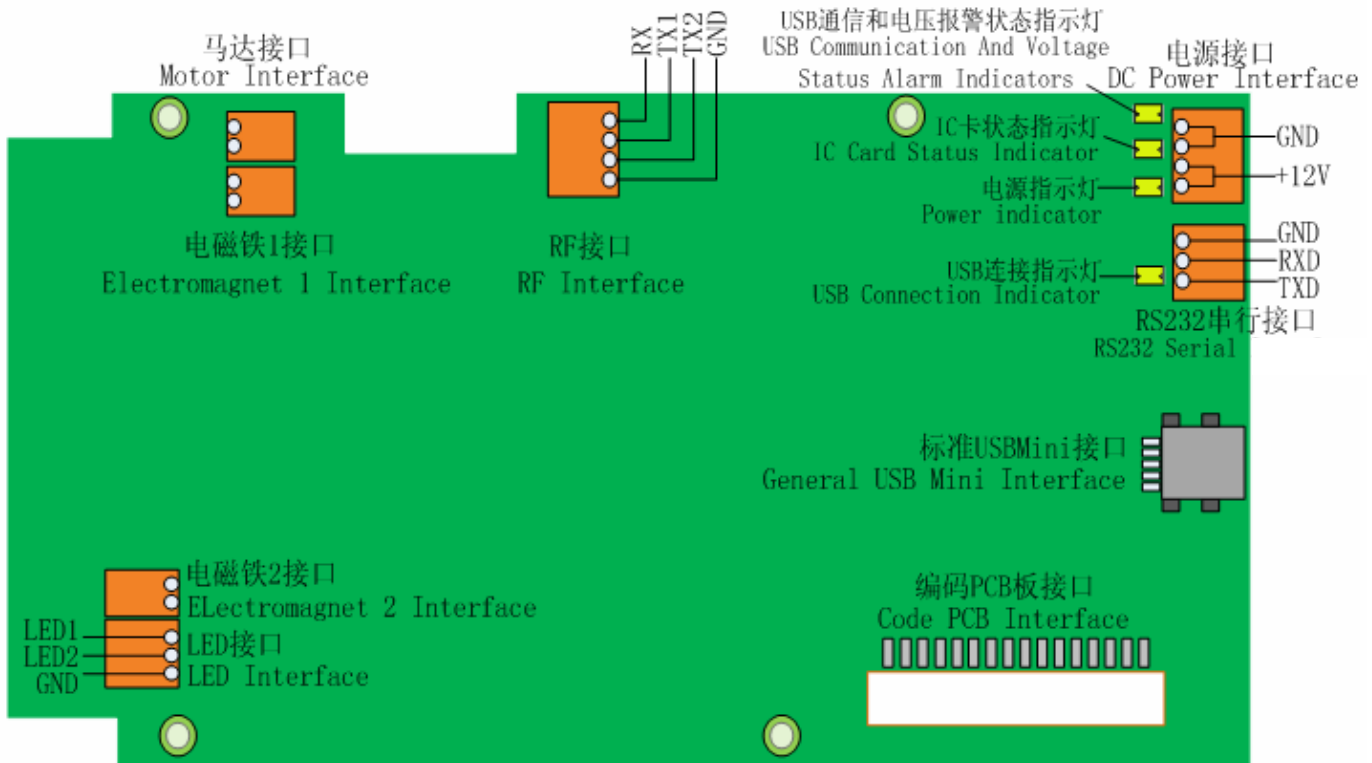


CRT-380B

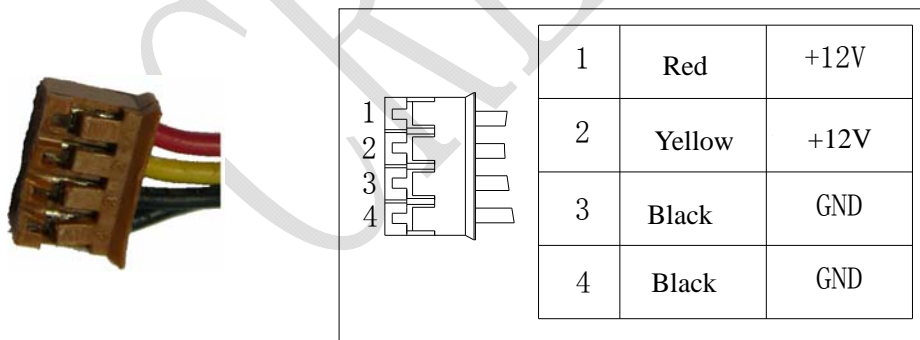


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5. Interface Specification and Dimension

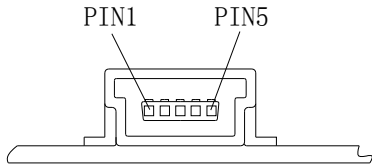


Pic1 CRT-310 interface diagram



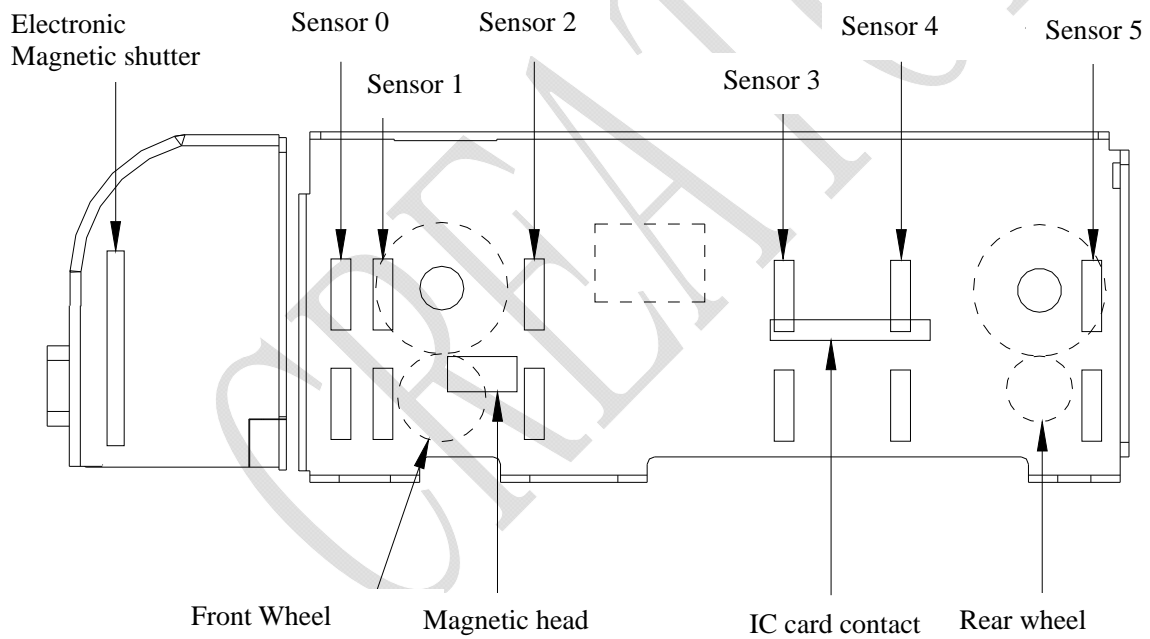
Pic2 4PIN power supply interface


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	Pin	Function	Color	Notes
	PIN1	V BUS	Red	Power +5V
	PIN2	Data -	White	Data -
	PIN3	Data +	Green	Data +
	PIN4	ID	A: GND B: Without GND	
	PIN5	GND	Black	GND

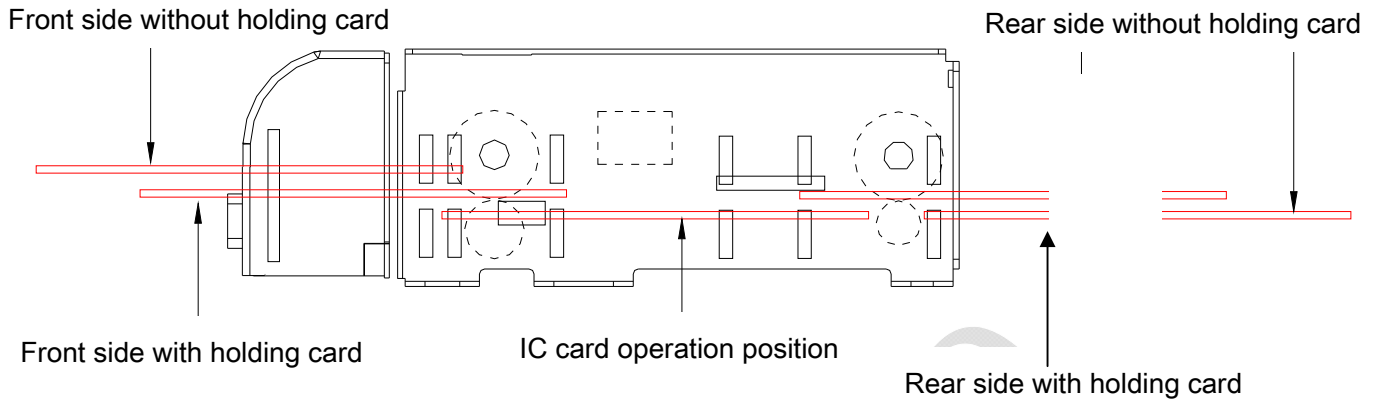
Pic3 MINI-USB interface

6. Sensor Position Diagram



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7. Card Stop Position Diagram



8. Working Modes

8.1 Card in mode:

- After the a card enters from the front side, reader will read the magnetic card automatically, and then move the card to assigned position.
- After a card enters from the rear side, reader will move it to the assigned position.

8.2 Magnetic card reading mode:

Reader will automatically execute magnetic card reading operation and then store the card data in the RAM. Data will be uploaded only when the reader receives the magnetic card reading command.

8.3 IC card reading mode:


IC card reading operation (including test IC card type operation) can not be executed unless IC card is moved to the IC card operation position.

8.4 RF card reading mode:

RF card can be operated when RF card has moved to IC card operation position.

8.5 Abnormal cards disposal:

- 1) Abnormal card - the dimension of the card is different from the ISO standard cards;
- 2) Abnormal card enters: When such card enters, the reader notice that the card is abnormal, so it will eject the card out automatically;
- 3) Abnormal card ejection: If there is an abnormal card in the reader, here are 2 ways to eject it out:
 - For the long abnormal cards -execute 'reset' command, reader will eject the card to the front.
 - For the short abnormal cards, no matter the card is at the gate or in the reader, execute the reset command ' eject the abnormal card from the rear side' while insert a normal card from the front side, reader will eject both normal and abnormal cards out of reader automatically.

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8.6 Abnormal Power off:

- 1) Power supply lead cable is a 4-wires cable (1 red, 1 yellow, 2 black) , 12V power connect to red/yellow, and GND connect to black. Yellow and black cable in the middle are for backup power supply which are connected to backup power, battery or capacitor.
- 2) With the backup power, Once the main power is off, reader will turn to power off protection mode. If there is a card inside, reader could set to eject the card. Reader could give a error feedback to host before main power is normal again. (Error –‘power off protection mode’)
- 3) If the main power is on again (higher than 11V), and reader needs reset to perform function properly.

8.7 Error disposal

Once error occurs such as card jam, reader needs to reset first.

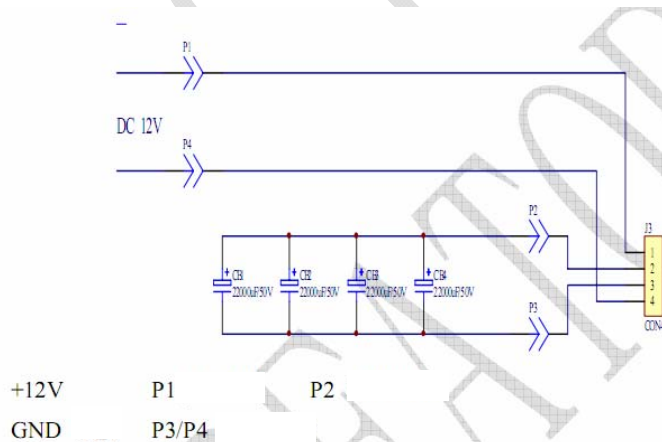
9. Power Supply Connection Instruction


2 type of connection method

- Method for single power supply (as the following diagram)



- Main power supply + backup power supply method (as following diagram)



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10. Maintenance

After a long time use, abrasion such as reader's transportation mechanism, contamination such as dust on sensor, magnetic head, IC card contact will severely influence the performance of reader, hence the reader must be maintained on a regular basis.

Detail maintenance instruction is shown as following:

- Use a cleaning card or a cloth with alcohol to clean reader's driving rolls when they are stained.
- Insert a cleaning card with alcohol and execute card movement commands to clean the sensors, magnetic head, magnetic shutter and press rolls.
- Periodic maintenance – Recommended to maintain the reader every 2,000 cycle operation.

Different component have different way of maintenance:

1) Sensor maintenance: Use the sensor status inquiry command to examine sensors' status. When the reader is running under normal condition, all 6 sensor groups status are 'OFF'; If any sensor group status is 'ON', it is possible to be covered by dust; You need to clean the sensor; if there is no change about the sensor status after cleaning, this sensor group might need replacement.

2) IC card contact maintenance: Insert an IC card with alcohol; execute 'auto test IC card type' command.

3) Driving roll maintenance: Insert a cleaning card with alcohol and execute card movement command.

4) Magnetic card maintenance: Insert a cleaning card with alcohol and execute card movement command.

11. Cautions


- Before maintenance the reader, make sure power supply is disconnected before maintenance to prevent damage to the reader.
- Connecting or disconnecting the serials cable when the reader is still power on can easily destroy reader's circuit, which should be prohibited.
- Keep the device staying away from oil, which will dramatically influence reader's performance,
- We recommend you to use DC12V/3A or above power supply.

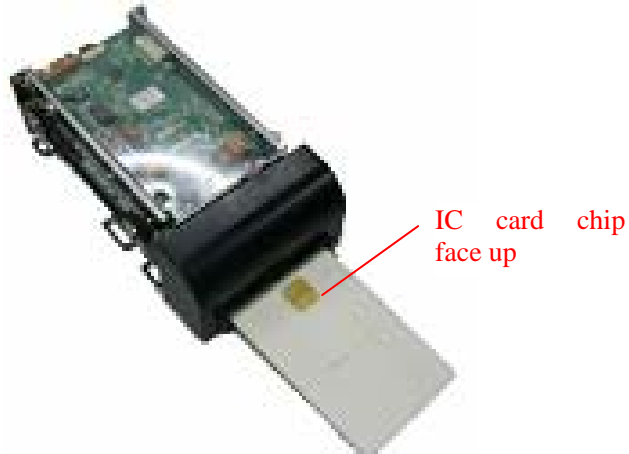
If the voltage could not meet the standard DV12±5%, it can lead to the card movement failure.

Caution! Power supply above 15V is 100% prohibited.

(DC24V/DC12C power transfer board CRT-310 A is available on customer's request.)

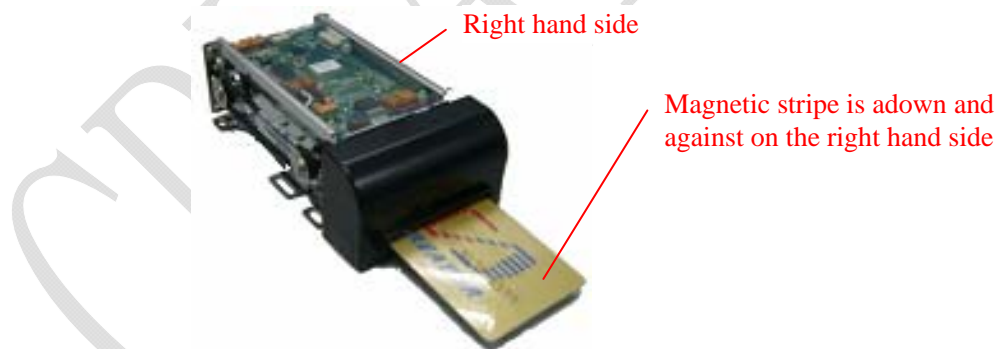
- IC card insertions direction: when cards is inserted from the front side of reader, IC chip should face up, the edge with IC chip should be inserted first as you can see in Pic 4.
- Always unplug the power cable first and then the communication cable

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Pic4 - IC card insertion direction

- Magnetic card insertion direction: If you insert a card from the front side of reader, magnetic strip should face down, the edge with magnetic strip should be against on the right hand side of the reader as Pic 5.




Pic5 Magnetic card insertion direction

- Electric shutter replacement

Note: Reader need to configure if you need to replace the shutter

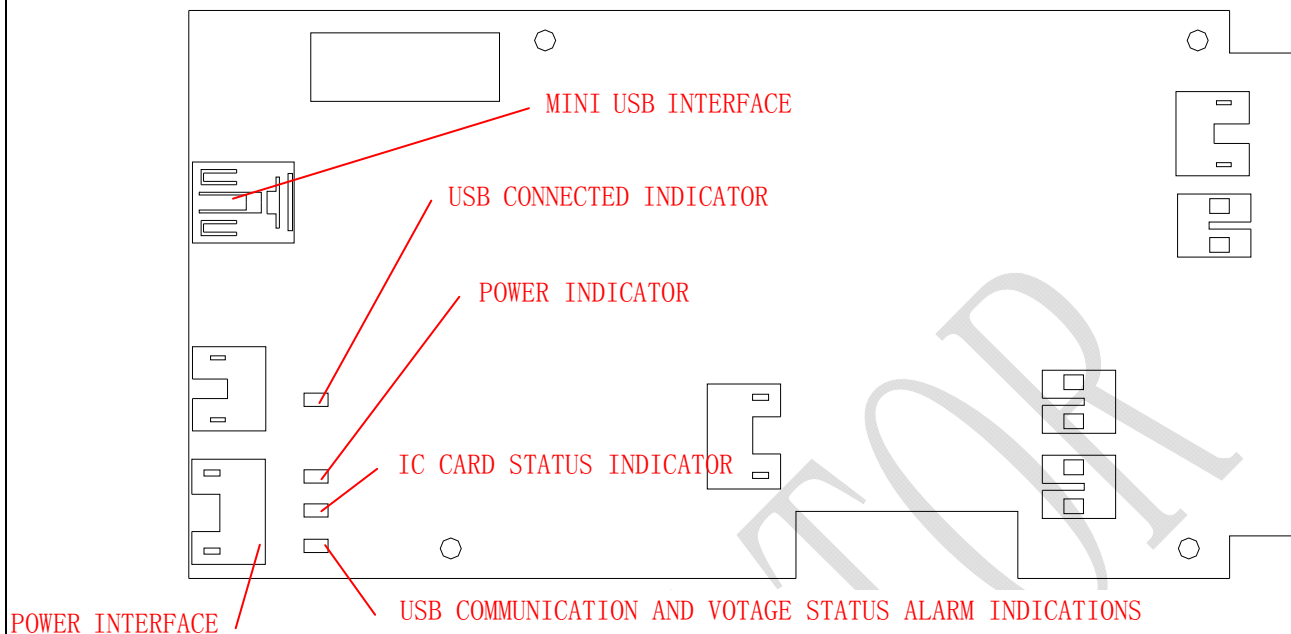
- LED indicator: (See the following)

- 1) When power supply is connected to the reader, POWER INDICATOR will be turned on.
- 2) When readers working under normal condition, USB COMMUNICATION AND VOTAGE STATUS ALARM INDICATIONS will keep blinking; When power supply is lower than 10.8 V or higher than 14.5V, the indicators will be light. Under this situation, reader will not normally response

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host commands but response 'under protection status' to all command. (Reader launches the 'power off protection mode' if power supply is lower than 10V, please refer to section 8.6)

3) When IC card is power on successfully, IC CARD STATUS INDICATOR will be light; the LED indication will be off when any operation refer to IC card is abnormal.




12. Relative Documents

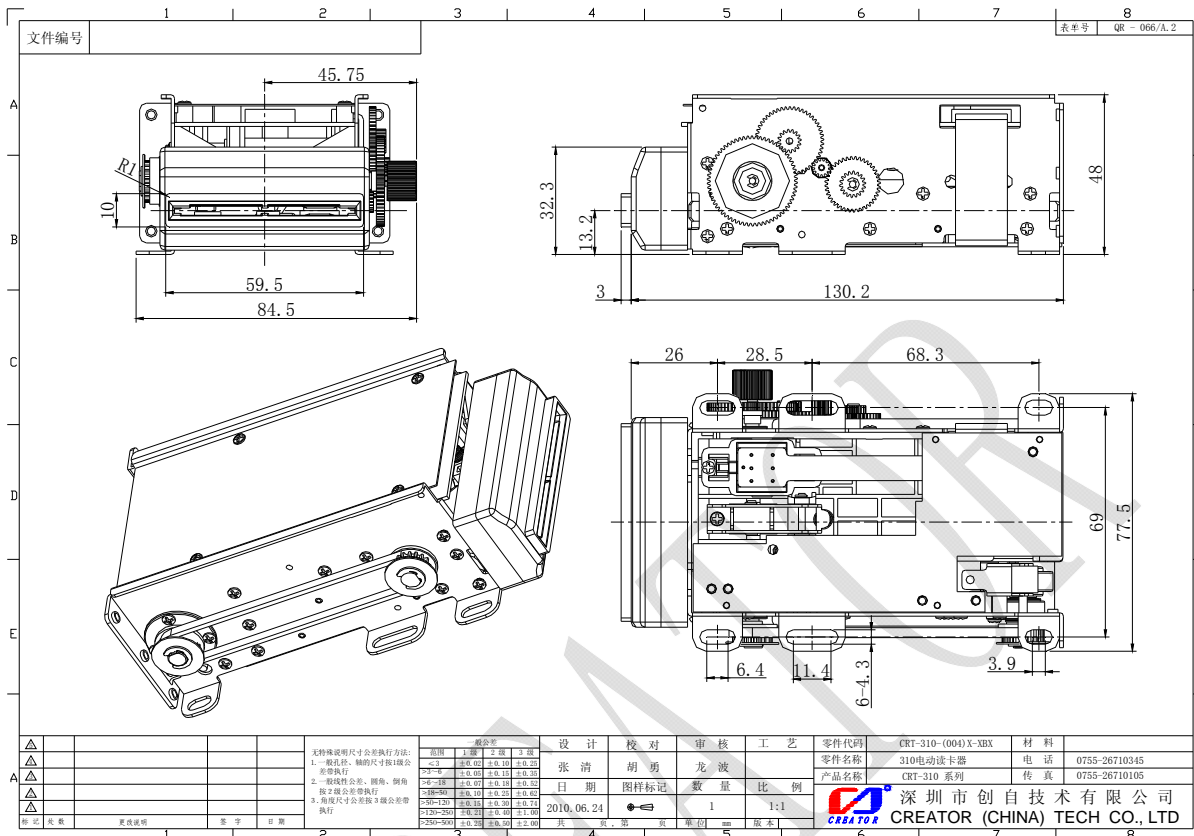
DLL: CRT-310-V3.0-DLL

DLL specification: CRT-310-V3.0 DLL Specification

Communication protocol: CRT-310-V3.0 communication protocol

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13. Dimension Drawing



Installation mechanism drawing for CRT-310 with CRT-380 B type bezel

