

# Smartpower card dispenser instructions



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### 1. Main characteristics

- 1 Industrial design, adjust to high temperature and other bad environments;
- 2 Simulated manpower friction card issuers , better adaptability to various deformed cards;

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- 3 Watchdog of hardware and embedded operating system to ensure properly running;
  - 4 Pre-dispense function accelerate dispensing speed;
  - 5 Connectable with the vehicle detector to achieve card issuing and "one car, one card";
  - 6 Automatic buzzer alarm when no cards, fewer cards or failure.
  - 7 Provide both RS232 and I/O voltage control interface;
  - 8 Automatic buzzer alarm when errors occur, automatic reset after 100 seconds alarm;
  - 9 Capacity of card stacker is more than 40pcs, automatic buzzer alarm when the withdrawing stacker is full;
  - 10 Slide card stacker with a capacity of 40pc;
  - 11 Adjustable of card stacker with a capacity of 120pc each;
  - 12 Automatic withdrawal to prevent card lost (only for TCD800F series
  - 13 Slide design to make installation and disassembling easier;
  - 14 Molded production to ensure high consistency of precision and quality.

## 2. Main technical data

- ✓ Operating voltage: 20VCD (max current 2A, static current 0.1A)
- ✓ Operating temperature: -20°C to 85°C
- ✓ Operating humidity: 30-90% (comparatively)
- ✓ Use condition: install in bin
- ✓ Card available: width: +/-0.5mm
- ✓ Length: 85+/-0.5mm
- ✓ Thickness: 0.3-2.5mm (adjustable)
- ✓ Card material: Paper or Polyester card
- ✓ Net weight of card dispenser: 2.0kg (including the briquette)
- ✓ Time of issuing: max0.5s
- ✓ Capacity of stacker: 150pcs (0.8mm), 100pcs available when an extra stacker is needed

## 3. Control interface

This dispenser provides both I/O and RS232 interface of power level. PWL control interface is led by standard 12pin (2.54mm) socket CN3of the control board, RS232 control interface is led by the standard 3pin (2.54mm) socket CN7.

### 3.1. TTL control interface (CN3)

Pins	Signal Definiens	Signal Description
1	-24V	Operating Voltage cathode
2	+24 VDC	Operating Voltage anode
3	0 V(input and output )	Link with Operating Voltage anode
4	Pay out (out card signal)	Input, Low-Level(min 200mS) effective
5	Reset( reset input)	Input, Low-Level(min 200mS) effective
6	OV	Link with Operating Voltage cathode
7	VD( loop detector input)	Input, Low-Level (min 200mS) effective. use as Enable Signal
8	Callback( back card)	Input, Low-Level (min 200mS) effective
9	Out ok( card on or get card signal )	Output Low-Level effective
10	Lower( less card)	Output Low-Level effective
11	Error( pre-dispense card error or block card)	Output Low-Level effective
12	Empty ( card box empty or collecting box empty)	Output Low-Level effective

### 3.2. RS232 control interface (CN7)

Pins	Signal Definiens	Signal Description
1	GND	Ground
2	RXD	RS232 receiver port
3	TXD	RS232 send port

### 3.3 Control interface

#### 1 Reset and automatic withdraw

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When the card dispenser reset, first sounds "toot, toot" for self-inspection. If there is card jam, the card will be automatically withdrawn to card stores; If there is no problem, the motor will prepare to issue the card. The following situations will make the machine reset:

- a) When the machine is electrified;
- b) The card dispenser received Reset signal or press the Reset button of control panel.
- c) Pre- dispenser (failure) wrong over 100 seconds.
- d) When card jam last over 100s, the machine will withdraw the card and reset.

Card withdrawing is to prevent card lost and reduce losses of the property.

In the following situations, the card dispenser will automatically withdraw:

- a) when reset if the cards jammed
- b) When the cards sent to the reader over 100s, cards will be withdrawn.
- c) If the card hasn't been taken for 100s, cards will be withdrawn.
- d) When the machine received the callback signal, cards will be withdraw

## **2 Errors and solutions**

Errors occur in the following situation:

- ① When Pre-dispense fail (buzzer ring "toot, toot, toot" for three short acoustic);
- ② When cards jammed (buzzer ring for two short acoustic);
- ③ When cards stacker is full (buzzer ring for four short acoustic).

When pre-dispense failed, the machine resets after 100s of the error signal; when card jammed or the stacker is full, the error signal will disappear by taking the card away; if the jammed card is not taken in time, the machine will reset and clean error signal. If the error signal still exists after reset, you should be awareness of other faults such as full stacker.

## **3 OUTOK output mode setting**

There are two ways of OUTOK signal output which is set by the DIP2 of CN9 .When DIP2 is ON, OUTOK means cards to be taken, that is, when the card was taken, the low-level output of TTL is300 mS pulse; When DIP2 is OFF, OUTOK means cards ready, the cards were sent to the card reader position or taken location.

## **4 Dispense mode setting**

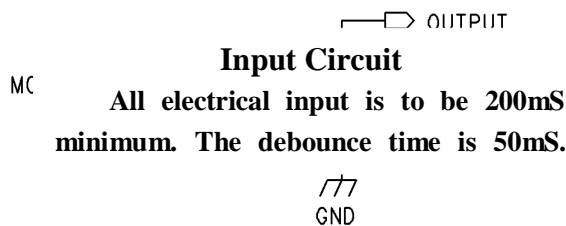
Card dispenser has two dispense modes: Pre-reading card dispense and direct dispense. This is controlled by the DIP1of CN9. The following assumptions (DIP2 = OFF) is to illustrate

this two modes.

**Pre-reading dispense:** DIP1 = ON, Payout signal and VD signal is effective, the card dispenser will send cards to the reader antenna location, then drive down OUTOK signal to wait for customers reading card. At this time, if the received callback signal and OUTOK will be high signal; If again received Payout signal, OUTOK cards will be to high signal and sent to card mouth, and then again driving OUTOK signal down until the card was taken before OUTOK signal turns high.

**Direct dispense:** DIP1 = OFF, DIP2 = OFF, Payout signal and VD signal is effective, the card will be sent directly to the card mouth, while driving down OUTOK signal until the card was taken before OUTOK signal turns high.

### 3.4 Input and Output Circuit



**Input Circuit**  
All electrical input is to be 200mS minimum. The debounce time is 50mS.

**Output Circuit**  
Outputs to the host machine are all open collector transistors, maximum voltage 30V @100mA. Out put at least keep 200MS

**Output Circuit**  
Outputs to the host machine are all open collector transistors, maximum voltage 30V @50mA.

### 3.5 Protocol of RS232

The protocol between card dispenser and the main frame is in 8 asynchronous data transfer format.

#### 3.5.1 Asynchronous data transfer format.

Code: NRZ	baud rate: 9600	duplex: semi duplex
Data bit: 8	parity bit: no	stop bit: 1

#### 3.5.2 Order of main frame format

**Order frame format:** <STX>□ □<ETX> <BCC>

<STX> : 02 (HEX) ,order frame start

□ □ : operate order( two bites of ASCII)

<ETX> : 03 (HEX), order frame over  
 <BCC> : <STX>@□@□@ <ETX>, check code

### 3.5.3. Operation order

The main frame sends the following orders to the dispenser and operates the relevant orders:

orders	ASCII	Description
Dispense the card	DC	The machine is ready and issue card after receiving the signal
capture	CP	When the card is at the position of mouth, this order is to be operated
Request flag	RF	Turn back to the real-time information of the machine
reset	st	Operate reset order

### 3.5.4. Examples of the order

The following codes are in hex:

Order of issue: 0x02, 0x44, 0x43, 0x03, 0x06

Order of capture: 0x02, 0x43, 0x50, 0x03, 0x12

Order of request flag: 0x02, 0x52, 0x46, 0x03, 0x15

Order of reset: 0x02, 0x53, 0x54, 0x03, 0x06

When one frame of order is sent, the machine will back to ACK (0x06) or NAK (0x15). If ACK (0x06) is received, the main frame send ENQ (0x05), the card dispenser then operate the order received.

### 3.5.5-card issuers response command

#### 3.5.5.1 response command frame format

Frame command response: <STX> □ □ □ <ETX> <BCC>

<STX>: 0 2 (HEX), the command to start the frame

<ETX>: 0 3 (HEX), orders the end of the frame

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□ □ □: issuing a state-code information, ASCII code format

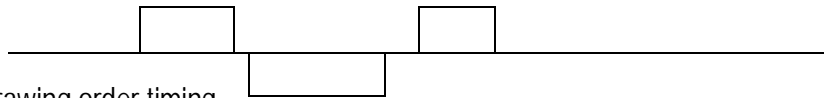
<BCC>: <STX> @ 'S' @ 'F' @ □ @ □ @ □ @ <ETX>, order or check different pieces of code

Notes: @ for the XOR operator.

### 3.5.6 The timing of communications between the host and the slave

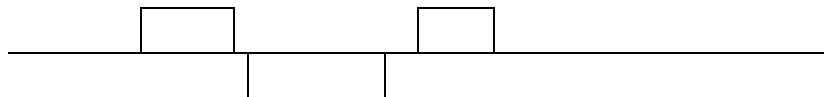
#### 3.5.6.1 Issuing order timing

Host: "DC" ENQ  
Card dispenser: ACK/NAK <operation>



#### 3.5.6.2 Withdrawing order timing

host: "CP" ENQ  
card dispenser: ACK/NAK <operation>



#### 3.5.6.3 Inquiry order timing

Host: "RF" ENQ  
Card dispenser: ACK/NAK "SF□□□"

#### 3.5.6.4 Reset order timing

Host: "ST" ENQ  
Card dispenser: ACK/NAK <reset>

Note: ACK:06(HEX), NAK:15(HEX), ENQ:05(HEX).

## 4. Dispenser working states indication

The red LED of the control board in card dispenser indicates Voltage states. And the buzzer output shows all kinds states of the card dispenser.



NO.	Card dispenser Working States	Buzzer Output	Port Output
1	Reset	Consecutive ring "toot, toot"	no
2	Lack card (can dispense card)	Interval ring "toot"	Lower
3	Jam card(can't dispense card)	Interval ring "toot, toot"	Error
4	overtime error(can't dispense card)	Interval ring "toot, toot, toot"	
5	warehouse full (can dispense card)	Interval ring "toot, toot, toot, toot"	
6	Empty	Interval ring "toot, toot, toot, toot, toot"	Lower

## 5. Operation and Maintenance

### 5.1 installation

The card dispenser is designed to be incorporated within a suitable cabinet mounted.

First make two holes with diameter of 3mm in the ticket box according to the holes on the soleplate, then fix the soleplate with bolt, nut and gasket to the ticket box, finally put the machine into the soleplate and fix it. The installation is done. Put the signal cables into the socket of the machine, turn the power on and check the machine.

### 5.2 card Loading

In order to fill the cartridge with cards, the following steps must be followed:

- 1) Remove power from the unit.
- 2) Remove the card weight form the cartridge.
- 3) Place a small amount (3cards) over the empty micro-switch in the unit, insuring that the cards are situated firmly on the surface under the card adjust plate.
- 4) Place the remainder of the cards on top of the 3cards that were initially placed in the unit.
- 5) Replace the card weight on top of the cards in the unit.
- 6) Restore power to the unit.

### 5.3 cleaning the jams

Should a card jam ever occur, you can clear it by the following precautions:

- 1) Remove power from the unit.

- 2) Remove all loose cards from the unit.
- 3) When removing the jammed card, the card adjuster plate may need to be loosened. Do not use excessive force. Do not pry the plastic parts with any tools.
- 4) If necessary, re-adjust for card thickness and load tower with cards.

## 5.4 card thickness adjustment

In order to meet different needs of the thickness, card thickness on the machine is adjustable. Please follow the step to adjust the thickness:

The key is to adjust the space between the upper and the lower wheels. The principle is to ensure the space is 1.5 times thick of the card, and keep even.

Steps as following:

- a) Loosen the tensioner
- b) Wring the bolts on the top of the bracket out about 1-2mm
- c) Loosen the four bolts on both right and left side of the bracket
- d) Select the right card and insert into the upper and lower wheels
- e) Adjust the two sides of the bracket on the top to keep the wheels appressed with the card
- f) Tight the four bolts on both side of the bracket
- g) Wring the two bolts on the top of the bracket in
- h) Take the card out of the wheels
- i) Tight the tensioner

Thickness of the card changes, please re-adjust the machine.

### How to select the thickness

Thickness of the card	2.2	108	1.5	1.2	1.0	0.8	0.6
Thickness of the plug guage	2.8~3	2.3~2	1.8~2	1.5~1	1.4~1	1.1~1	0.8~
	.4	.8	.2	.8	.6	.3	1.0
Minimum for used cards and maximum for new cards.							

## 6. Safety and Maintenance

- 1) Control circuitry must be arranged to disconnect power to the mechanism when the host

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machine/cabinet is opened for servicing.

- 2) Overcorrect protection to the mechanism must be provided by the host machine.
- 3) Servicing and maintenance staff must be adequately trained and aware of the hazards presented by the rollers and drive belts. The motor drives through a reduction gear creating sufficient torque to trap fingers, hair and clothing of the unwary.
- 4) Never hold the dispenser by the cartridge alone as it could become detached, allowing the mechanism to fall causing possible injury or damage.
- 5) Avoid the inclusion of foreign objects such as tape, rubber bands and wire as these could cause the machine to jam.
- 6) Keep mechanism clear of contaminants. Oily adhesive substances will seriously affect the performance of the dispenser.
- 7) Ensure the dispenser is correctly calibrated for the cards to be dispensed as persistent dispensing problems lead to accelerated wear on the components.

Calibration details are recorded on the side of the dispenser as a digital reference (in fractions of a millimeter) to denote the card thickness. Recalibration should not be carried out by untrained personnel.

8) Ensure electrical interface connections are in accordance with values detailed in section 1.6 as excess voltage or current will damage the motor or control circuitry.

9) Routine maintenance should be undertaken every 2 months or 10,000 operations whichever is the sooner:

- Wipe the surface of the clutch roller (at the base of the card stack) with an alcohol-impregnated cloth or pad.
- Clean dust from the optic-sensor (mounted at the front of the mechanism below the payout point) with a small brush or suitable aerosol duster.
- Check the drive belts for wear and adjustment (1-2mm deflection when light pressure is applied to the longest edge).
- Check for accurate dispensing as incorrect adjustment for card thickness can cause accelerated wear on the mechanism.