Wiring Instructions v3

Gatekeeper h4.1

Technical Support

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Preface

This wiring guide is for the technician or electrician responsible for wiring the Gatekeeper h4.1, door readers, and access control units as supplied by Treshna Enterprises Ltd.

This guide includes an overview of the hardware involved, example wiring diagrams for both Fail Secure and Fail Safe access control devices, emergency buttons, as well as diagnostic tests and troubleshooting.

Please read this manual carefully before the installation of the Gatekeeper and readers.

Hardware Checklist

- ❏ Gatekeeper computer
- ❏ Power supply (basic unit provided)

You will also have, or may be supplied with:

- ❏ Desktop card reader & regular USB data cable
- ❏ Wall-mounted card reader (with diodes)

You will also need the following items:

- ❏ Battery backed power supply (12V)
- ❏ Router or network switch
- ❏ Internet connection
- ❏ Ethernet cable to connect between Gatekeeper and router, network or switch
- ❏ Door hardware as required (exit button, emergency exit, door lock, turnstyle etc) - **PLEASE NOTE: IT IS THE CLIENT'S RESPONSIBILITY TO ENSURE THESE ARE PROVIDED AND INSTALLED**

Note: The wall-mounted card readers are wired to the door. There are two relays inside the Gatekeeper.

⚠ **Please also note that the GateKeeper Plug that we send you must only power the Gatekeeper, not the door lock. Otherwise, this will result in damage to equipment.**
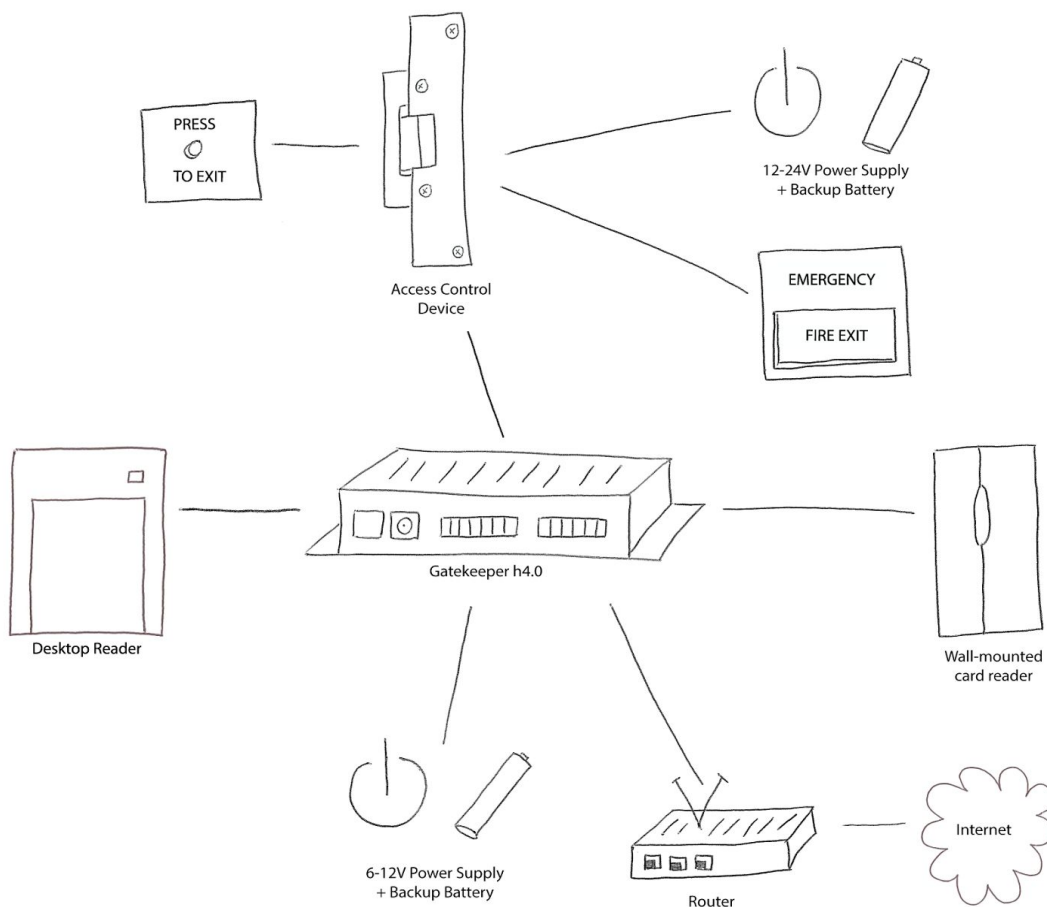
Gatekeeper Overview

The Gatekeeper h4.1 contains both the Gatekeeper computer and relay unit required to operate the access control that works with GymMaster.

The Gatekeeper will sometimes be used to operate desktop readers and receipt printers, which connect to the USB ports.

We strongly recommend using **Backup Battery Power** for the Gatekeeper, Card Readers and computer network components to optimize the full benefits of the Gatekeeper, as well as for security in the event of power failure.

It is necessary that an **Emergency Fire Exit Button** be included in your door setup for safety, and to meet any local legal requirements. An **Exit Button** is also strongly suggested.

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Relay Terminals & Power Supply

Relay Terminals

These terminals are for signalling the access control device. For loads over 2A we do not recommend connecting directly, and use a secondary relay as a buffer instead.

NO Relay normally open contact

COM Relay common terminal

NC Relay normally closed contact

Exit buttons and Emergency Fire Exit delays are not provided by GymMaster however we have included suggested wiring below.

As access control devices are often inductive, switching off the current can cause a voltage spike on the wires to the access control, damaging the reader. A snubber should be fitted near any switch or relay contacts, for DC circuits a silicon rectifier diode such as IN4001 is well suited. Please note that the wire diode in the wrong direction (polarity) will cause a short circuit and damage the power supply.

Please make sure that the diode is wired correctly according to the diagram, otherwise it may cause damage to the Gatekeeper board or the access control device's power supply.

12V Supply

Connect a 12V supply capable of at least 1000mA, the socket suits a 2.1x5.5mm barrel connector with the centre positive, or a screw terminal for hard wired power supplies.

Please use a separate power supply (which you must provide) for the access control device (magnetic lock/electronic strike).

The RFID Reader

The RFID reader must be mounted in a location where the electrical noise is quiet. If there is a lot of electrical noise the read performance will be reduced. Electrical noise can be generated from motors, VSD's, switch mode power supplies, CRT monitors, fluorescent lights etc. New electrical equipment (if installed correctly) is usually ok as it must meet EMC requirements. Also, two readers should be mounted far enough to avoid interference on each other.

The RFID reader has several wires but only 4 of them are used by our system. The unused wires should be insulated from one another. The 4 wires that are used are coloured **red, black, white,** and **green.**
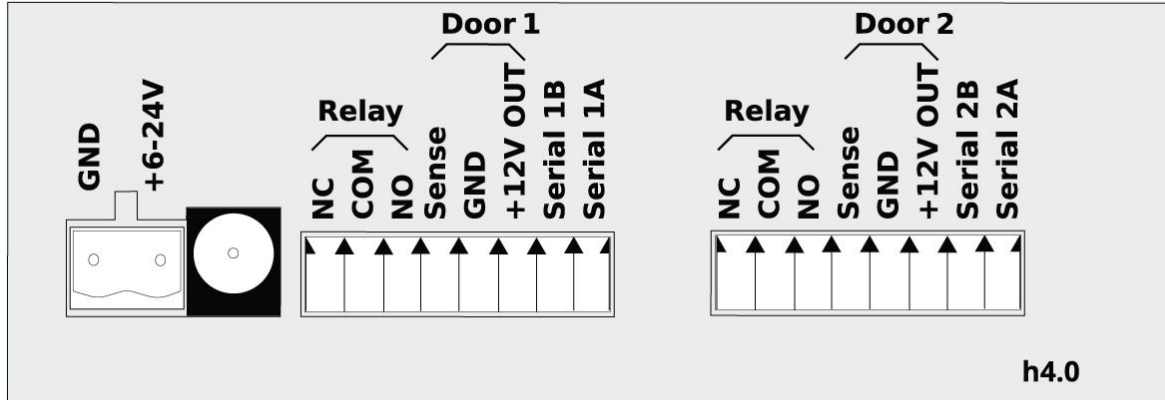
RFID Readers with Screw Terminals

Some readers have screw terminals instead of wires. Use the following key to interpret the diagrams. No other terminals are used.

Terminal	Wire Colour	
VCC	Red	
GND	Black	
A	Green	
B	White	

Gatekeeper Inputs

Sample Wiring Diagrams

These wiring diagrams are intended only as examples of how the relay unit and RFID device may be installed. Actual installation wiring may differ.

The difference between fail secure and fail safe electronic locks are as follows:

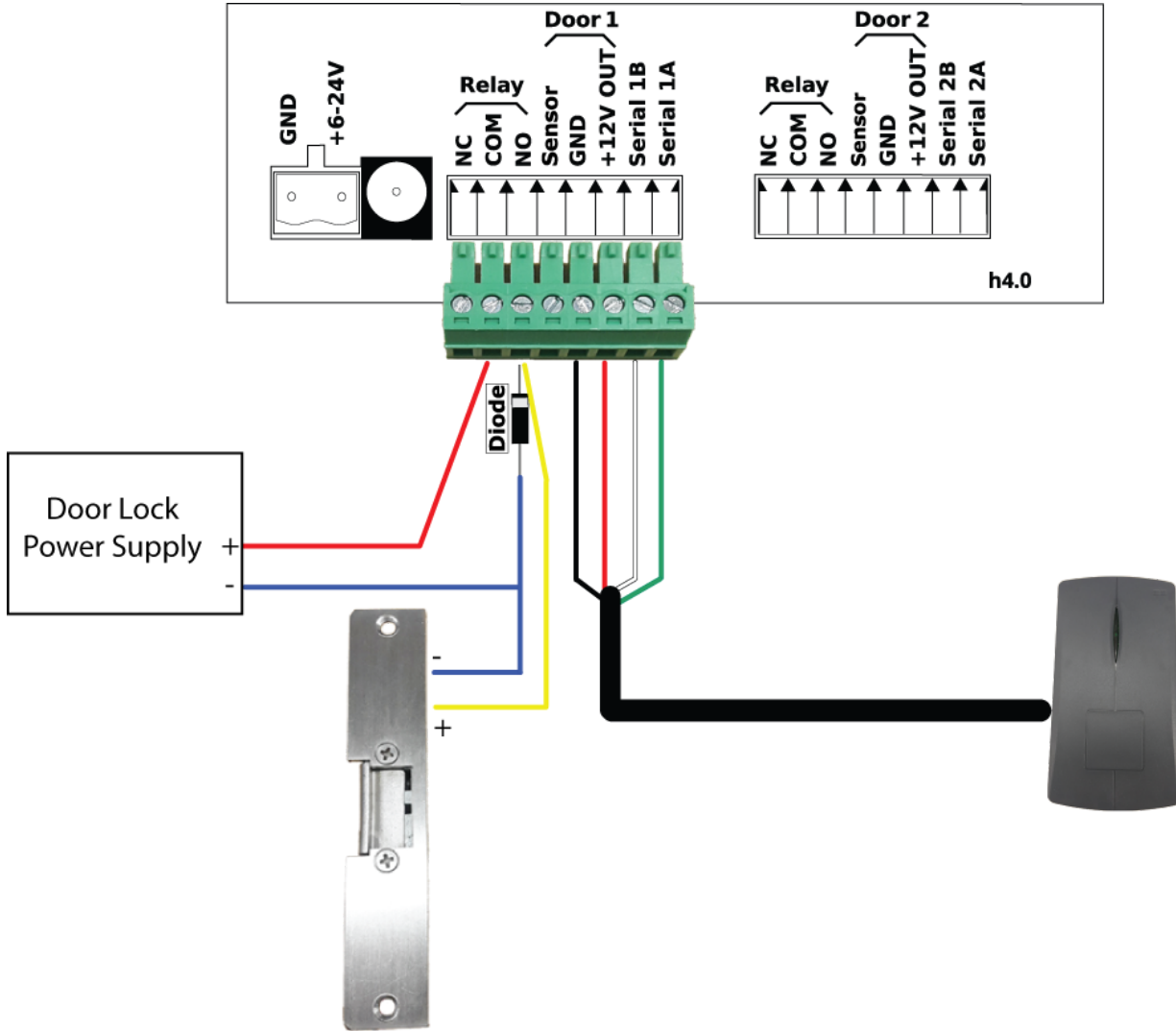**Fail secure** locks will **lock** the door when the power goes off

Fail safe locks will leave the door **unlocked** when the power goes off.

Note: If you are using fail secure locks, it is recommended that you have other means by which you can physically unlock the door in case of Gatekeeper outage (loss of power, or no connection to internet for a long period, etc.)

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Fail-Secure

Fail-Secure with Emergency Exit

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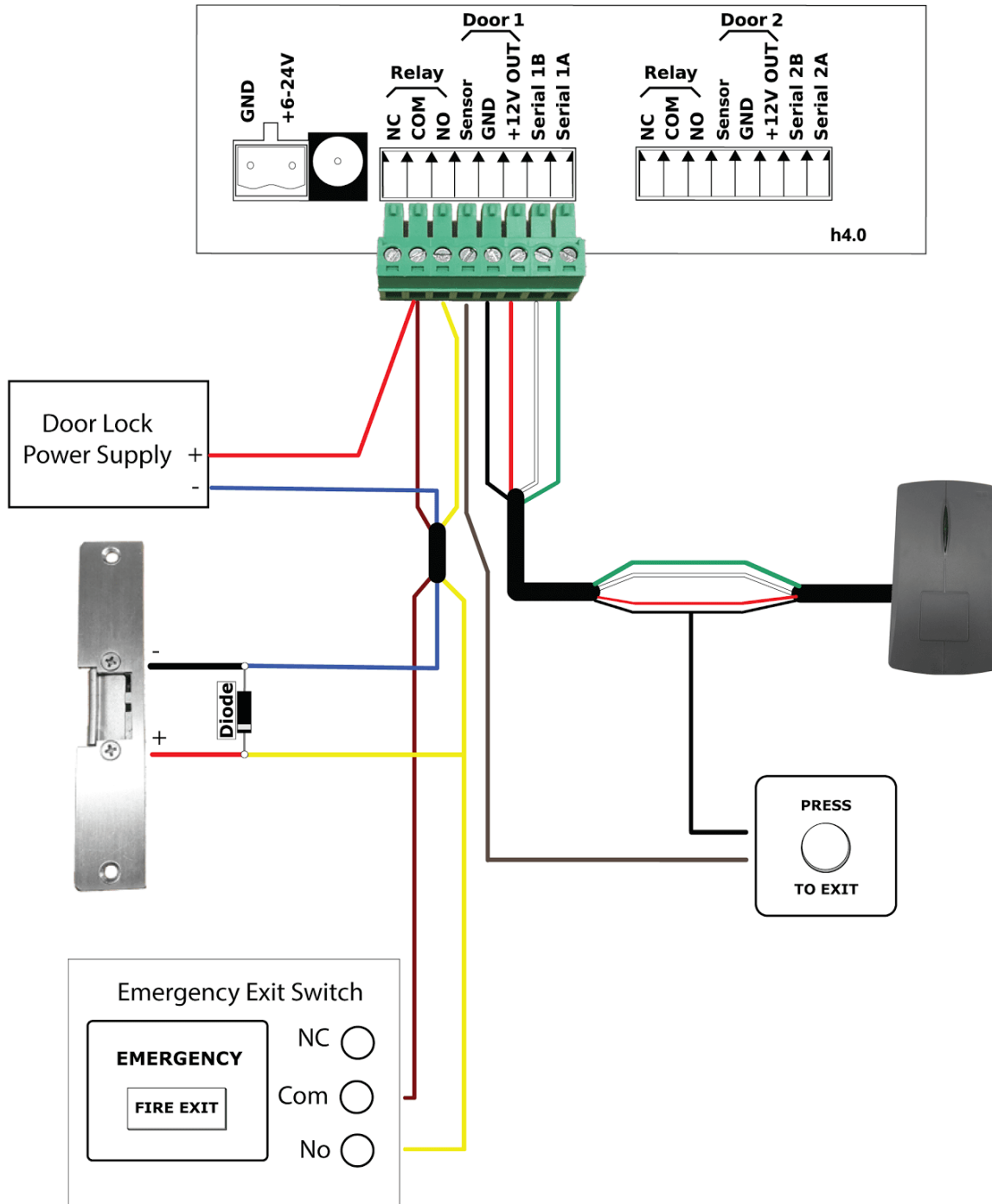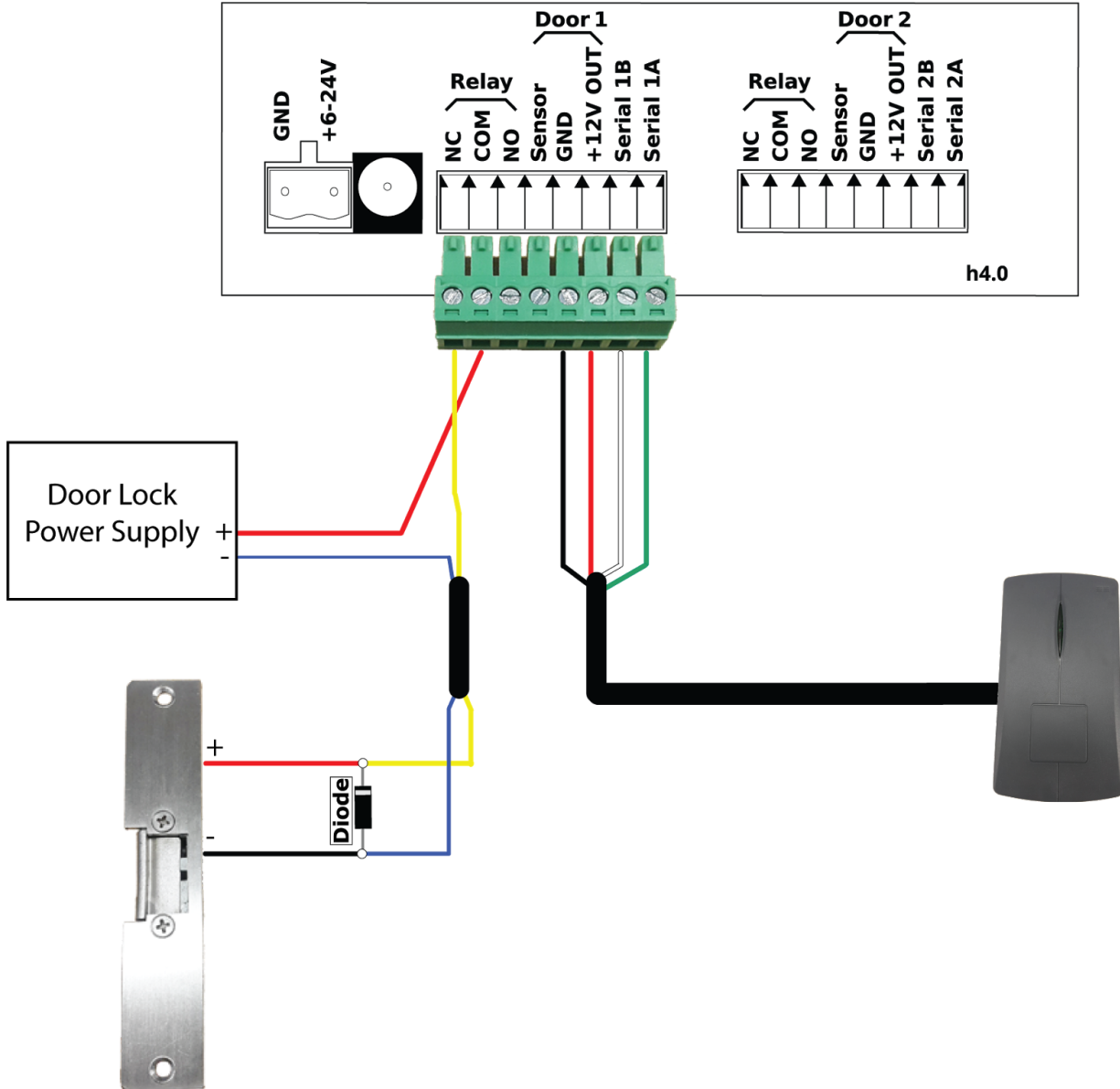
Fail-Safe

Fail-Safe with Emergency Exit

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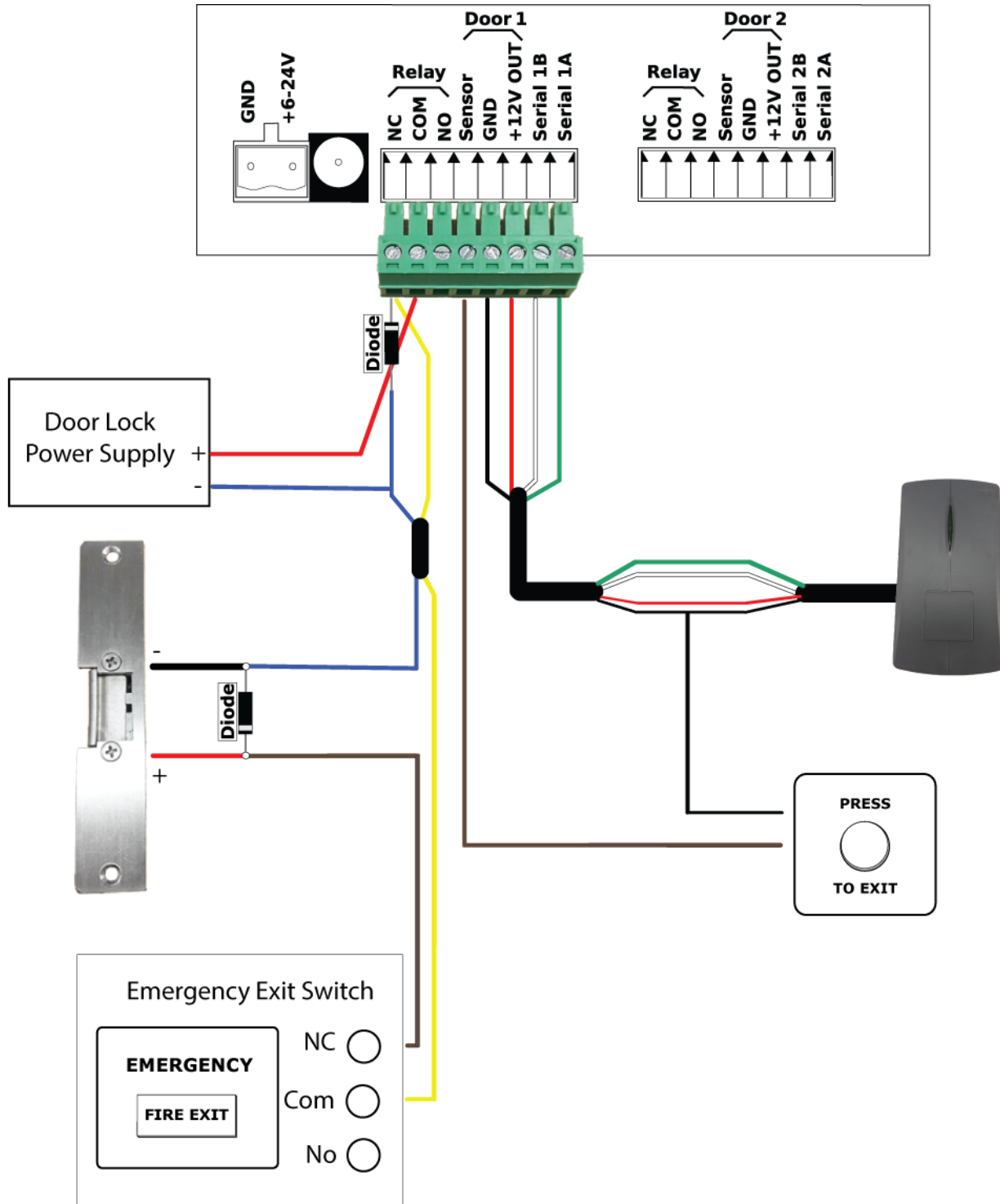
Combinations of Relay Units

There are several useful ways in which multiple relay units can be interconnected. In these illustrations the connections to the reader and PC are not shown.

Bi-Directional

When you want to have readers both sides of the door, you need to combine the relay contacts. These wiring patterns can be used in combination with the power supply sharing wiring pattern above. The wiring pattern you should use depends on which relay contacts are being used.

Normally Open Contacts
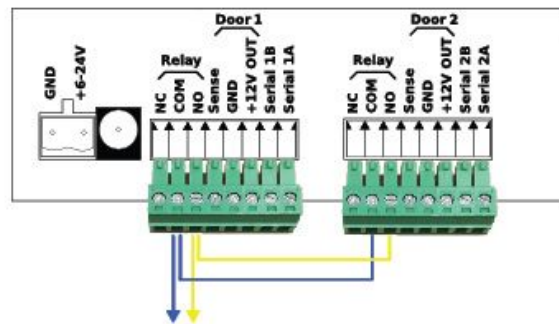
In arrangements where the normally open (NO) contacts are used, wire the relays in parallel.
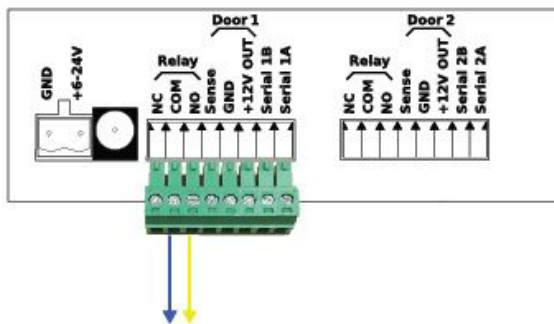
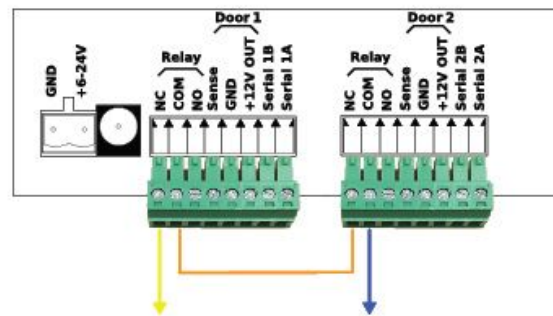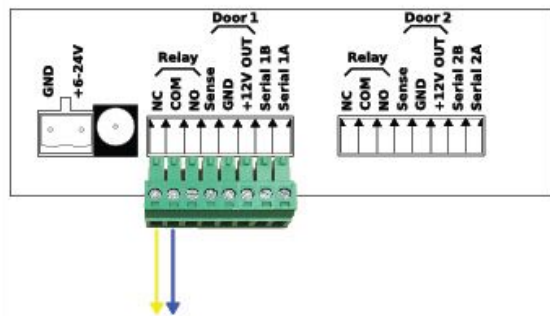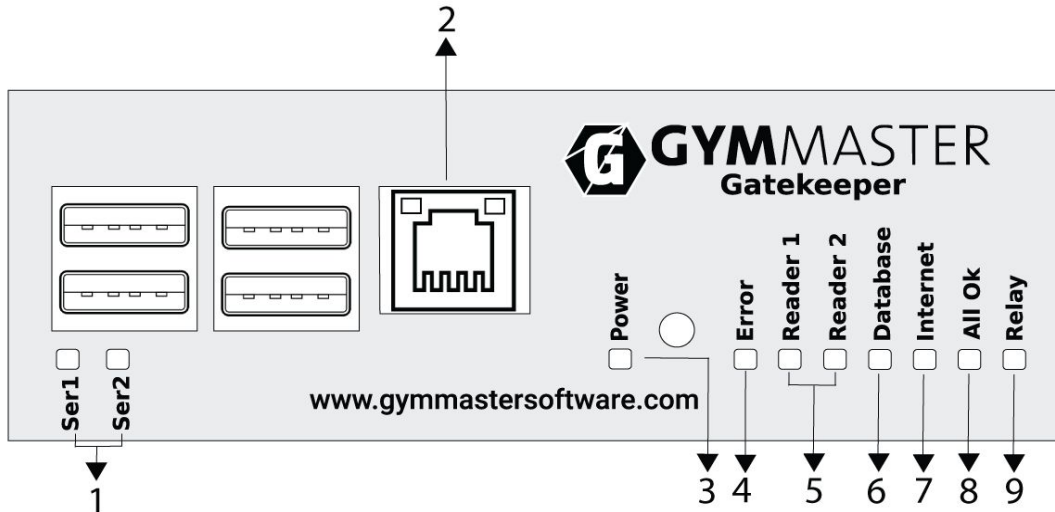Change this: To this:

Normally Closed Contacts

In arrangements where the normally closed (NC) contacts are used, wire the relays in series.

Gatekeeper Status

The front of the Gatekeeper h4.1 makes it easy to diagnose whether there is a problem, and the nature of any such problems.

What Do the Lights Mean?

Ref	Light	Activity	Indicates
1	Act1 (or Ser1) Act2 (or Ser2)	Flickering/Off	Flickers when the Gatekeeper is able to talk to the attached readers
2	Ethernet	Orange & Green On/Off	Network connection (both should be on)
3	Power	On/Off	Power to the Gatekeeper unit
4	Error	Red/Off	There is an error
5	Reader 1 Reader 2	On/Off	Reader/s are connected
6	Database	On/Off	Connection to the cloud server
7	Internet	On/Off	Internet Connection
8	All OK	On/Off	Everything is working as it should be.
9	Relay	Flickering/Off	Should turn on when the door opens.

Troubleshooting

Test The Relay Wiring To Magnet Lock

Once you have finished the wiring, you should test if the wiring is correct and working by using a paperclip. Do this before plugging the connector into the Gatekeeper socket.

Find a paperclip, straighten it and then bend it as depicted below. Connect the paperclip into the two holes where the two wires connect to the magnet lock. You should be able to see the door lock activate or deactivate, depending on the type of lock.
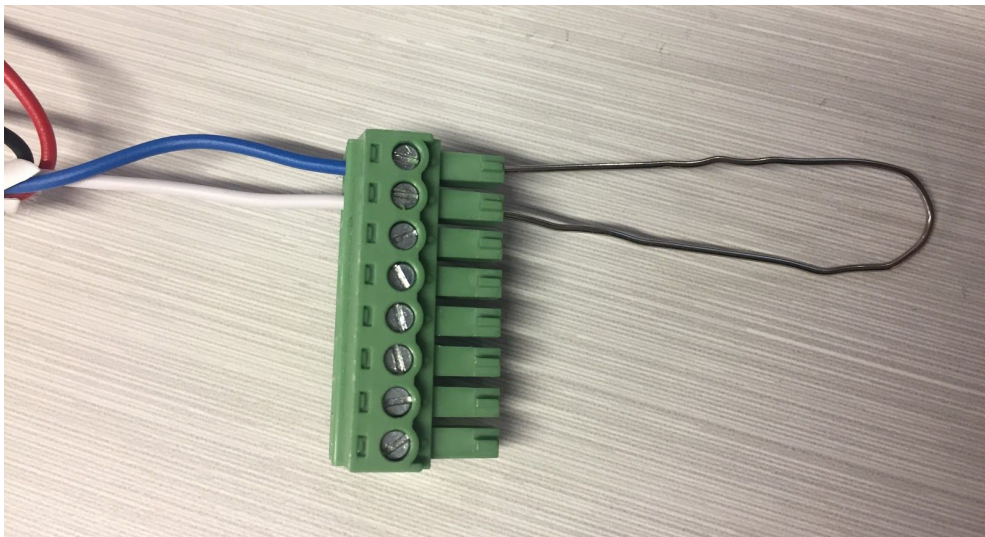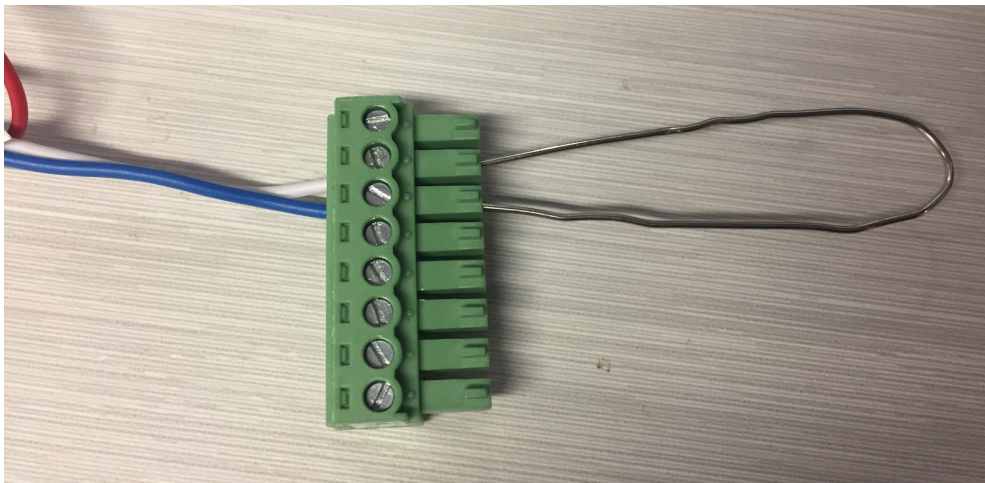
To demonstrate, if the lock is unengaged (unlocked) before you plug in the paperclip, it should be engaged (locked) after you plug in the paperclip. If the lock is engaged (locked) before you plug in the paperclip, it should become unengaged (unlocked) after the paperclip is connected.

If that does not happen, it means that the wiring has not been done correctly on the lock part. Please check power supply for the lock and other related wiring.
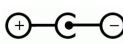
Test If The Relay Works With A Multimeter

You can also use a multimeter to test of the relays are working. First, set the door to locked (or active), set the multimeter to 200Ω, then hold the probes against the COM and NO. The reading should be infinite (but the multimeter would display 1 on the far left, followed by space then dot). Hold the probes against the COM and NC and it should read 0Ω (although, due to wire resistance or tolerance error there should be a few ohms). Now, change the door status to be unlocked, and measure the resistance between COM and NO, COM and NC. The result should be the opposite.

The Gatekeeper Power Button Is Not Turning On

The Gatekeeper Power LED should be lit when it is connected to a power supply. If it is **not** lit when it is plugged in then:

- Test the power supply by disconnecting it and checking that it the power supply works
  - Unplug the power supply from the socket on the Gatekeeper,
  - The power supplies we send have a red LED that should light up if it is working,
  - If the power supply is not working, check that it is plugged into a working outlet.

- Having confirmed that the power supply works, reconnect it to the GateKeeper.

- If nothing happens, either the cable from the power supply to the Gatekeeper unit is faulty, or the plug has incorrect polarity.
  - The polarity of the plug can be changed by removing the tip and rotating it 180 degrees about its long axis. The arrow should indicate this symbol: ⊕—⊂—⊝

- If the LED on the power supply goes out, this indicates an electrical fault. It could be:
  1. A wiring fault (short circuit) somewhere on the card reader cable,
  2. Something on the card reader cable is consuming too much power,
  3. A bad power supply,
  4. A faulty Gatekeeper unit (unlikely).

Gatekeeper Ser1 Or Ser2 Light/S Are Not Turning On

When the access control units are plugged into the back of the Gatekeeper, the Ser1 & Ser2 lights should be flickering to indicate that the Gatekeeper & the access control units are talking to each other. If it is not, check either the **Reader 1** & **Reader 2** lights are on. See the next point.

Gatekeeper Reader (1&2) LED Light/s Are Not Turning On

When the access control units are plugged into the back of the Gatekeeper, the Reader 1 & Reader 2 lights should turn **green**. If they are not turning on, this indicates that the Gatekeeper is unable to see the reader. This may be due to:

- Incorrect wiring,
- A faulty cable,
- A faulty reader.

Door Reader Light Is Not Turning On

It should turn **red** immediately once connected to the Gatekeeper, which indicates that it is receiving power from the Gatekeeper. The door reader lights should be in a normal state of **green**. This means that the card reader software is active. If the light is not turning on, then it may be due to the reader not receiving power. Common causes are:

- Incorrect wiring,
- A faulty cable,
- A faulty reader.

Door Reader Light Is Always Red

The card reading software is not active. Possible causes are:

- The reader is not connected to the reader,
- Misconfigured database door settings,
- Misconfigured wiring.

The Door Reader Is Not Turning Red When Swiped

When you swipe a valid tag on the reader, the light on the reader should turn from **green** to **red**. If this does not happen, then it would be due to one of the following causes:

- A faulty tag,
- Faulty reader,
- Faulty cable,
- The door has been disconnected from the Gatekeeper,

- The tag has not been activated in GymMaster.

The Lock Is Not Releasing When Swiped

The lock should release when a valid tag is swiped at the access control unit. If it is not releasing, this can be caused by:

- An invalid tag associated with membership in GymMaster (ie. an issue with the membership),
- Door settings set to locked in GymMaster. To unlock:
  - In the navigation bar of GymMaster, select **Visitors**, then **Access Control**.
  - Select the door and set to **Active** (tag required), **Unlock** (door open), or **Locked** (no access for members). Click **Apply**.
- Incorrect wiring to door lock,
- Faulty relay.

Door Lock Not Locking

Even when a valid tag is not present, the door is not locked/remains released. Causes of this include:

- Door set to **Unlocked** in GymMaster settings (see above issue for instructions to fix),
- Incorrect wiring to door lock or relay,
- Faulty lock,
- Faulty relay.

Door Reader Has A Delay In Responding

When the door reader has delays in responding to a key tag swipe, go to the **Visitors** page and click on the green **Open** button beside the door. If the relay lights up immediately, and at the same time a clicking sound is heard from inside the Gatekeeper, then check if there is another door reader that is supposed to be plugged in but isn't; or whether it has bad wiring.

Door Lock Delay In Opening

When there is a delay in opening the door, go to the **Visitors** page and when you click on the **Open** button beside the door, check if the relay lights up immediately. If it does, then refer to the "Relay Wiring to Magnet Lock" section, and try shorting the relay contacts (i.e. COM and NO, or COM and NC) to see if that triggers the door to open immediately. If the door does not open immediately, check the locking mechanism & see if it has a timer on it.

Gatekeeper/Reader Showing Offline On Visitors Page

The Gatekeeper will report the doors' status and its own status to the server every minute (approximately). If the server detects that the Gatekeeper is not reporting it's status for more than 5

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minutes, it will show the Gatekeeper as offline. If you have found that the Gatekeeper is showing offline on the **Visitors** page, then:

- On the Gatekeeper panel, check if the **Internet** LED light is on or off.
- If the **Internet** light is **off**, check that your Ethernet cable and router/switch are plugged in. If so, change the cable to the other Ethernet port and reboot the router/switch. In normal operation, the two lights on the Ethernet port of the Gatekeeper should be flickering.
- If the **Internet** light is **on**, either the server has probably been down for more than five minutes - which is confirmed by the **Database** light; or your internet connection is faulty or intermittent. Try swiping the key tag on the reader to see if it reads, shown by the popup on your screen.

If the reader is showing an error on the **Visitors** page:

- First check that the reader is plugged in. Ideally, don't leave a configured reader unplugged, as it will generate a lot of alarm messages on the server.
- Check whether the reader's lights are on. If not, that means the reader is not connected to the power, in which case you should check the wires/cable.
- Swipe a key tag on the reader and check it's response (light changes, beeping). If it is not responding at all, check the wires/cable.
- If the wiring/cabling is correct according to the diagrams earlier in this document, There is a possibility that the reader is faulty. Check to see if there is any damage on the outside, and whether the temperature is high. Call GymMaster for a replacement.

Note On The Power Supply

The input power supply must provide 12V DC. It is recommended that an uninterruptible power supply (UPS) is used to back it up.

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