

201D4/8

201D4/8 MULTI-DOOR
CONTROLLER SYSTEM

USER MANUAL

201D4/8 Series

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1. Multi-door Access Controller 201D4/8

1.1 General

201D4/8 multi -door access controller features powerful function, stable performance and easy operation. It is suitable for property administration in intelligence residential district. Apart from having all the functions of single door access controller, it can support multiple inputs and outputs. Its parameter setting is completed via supporting computer software, thus, facilitating users' operation and management.

1.2 Performance Parameter

- ※ Dimension: (L)260mm×(W)170mm×(H) 55mm
- ※ Power : DC7~35V, power consumption: ≤1W;
- ※ Power supply: build-in switch power input AC 220V /50Hz
- ※ Working environment: temperature -20℃~60℃, humidity: 5%~90%; 100%damp-proof treatment
- ※ Communication mode: standard RS485 communication, with data-lost prevention agreement and lightning prevention for both sides.
- ※ Amount of users: 9214
- ※ Record capacity: keeping18,724 pieces of latest records.
- ※ The time for keeping data of external power failure: 1 year
- ※ The number of subcontroller controlled: 4/8 each
- ※ Supporting software with powerful function

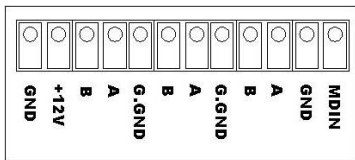
1.3 Connection Instruction



Picture 3.1: Product appearance figure

1.3.1 Connection Definition

- (1) 201D4/8 multi-door access controller is embedded in iron box.
All outward wires are led in through the two holes in the front side of metal box. The connection is shown as follows:



- (2) The Connection Definition of 12 Terminals.

Connector of 12 pin wires		
Wire 1	GND	Power input
Wire2	+12V	
Wire3	B-	Connecting to computer (RS485)

Wire4	A+	Connecting to multi-door (RS485)
Wire5	G.GND	
Wire 6	B-	
Wire 7	A+	
Wire 8	G.GND	
Wire 9	B-	Fire Alarm Input
Wire10	A+	
Wire11	GND	
wire12	MDIN	

The switch of first 3 digits in address code

Switch No.	Position	Value
1	ON	1
	OFF	0
2	ON	2
	OFF	0
3	ON	4
	OFF	0

Choosing RS485 communication physical address by pressing last 8 digits toggle switch

Switch No.	Position	Value	set ID as "55"
1	ON	1	ON
	OFF	0	
2	ON	2	ON
	OFF	0	
3	ON	4	ON
	OFF	0	
4	ON	8	OFF

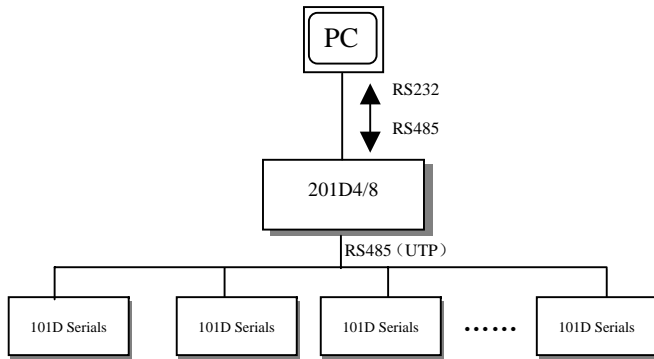
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	OFF	0	
5	ON	16	ON
	OFF	0	
6	ON	32	ON
	OFF	0	
7	ON	64	OFF
	OFF	0	
8	ON	128	OFF
	OFF	0	

8 digits toggle switch stands for 8 binary numbers. If they are converted into decimal number, you will get communication address of this computer.

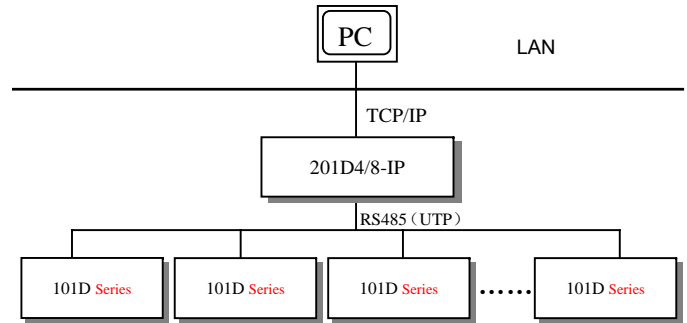
1.3.2 Connecting Master Controller 201D4/8 with Sub Controller:

RS485 Communication method diagram



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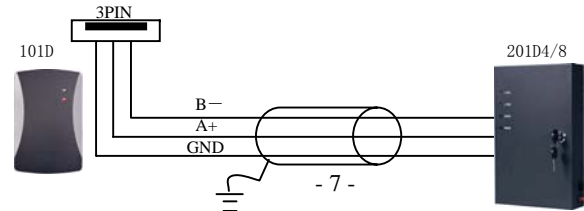
TCP/IP Communication method diagram



201D4/8 can be connected with 101D subcontroller. The way of connecting subcontroller with master controller and the functions of subcontroller will be described in detail in next section.

Note: The multi-door controller can be connected with subcontrollers via RS485. To ensure sharing reference point for communication signal (required by RS485 communication), the multi-door controller must share the same ground with each subcontroller.

The network wiring diagram between controller 201D 4/8 and subcontroller 101 is shown as follows:

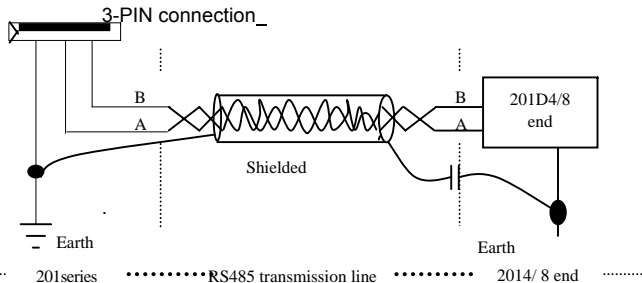


1.3.3 The Standard for RS485 Network Wiring

Caution!

- » Two or more pairs of shielded twisted pair wire shall be used as RS485 communication cable
- » Use a pair of multi-core pair wire as signal cable, and connect one or all of the remained wires to working reference ground of two-end equipment RS485.
- » The shielded layer of communication cable should be earthed

Note: The following is based on 101D/DE



Key for RS485 networking (compulsory):

- » The connector of signal wire should be well welded.
- » Shielded twisted pair wire should be used.
- » All equipments on the network connecting with RS485 must be earthed.

The ground (earth ground) is both reference ground for signal A, B of

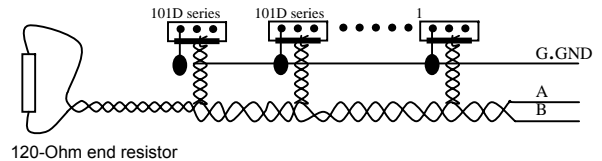
RS485 and guarantee for lightning prevention.

If shielded twisted pair cable is used, the shielded layer of one of its end should be connected to shielded ground (earth ground). If it is long enough, the other end should be added high-frequency decoupling capacitance before being connected to earth ground.

Differential transmission mode is adopted for Signal A, B of RS485 differential mode < 7V, common mode < 12V. If the networked equipments are not well connected to the ground (earth ground), some problems will occur:

- (1) Because ground level (reference) is different, sometimes the common mode voltage exceeds 12V to interrupt communication, if affected by the environment.
- (2) Affected by distributed capacitance, signal A, B of RS 485 will discharge to burn RS485 drive chip.
- (3) The equipment, even all the equipment connected to the whole system will be burnt by thunder and lightning.

If it is not convenient to connect the equipment to the ground, as alternative, all the "earth ground" (G.GND) of the equipment can be connected together. Please refer to the following schematic diagram:



1.4 Engineering Installation Drawing of 201D4/8

1.4.1 Understanding installation environment

Please understand and investigate the environment for installation and application before conducting installation 201D4/8 multi-door access controller. Although the controller has long life span, its normal operation will be affected if placed in the following environment for a long time:

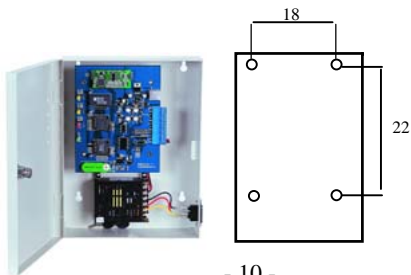
- ※ Exposure to direct sunshine
- ※ Kept in the environment with high temperature and high moisture for long time
- ※ Kept in salt-sprayed environment for long time
- ※ Kept in the environment with acid gas or other corrosive gases.

Therefore, It should be avoided to install in the abovementioned environment. If it is unavoidable, protective measures should be taken.

1.4.2 Installation of the Controller

201D4/8 has been endowed with full convenience in installation and maintenance, but it is required that future maintenance and servicing shall be taken into account while conducting installation

Schematic drawing for installment is shown as below.



Instalment steps:

- 1) Open the metal box of controller with key
- 2) Install the metal box in the target place.
- 3) Lead in all exterior wires through the two holes in the bottom of metal box.
- 4) Make all wires of the controller well connected (See connection definition in Section 3.1)
- 5) Check all the wires and test for normal operation
- 6) Cover and lock the metal box.

1.5 Packing list

Outer packaging: metal box (with key)
One unit of 201D4/8 master controller (Stuck with bar code sticker with model number and production date)
Each piece of power switch and transformer
Fixing rubber post, self-drilling screw, power cord
One copy of instruction manual (including connecting diagram and installation diagram)
One copy of certificate for maintenance warranty

2. Multi –door Subcontroller 101D series

2.1 General

101D subcontroller is a supporting controller of multi-door access controller 201D4/8. It can function as intelligent and safe backbone controlling equipment by integrating electric-controlled lock, door magnet, infrared inductor and alarming device. It can be teamed up with master

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controller to form multi- door access controller via standard RS485 communication.

- 101D: No built in reader, accessible with EM/ Mifare induction reader.
- 101DE/DM: with one built in EM/ Mifare induction reader.

2.2 Performance Parameter

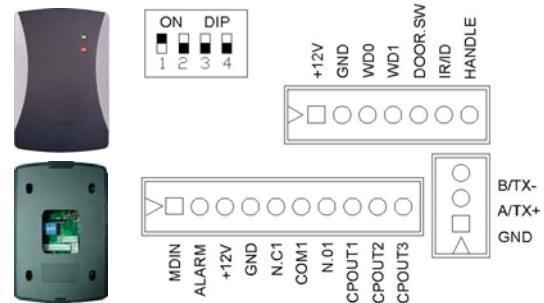
Power: DC

- ※ Dimension: 115mm(W)×75mm(L)× 21mm(T)
- ※ Weight: 280g
- ※ Colour: Various colours such as grey, white, silver and champagne are available for choice
- ※ Power: DC 9~12V, current: 50 ~80 m A
- ※ Power consumption: ≤1.2W;
- ※ Work frequency: 125 KHz /13.56 MHz
- ※ Card swiping distance: 15cm for EM card at most, 8cm for Mifare card at most;
- ※ Output: driving relay output and alarming output.
- ※ Input: manual button, door magnet and infrared, ect.
- ※ Transmission distance: less than or equal to 1000 meters
- ※ ESD interference: space ≤ 9 KV; contact discharge ≤ 6 KV
- ※ Working environment: -20℃~60℃,relative humidity: 5%~98%;
- ※ Communication mode: standard RS485 communication;
- ※ Working condition: indicating working condition via sound and light, red light lighting refers to standby mode, green light lighting and buzz sound means card swiping mode;

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2.3 Connection Instruction

101D/DE subcontroller has socs including 10PIN, 7 PIN, 3 PIN and each of ID address code and toggle switch, the connection instruction is shown as follows:



- 1) Choosing RS485 communication physical address (ID number) by pressing 4 digit toggle switch: chosen range (1-8)

Switch No.	Position	Value	set ID as "4"
1	ON	1	OFF
	OFF	0	
2	ON	2	OFF
	OFF	0	
3	ON	4	ON
	OFF	0	
4	ON	8	OFF
	OFF	0	

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4 digit toggle switch stands for 4 binary numbers. If they are converted into decimal number, you will get communication address of this computer, the maximum ID number is 8

2) One 3PIN connector in the right row

Connection definition of 3 lead wire in the right row--connecting with 201D4/8 master controller			
Wire 1	GND (Green)	Shielded ground	Two wires bound together
Wire 2	A (coffee)	RS485 +	
Wire3	B (grey)	RS485 -	

3) 7-PIN connector in the upper row

Connection definition of 7-pin lead wires in upper row			
Wire 1	+12V(red)	positive	Two wires bound together
Wire 2	GND (black)	negative	
Wire 3	WD0 (yellow)	wiegand Data0 of Reader#2	
Wire 4	WD1 (white)	wiegand Data1 of Reader#2	
Wire 5	DOOR.SW (orange)	Door Sensor	
Wire 6	IR/ID (violet)	Infrared input	
Wire 7	HANDLE (green)	Exit Button	

4) 10PIN connector in the lower row

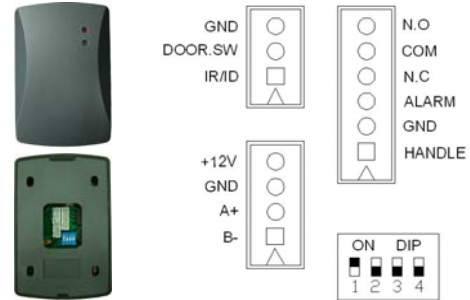
10PIN connector in lower row			
Wire 1	(Violet)	Standby	

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Wire 2	ALARM (blue)	Alarm output	Two wires bound together
Wire 3	+12V (red)	Power +	
Wire 4	GND (black)	Power -	Three wires bound together
Wire 5	N.C (grey)	Normally closed of the first Relay	
Wire 6	COM (orange)	Common of the first Relay	
Wire 7	N.O (white)	Normally open of the first relay	

Note: such pins as 8,9 and 10 are spare

101DM includes 6PIN, 3 PIN, 4 PIN and each of ID address code and toggle switch, the connection instruction is shown as follows:



- 1) Choosing RS485 communication physical address (ID number)by pressing 4 digit toggle switch in the lower right row: chosen range (1-8)

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Switch no.	position	value	set ID as 1
1	ON	1	ON
	OFF	0	
2	ON	2	OFF
	OFF	0	
3	ON	4	OFF
	OFF	0	
4	ON	8	OFF
	OFF	0	

4 digit toggle switch stands for 4 binary numbers. If they are converted into decimal number, you will get communication address of this computer, if the first three digits are all set to "ON" position, the ID number shall be: 1+2+4=7, the maximum ID number is 8, with the fourth digit in "ON" position

2) One 3PIN connector in the upper left row

The connectors of 3 lead wires on the left		
Wire 1	IR/ID(grey)	Infrared input
Wire 2	DOOR.SW (green)	Door Sensor
Wire3	GND (white)	Power –

3) One 4 PIN connector in the lower left row

Connectors of 4 lead wires in the lower left row			
Wire 1	B (white)	RS485 B	Two wires bound together
Wire 2	A (yellow)	RS485 A	
Wire 3	GND (black)	Power –	
Wire 4	+12V (red)	Power +	

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4) 6 PIN connector in the upper right row

Connectors of 6 lead wires in the upper right row		
Wire 1	HANDLE (red)	Manual button input
Wire 2	GND (black)	Power -
Wire 3	ALARM (Yellow)	Common alarming output
Wire 4	N.C (white)	Normally closed of the Relay
Wire 5	COM (orange)	Common of the Relay
Wire 6	N.O (purple)	Normally open of the Relay

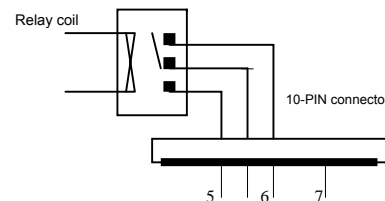
2.4 Outward Connection of 101D Multi-door Subcontroller

Note: the following instruction is based on 101D/DE

2.4.1 Relay for Driving Electric Lock of 101D/DE Series

(1) Relay #1 (electric lock for driving door)

Relay:
 Coil current: 25mA /5V
 Contact resistance $\leq 1\Omega$
 Max. load : DC35V/2A
 AC75V/3A



2.4.2 Using the Same Power to Drive Electric Lock

Cautions!

First of all, you should make clear whether the lock is driven by using the same power with the controller or using a separate power when

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controlling the electric lock of 101D/DE series.

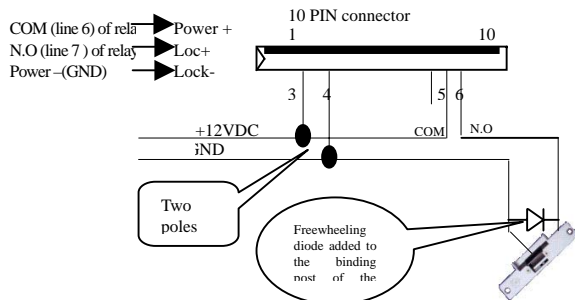
If rated driving voltage applied on the lock is not the same with that of the controller, a separate power working type must be adopted.

When choosing the power for driving the electric lock, actual power supply capacity and rated working voltage for the electric lock should be also taken into account.

The rated voltage and current for some common locks are given in the following table:

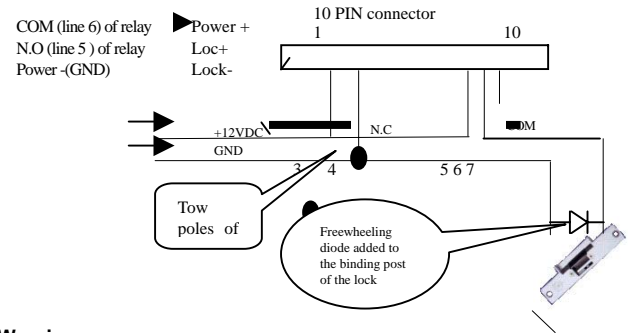
Electric lock	Rated voltage	Current	Min. power supplied
Pulse lock (1)	12V	3.3A	42W
Pulse lock (2)	12V	1.1A	15W
Electric strike	12V	0.38--1A	6--15W
Electric lock for glass doors	12V	0.6—1.2A	15W
Magnetic lock for glass doors	12V	0.6—1.2A	15W

- (1) Use the same power to drive **normally close lock** (the lock is locked after powering off).



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- (2) Use the same power to drive **normally open lock** (the lock is open and free after powering off)

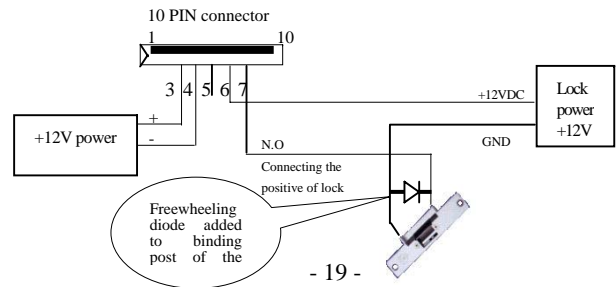


Warning:

If the normally closed lock is connected in the same way as the normally open lock, the electric lock may be damaged due to constant power supply to the electric lock coil.

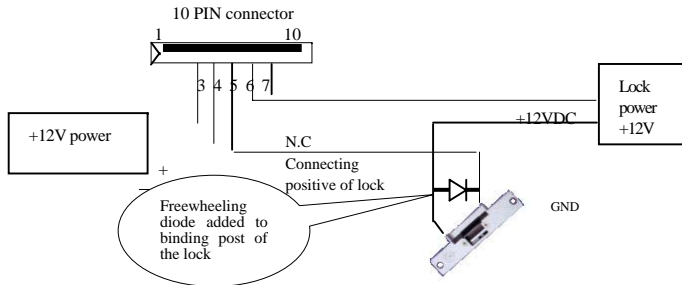
2.4.3 Using separate power to drive the electric lock

- (1) Using separate power to drive normally closed lock (the lock is locked after powering off)



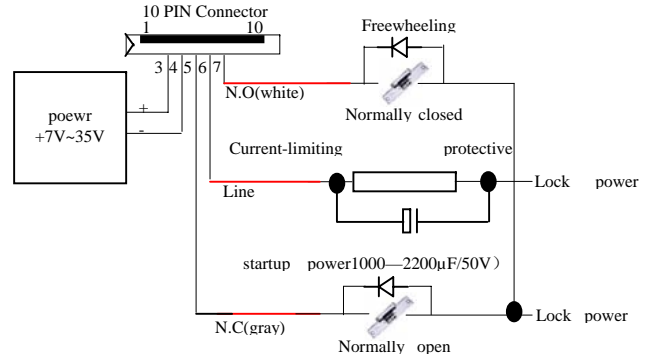
Warning:

- (2) If the normally closed lock is connected in the same way as the normally open lock, the electric lock may be damaged due to constant power supply to the electric lock coil.
- (3) Using separate power to drive **normally open lock** (after powering off, the lock is open and free)



2.4.4 Protection of Electric Lock

- (1) In order to prevent the lock from overheating due to high voltage (if it is too low, the voltage the strength will not be enough for locking) over an extended period of time, a current limiting resistor should be series-connected on the power supply end of the lock and an additional starting capacitor should also be added.

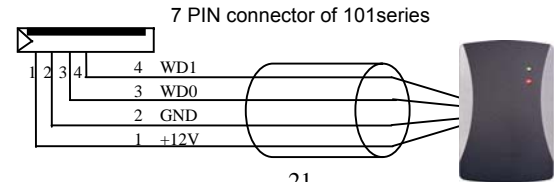


A capacitor with low series resistance is required, for it can release peak value current required for start up. For example, if the lock started to be locked in case of +12V, when the resistor is connected, favorable locking status can be maintained when the voltage is reduced to about +8V.

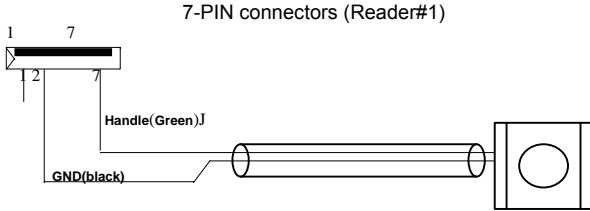
- (2) Power supply time for the electric lock (especially the pulse lock) should be set properly. For example, as to pulse lock, the power supply time should be set within 0.1-0.5 second in order to prevent heating from the coil inside the lock.

2.4.5 Outward connecting induction head of to 101D/DE

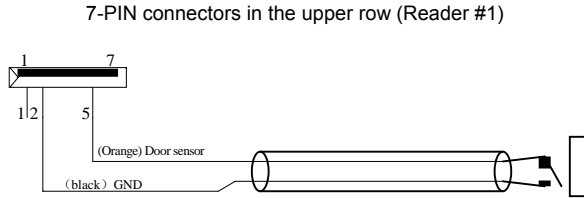
- (1) The induction head shares the same power (+12V) with 101D/DE series.



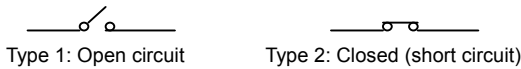
2.4.6 Connecting Manual Door Opening Button



2.4.7 Connecting Door Magnet (Door Switch Inductor)



When **the door is open**, the door magnet (door sensor) has ^{Door}two types of output generally:

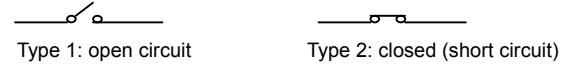


2.4.8 Connecting Infrared (or other) Inductor

7 PIN connector (induction head)

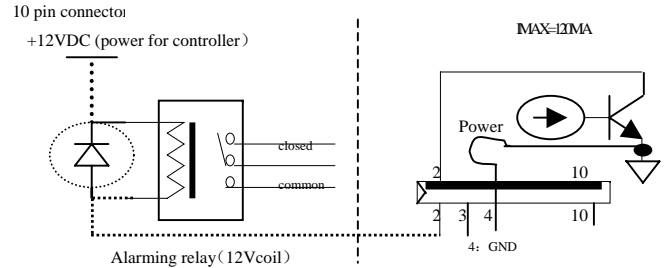


When the door is open, the door magnet (door switch inductor) has two types of outputs generally:

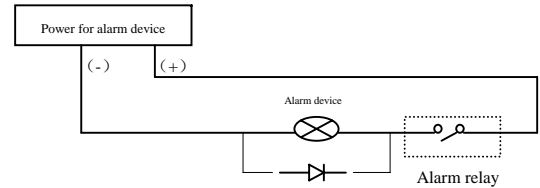


2.4.9 Alarming Output

101D/DE provides OC door output in case of alarm:

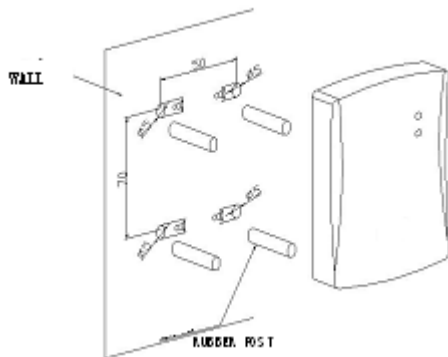


Note: If an instant buzzer or DC ring is used as an “alarming device”, a freewheeling diode should be added to both ends of the device in order to increase system EMC indication.



2.5 Engineering Installation Drawing

INSTALLATION DIAGRAM OF 101D



Installation steps:

- ① Select installation position for 101 series according to unified height
- ② Drill (in/out) line hole in the wall (above 10 mm);
- ③ Drill 4 fixed holes with diameter of 6 mm again and stuff them with rubber stopple;
- ④ Secure the back veneer;
- ⑤ Make all the connections of 101 series well connected;
- ⑥ Insert the plug into the soc in the back of 101 series tightly;
- ⑦ Hang 101 series on the back veneer;
- ⑧ Fasten 101 series to back veneer with two screws;
- ⑨ Applying current to test operation if operation is in order, the installation is completed.

3. FAQ

3.1 Why does RS485 connection fail?

Reasons for connection failure:

Repeated hardware equipment ID setting (change ID and communication group code, see Section 2.3 for details), communication address code and communication group code of each equipment registered in the database of computer software are different from those of hardware equipment.

Wrong connection of communication wires A and B, please exchange the cables (see Section 5.12 for details);

The reference “ground” wire for signals is not connected, which causes unstable connection and data loss; please connect the “ground” wire properly; Software serial setting is not correct.

Communication speeds on both ends are different or the checking methods on both ends are different.

3.2 Why is RS485 connection not stable?

Lose data occasionally: See “Appendix 3”, “ground” wire must be connected properly and then follow the solution as introduced in “Appendix 3”.

Short communication distance: A. Because twisted-pair is not applied. Twisted-pair must be used for communication of RS485. When communication wires pass through an area with strong electromagnet intervention, shielded twisted-pair (exceed Class Five) should be used.

B.The converter (module) of RS232-RS485 does not have power source usually and its drive capacity is not strong, which causes short distance of communication driving and small quantity of connected equipments. RS232-RS485 module with power source or interface card, such as 485HUB (standard RS232 transmit to RS485 and then RS485 transmit to multiplex photoelectricity insulated hub of RS485) should be used.

Few units of equipments can be connected by RS485, connection will be unstable even with more than 5 units: twisted-pair is not used, thus drive capacity of RS232-RS485 module communication is not strong enough, and the "ground" between the upper machine and the equipment is disconnected; solutions: see (2) and then connect the "grounds" (reference ground for signals) for all terminals. If the problem continues, please replace RS232-RS485 module. If the problem still exists, it means that communication circuit in one set of equipment has been damaged.

3.3 How to increase the communication distance of RS485?

In order to increase the communication distance of RS485, signal amplifier such as 485HUB should be used.

3.4 Why does card number verification appear wrong when a card is read?

The output signal wires WD0\WD1 of reader are connected to the controller incorrectly. Please exchange the connections of WD0 with WD1.

Or one of WD0\WD1 is short-circuited with ground wire or other signal wires.

It displays invalid user when reading a card, which means the controller fails to find the card number.

3.5 Why does it appear invalid user when a card is read even though the card has been authorized by software communication?

The controller only can store the "card number", while there are many ways to acquire the card number. Different users have different requirements and different developers have different solutions, therefore, "the same card" will have "different numbers" by different "acquisitions". Please see "Appendix 1" for details.

The card number acquired by computer software authorization is decided by software solution + card issuer, for example: card number is 04, B5, 13, A2 and 09.

The controller will have its own "acquisition way" when processing a card. If its "acquisition way" is the same as processing "way" of computer software, it will have the same card number: 04, B5, 13, A2 and 09; however, if not the same, it will get different numbers, such as 00, 00, 13, A2 and 09.

Therefore, the "acquisition way" of card number in computer software should be set the same as the "acquisition way" of card number within the equipment.

3.6 What is the confirmed delay of inbreak detection (infrared) sensor?

When 101D series is connected with an inbreak detector and the

detector is activated, once the controller receives inbreak signals, it will initiate timing and detect if there is legal card reading. Timing period is the time specified by delay of inbreak confirmation. If there is legal card reading within such timing period, the controller will consider it to be legal entry and no alarm will be given; if there is no legal card reading within the period, the controller will consider it as illegal entry, illegal inbreak warning record will be generated and the controller will also send alarm signals at the same time.

Delay of Inbreak Detection (Infrared) Activation:

When an authorized person activate 201d4/8 series monitor function of inbreak detection upon leaving a controlled zone, the delay time from the moment when keypad sends a command to 2014/8 series to the moment when 2014/8 series really starts such function allows the authorized person to leave the inbreak detector protected zone without causing wrong alarms within enough time.

3.7 Why is the door opened by mistake?

Reasons: (1) Contact with manual opening keys wrongly, or the peel-off of long connecting wire which causes misconduct of the wires; (2) The reference ground of input "MDIN" signal of "fire control interaction" is not chosen properly. In case of fire alarm, the output relay signal of "fire control host" has two contact points; one should be connected to signal ground (power ground) of the controller and the other one should be connected to "MDIN".

Therefore, "fire control interaction" is started by the fire control host and the output "contact point" of the fire control host must be connected

properly.

If the reference ground for MDIN signals of "fire control interaction" is not chosen properly, the level of MDIN signal wires will be inaccurate (sometimes it is high and sometimes it is low) for the controller; without a stable contact point input in an open circuit, MDIN signal is so low that the input opto-coupler conduction is accepted by the controller.

Notes: When the controller is judging "manual opening" keys and "fire control interaction" input, special treatment of signal width (200 milliseconds) will happen. The controller will not respond to intervention pulse less than 200 milliseconds.

3.8 Why does the controller pip frequently?

The controller can not be started because the voltage of power supply is too low or the power supply fails to provide adequate current; therefore, reset occurs and the controller pips frequently.