	SPECIFICATION	Model No.	CRT-350-N
		Date	2016/4/8
	Motor-driven Card Reader User Manual	Ver.	1.1
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Motor-driven Card Reader Model:CRT-350-N

USER MANUAL



CREATOR(CHINA) TECH CO., LTD.

Version Profile

Version	Completed	Descriptions
1.1	2016-04-02	Product Outline Modification
1.0	2015-11-10	The First Release

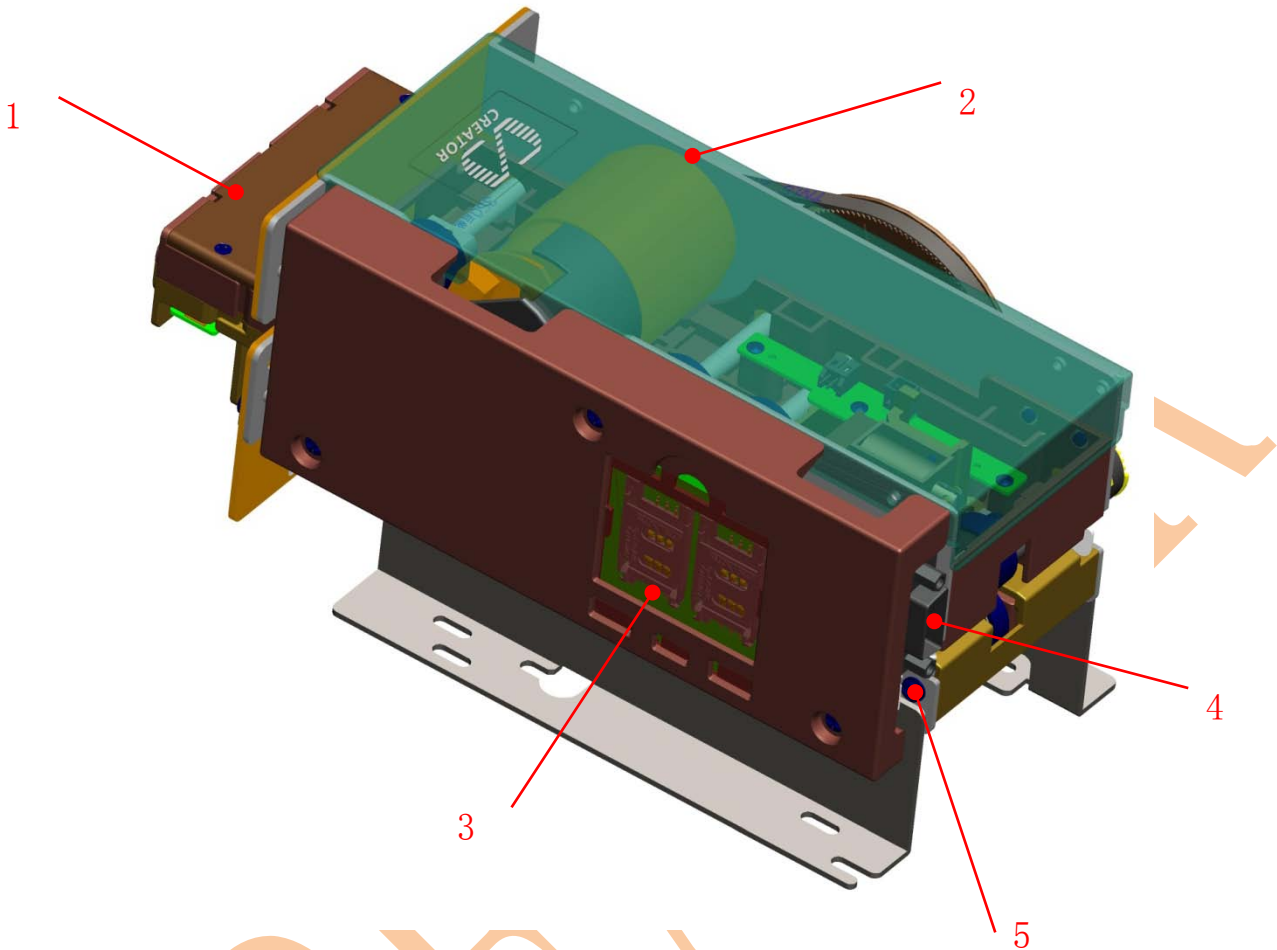
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CATALOG

1 Product Composition	错误! 未定义书签。
2 Product Model	错误! 未定义书签。
3 Product Feature.....	错误! 未定义书签。
4 Card Type Required	错误! 未定义书签。
5 Universal Specs.....	错误! 未定义书签。
6 Basic Function	错误! 未定义书签。
7 Adaptability	错误! 未定义书签。
8 Lifetime	错误! 未定义书签。
9 Reliability	错误! 未定义书签。
10 Power Failure Protection	错误! 未定义书签。
11 Warped Card Adaptability	错误! 未定义书签。
12 Communication Interface	错误! 未定义书签。
13 Product Outline.....	错误! 未定义书签。

1 Product Composition

CRT-350-N Basic composition as follows:



- 1— Electronic control shutter
- 2— Card reader main body
- 3— PSAM card slot
- 4— RS-232 communication interface
- 5— DC socket

Caution: Above of DC 30V is prohibited, which may damage the device.

2 Product Model

CRT-350-N

3 Product Principal Feature

The product is an ATM-oriented card reader supporting magnetic stripe card & contact IC card.

- 1) R/W magnetic stripe card & IC card with 2 PSAM card slots.
- 2) Electronic control shutter, unlock shutter via mag-stripe card detected or switch.
- 3) Auto capture from front, eject card from front, retrieve card from rear, jittery card front insertion
- 4) Communication protocol complied with the requirement of banking self-service kiosk.
- 5) CE & RoHS approved.
- 6) Power down protection.
- 7) EMV 4.2 Level 1 & PBOC 3.0 Level 1 certified.

3.1 Card Transmission Function

Auto capture from front, eject card from front, retrieve card from rear, jittery card front insertion

Motor drive

Rubber-wheel friction drive

3.2 R/W Mag-stripe Card

Support R/W 3 tracks below:

ISO/IEC Track1

ISO/IEC Track2

ISO/IEC Track3

R/W mag-stripe card, support 300oe LOCO or Hi-Co mag-stripe card.

3.3 Communication Function

RS-232 Asynchronous half duplex communication

Interface: DB-9pin male socket

3.4 Electronic Control Shutter

Electronic control safety shutter is in close status (Default).

Unlock the shutter via command

3.5 Pre-detect the Magnetic Signal

Support ISO/IEC Track2 or ISO/IEC Track3 Unlock the shutter when magnetic signal detected.

Support ISO/IEC Track1 or ISO/IEC Track2 or ISO/IEC Track3 Unlock the shutter when magnetic signal detected (Optional).

3.6 R/W Contact IC Card

Support R/W asynchronous or synchronous card

1). CPU Card (Asynchronous)

ISO/IEC 7816 -1,-2,-3 criteria

Table 1: CPU & IC Card Interface Specifications

IC Card Definition	Specifications	Descriptions
Vcc	DC+5V±0.25V (Max 50mA) DC+3V±0.25V (Max 20mA)	IC card power
Vpp	Open circuit	
Clk	3.58MHz(Default) 7.16MHz(Automatic Upgrade firmware)	Working clock is controlled by the firmware
Baud Rate	9600~115200bps	Baud rate is controlled by FD parameter.
Card Type	T=0; T=1	Support T=0/T=1
PPS		Support

2). Asynchronous IC Card: ISO/IEC 7816 -1,-2,-10 Criterion

Operating power: 5V/3V

Support SL4442/SLE4428 R/W CPU IC card

AT24C01/24C02/24C04/24C08/24C16/24C32/24C64 R/W Memory card

AT88SC102 R/W CPU card

3.7 R/W SAM

Support to operate SAM,2 SAM slots integrated (SAM1,SAM2)

Support to detect SAM status

Table 2: SAM card, IC card interface specs.

IC Card Definition	Specs.	Descriptions
Vcc	DC+5V±0.25V (Max 50mA) DC+3V±0.25V (Max 20mA)	IC card power
Vpp	Open circuit	
Clk	3.58MHz(default) 7.16MHz(Automatic upgrade firmware)	Working clock is controlled by firmware.
Baud Rate	9600~115200bps	Baud rate is controlled by FD parameter.
Card Type	T=0; T=1	Support T=0/T=1
PPS		Support

SAM Card Interface Definition

PSAM Card Definition	Descriptions
1	C1 VCC
2	C2 RST
3	C3 CLK
4	C5 GND
5	C6 VPP(open)
6	C7 I/O

3.8 Card Retrieve

Support retrieve card from rear.

Retrieve card with counter to read/write counting value.

3.9 Criterion

Comply with:

ISO/IEC 7811 for mag-stripe card

ISO/IEC 7816 for IC card

EMV2000 Ver 4.0 L1

PBOC 3.0 L1

3.10 Encryption

1) Support China commercial encryption algorithm (hardware integrated encrypted chip) to provide the sensitive data transmission with encrypted protection.

2) Support DES, 3DES, AES prevailing encryption algorithm to provide the sensitive data transmission with encrypted protection.

4 Card Type Requested

Length: 85.47~85.90 mm

Width: 53.92~54.18 mm

Thickness: 0.76±0.1 mm

4.1 Mag-stripe Card

- 1) Mag-stripe card type ISO/IEC 7810/ID-1, 7811-1/2/6 approved.
- 2) Magnetic force Support Lico / Hico
- 3) Read mag-stripe card
- 4) Write mag-stripe card
- 5) Mag-stripe card recording specs.

	ISO Track1	ISO Track2	ISO Track3
Record Density	210 bpi	75 bpi	210 bpi
Data Max. Capacity	76	37	104
Record Length	variable	variable	variable
Data Code	7 bit	5 bit	5 bit

4.2 IC Card

- 1) IC card criteria Comply with ISO/IEC 7816-1/2/3,
EMV 4.2 , PBOC 3.0
- 2) IC card type CPUcard T=0 ,T=1
SL4442,SLE4428
AT24C01,AT24C02....24C64
AT88SC102

4.3 SAM Card

- 1) SAM Card Criteria Comply with ISO/IEC 7810/ID000
ISO/IEC 7816-1/2/6,
- 2) IC Card Type SAM card T=0 ,T=1

4.4 Clean Card

Clean card for ATM or card reader is suggested to be used.

5 Universal Specifications

5.1 Product Outline

Please refer to Appendix enclosed herein for the size & outline photo of the product.

5.2 Product Weight

Around 1.3kg (Excluding accessories & package)

5.3 Power Specs.

- 1) Working Voltage: DC 24V $\pm 10\%$
- 2) Power Ripple: <200mV
- 3) Working Current (Excluding magnetic current):
 Idle Current: < 250mA
 Peak Current: <3000mA (Duration:50ms)
 Card-driving current only: <1200mA
- 4) Electromagnetic working current:
 Shutter electromagnetic current: <800mA
 IC card electromagnetic current: <600mA

5.4 Communication Method

RS-232

6 Basic Function

Type	Index	Descriptions
Transmission Speed	Standard speed 190mm/s $\pm 5\%$	Transmission speed when R/W card.
	Max. speed 300mm/s	
Transmission Time	Around 1.5s	From card-holding position to card corridor
Front card-out length	24mm ± 1 mm	Card-out length from front card-holding position
Pressure Rate	DC200V ,1min	Between PCBA GND & metal body
Insulating Resistor	DC200V > 10M Ω	Between PCBA GND & metal body

7 Adaptability

7.1 Working Temperature & Humidity

5~50°, 20% ~ 80%RH

7.2 Storage Temperature & humidity

-20°~ +70°, 20% ~ 80%RH

Remarks:

Under storage status, card reader doesn't works.

-20° Storage time <24hours

60° storage time <96hours

7.3 Vibration

Frequency scope:5~50Hz;

Acceleration:2m/s² (0.2G) ;

Vibration direction & time: X,Y,Z in 3 directions,15minutes/direction.

Amplitude:2mm;

All functions won't be effected after vibration.

7.4 Shock

Acceleration: 294m/s² (30G) , 11ms,

X,Y,Z in three directions,1time/direction.

All functions won't be effected after vibration.(No package condition tested.)

8 Lifetime

8.1 Card Reader Lifetime

Card transmission:1,000,000 times

(One time means card shuttle runs in the corridor of card reader.)

Principal Parts: R/W Magnetic Head 1,000,000 times

Pre-detecting magnetic head: 1,000,000 times

Drive motor: 1,500,000 times

Synchronous rubber belt: 1,000,000 times

Drive rubber wheel: 1,000,000 times

IC card contact: 300,000 times

9 Reliability

9.1 R/W Mag-stripe card Error Rate

Error Rate: < 1/1000

Test Condition: Standard mag-stripe card tested under normal temperature(15~25°C,35~60%RH)

Test Period: 1 working stroke/10s

Remarks:Working stroke represents R/W magnetic once. New card will be replaced when 2000 times conducted during non-stop test.

Max. mag-stripe card reading performance: support TC-JI 15% BB 30%SI Q card & TC-A 30%SI Q card.

9.2 R/W IC Card Error Rate

Error Rate: <1/1000

Test Condition: Suitable IC card under normal temperature (15~25°C,35~60%RH)

Test Period: 1 working period/10s

Remarks:

Working period means card will be fully driven to IC contact position and activated during power up.

Plus, new card will be replaced when it runs over 2000times during non-stop test.

9.3 MTBF

>200,000hours (Electronics only)

9.4 Self-diagnosis

1) Safety self-diagnosis

Self-diagnosis executed when power up or sending command or during working.

2) Sensor self-diagnosis

9.5 Maintenance Requirements

- 1) Optical sensor maintenance
- 2) Drive mechanism maintenance

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10 Power Failure Protection

The card will be back to users when backup capacitor connected during main power down.

10.1 Power Failure Definition

- 1) Power failure value: <20V
- 2) Power failure lasting time: >15ms

10.2 Power Failure Troubleshooting Process:

When power failure occurred during card reader's operation, the card inside will be driven to the front by resetting initialization command Pd Wv and the stored power of backup capacitor.

Remarks: During power failure, the card reader won't respond RS232 communication and DSR_PIN displays OFF status.

More specifications on Pd, Wv, pls refers to the communication protocol of CRT-350-NJ10.

10.3 Power Failure Recovery:

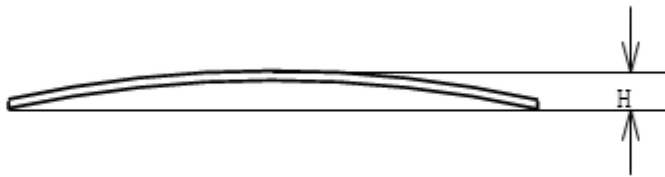
The card reader will start communication and DSR_PIN will move to ON status once the main power reaches 20V above.

10.4 Backup Capacitor Specs.:

- 1) Capacitor level: >0.33F (Withstand voltage >50V)
- 2) Capacitor output: 18~25V Constant 2A output \geq 2s

11 Warped Card Adaptability

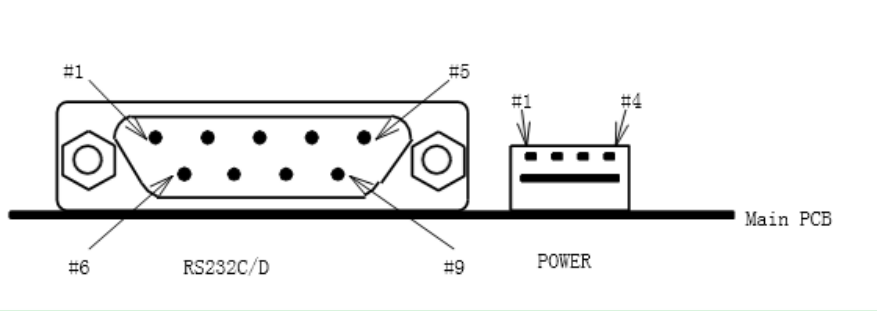
2mm Average warped card height <2mm



- 1) Warped Height <1.0mm free card move
- 2) Warped Height <2.5mm R/W mag-stripe card to be effected
- 3) Warped Height >4.0mm Card drive stuck

12 Electronic Interface

RS-232 Interface & Power Socket

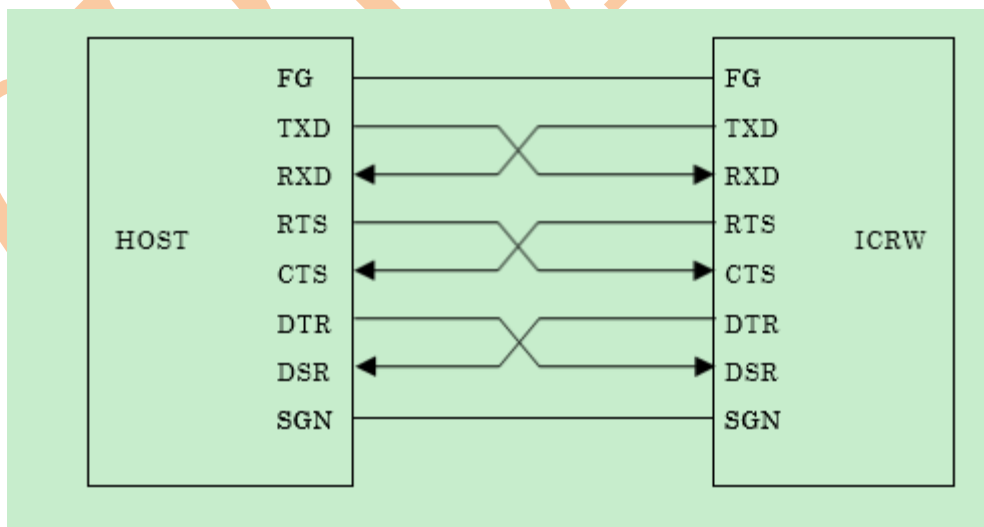


12.1 RS-232 Communication Interface

1) Card Reader's DB-9PIN Definition

Pin	Signal	Input/Output	Functions
1	NC	--	
2	RXD	I	Data receive
3	TXD	O	Data send
4	DTR	O	Data ready
5	SGN		Signal Ground
6	DSR	I	Data prepare
7	RTS	O	Request send
8	CTS	I	Clear send
9	NC	--	

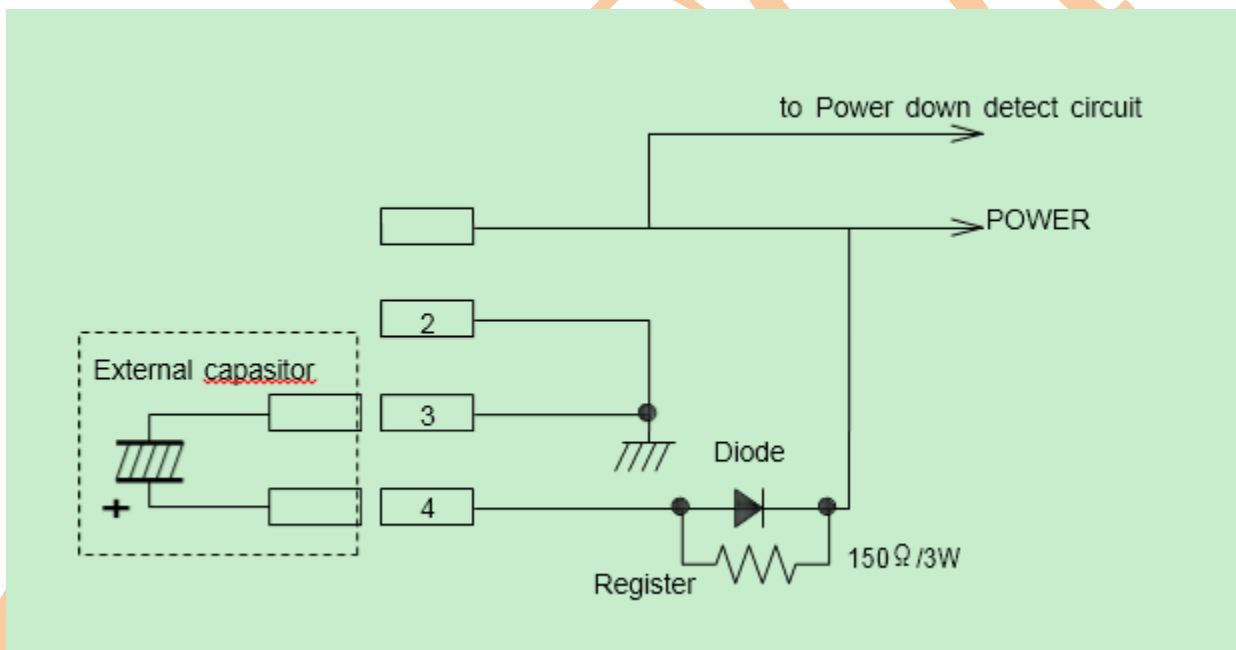
2) RS-232 Data cable wiring diagram



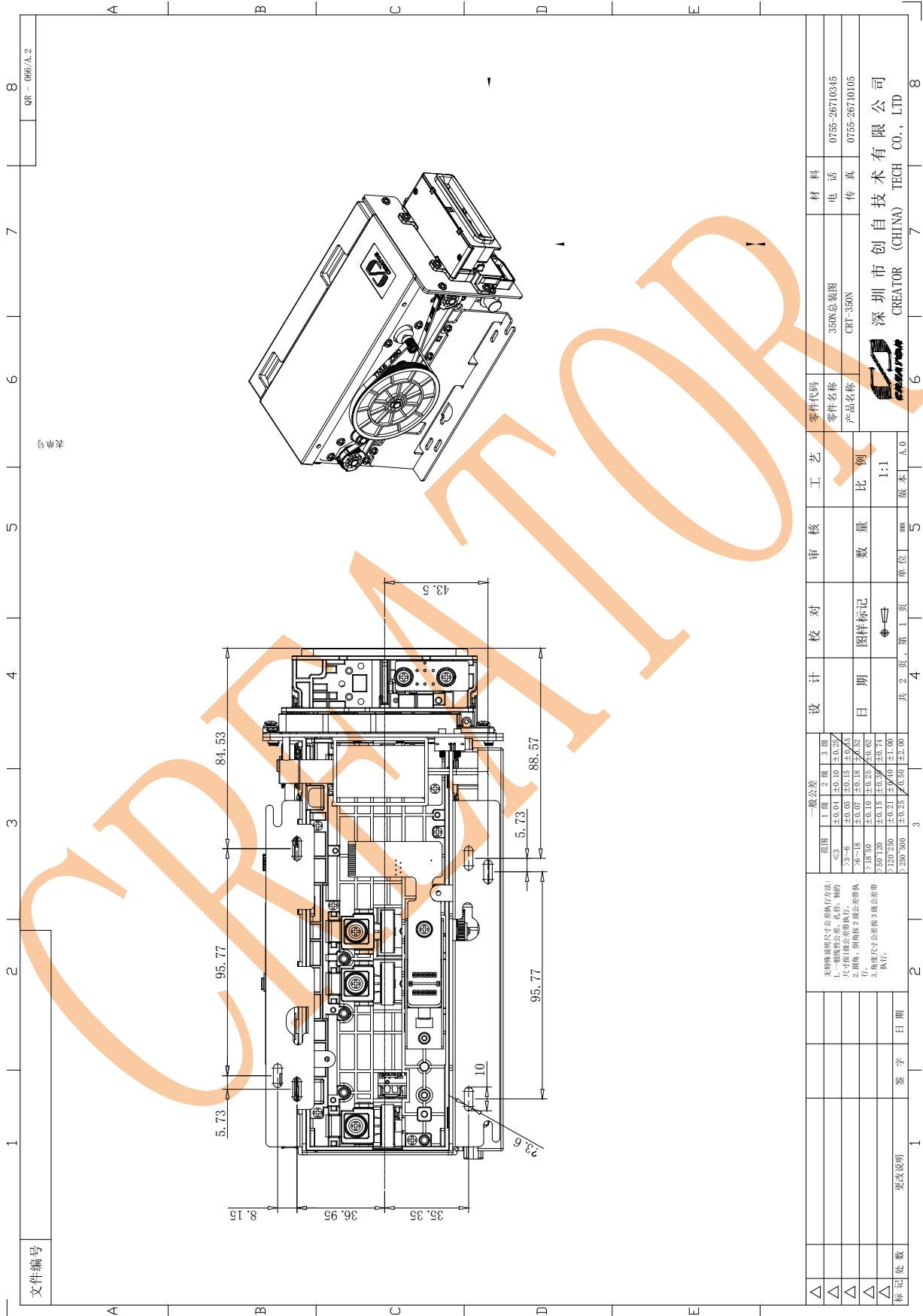
12.2 Power Socket

Pin	Signal	Function
1	+24V	24V main power input
2	PGND	Power Ground
3	PGND	Power Ground
4	+24VB	Backup power input

- Single power wiring
PIN1, PIN4 connect DC 24V positive, PIN2, PIN4 connect DC 24V Ground
- Backup capacitor wiring (Backup capacitor specs refers to 10.4)
PIN1 connects DC 24V positive, PIN2 connect DC 24V Ground
PIN4 connect backup capacitor positive, PIN3 connect backup capacitor negative



13 Product Outline



一般公差			
范围	1级	2级	3级
≤3	±0.04	±0.10	±0.25
>3~6	±0.05	±0.15	±0.45
>6~18	±0.07	±0.18	±0.52
>18~50	±0.10	±0.25	±0.62
>50~120	±0.15	±0.30	±0.74
>120~250	±0.21	±0.40	±1.00
>250~500	±0.25	±0.50	±1.50

本图例说明尺寸公差执行方法:
 1. 一般线性公差, 孔位、制的大于按级公差带执行。
 2. 圆筒、倒角按 2 级公差带执行。
 3. 角度尺寸公差按 3 级公差带执行。

设计	校对	审核	工艺	材料
日期	图样标记	数量	比例	1:1
共 2 页, 第 1 页	单位 mm	版本 A.0	零件名称	350N总装图
			零件代码	CRT-350N
			电话	0755-26710345
			传真	0755-26710105
			深圳市创自技术有限公司	
			CREATOR (CHINA) TECH CO., LTD	

