

## DRx Specification

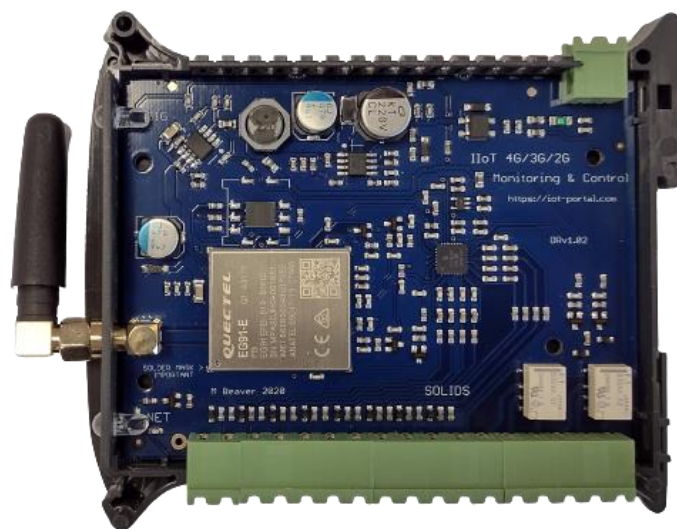
The DRx PCB is available in a number of configurations on both mobile bands and cellular IoT bands.

The inputs can be configured via the user interface, over the air, as 8x 0-36VDC analogue or digital (on/off) type inputs for use with volt free contacts. In the digital configuration the input sources a weak pull up current (<1mA) at 2.8V.

Additionally, the inputs may be configured as Wiegand inputs for use with security tag and keypad readers.

The inputs can also be configured as low data rate UART inputs. Please note this requires a customised sub-PCB.

The DRx PCB features two volt-free relay outputs capable of handling 50VDC up to 2A.



### DR4

<b>Cellular Technology</b>	4G LTE Cat-1, 3G UMTS, 2G GSM
<b>Aerial</b>	SMA Female Penta-Band
<b>Power Supply</b>	12-24VDC/AC 20mA-100mA
<b>Reader Interface</b>	Wiegand 5V
<b>Exit/Fire Inputs</b>	NO/NC/GND
<b>Output Relay</b>	NO/NC/COM 2A 50V Max.
<b>Output Transistor</b>	100mA 50V max.
<b>Timers</b>	7-day, 2 events per day
<b>Keycode Length</b>	1-7 digits
<b>Tag ID</b>	7 characters

### DR5

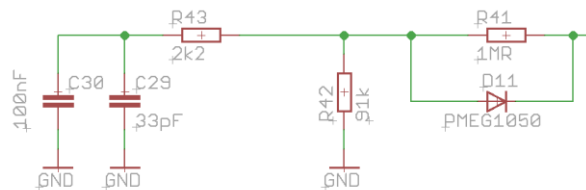
<b>Cellular Technology</b>	5G NB-IoT & Cat-M1, 2G GPRS
<b>Aerial</b>	SMA Female Penta-Band
<b>Power Supply</b>	12-24VDC/AC 20mA-100mA
<b>Reader Interface</b>	Wiegand 5V
<b>Exit/Fire Inputs</b>	NO/NC/GND
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## IIoT Monitoring and Control System

The Priory Electronics Industrial IoT System allows monitoring and control of your industrial control systems remotely via SMS, Web or call, using the 4G and 5G mobile phone networks. The eSIM provides connectivity to multiple networks in over 100 countries.

Each input can be used to send SMS and email messages and initiate a Text-to-Speech voice call. Inputs can be used to operate outputs on the local device and also on remote devices creating a long-range switch connection. Output relays can switch currents up to 1A at 50V.

### Input Configuration



Input Reference Circuit (1.091MR Impedance)

### Digital Mode

Each input can be configured as an analogue or digital input. The mode is selected using the settings button on the input card on the Live Screen (circled in orange below).

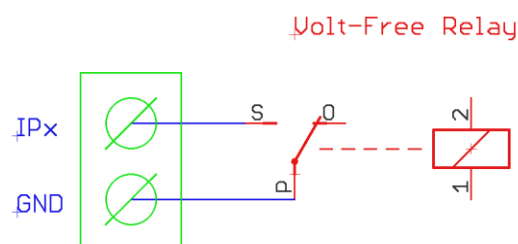


Input Settings Button

The Input Settings modal features the Digital/not Analogue checkbox. To switch the input over to digital, ensure this checkbox is checked and click the Save button immediately below the checkbox. **The device must be powered on and registered on the network for the change to the input to be made.**

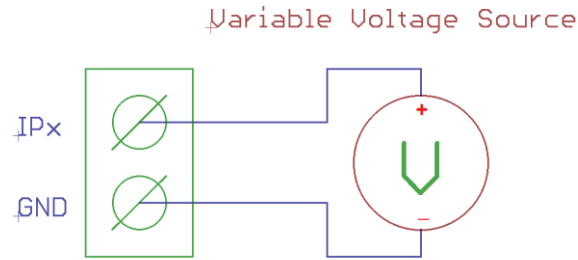


Digital inputs have 2 states; High and Low and are designed to be connected to a volt free switch or relay. Setting the input to digital sets the device to source a small current through the input channel. This allows it to sense when a switch contact has been connected to the GND terminal. This corresponds to the 'Low' state. When the input is open circuit it is considered to be in the 'High' state.



Setting the input to digital will overwrite the upper and lower threshold voltages to 20V and 10V respectively. The source voltage will be 2.8V maximum.

## Analogue Mode



To switch to analogue mode the 'Digital/not Analogue' checkbox should be unchecked and the 'Save' button should be clicked only when the device is powered up and registered on the network.

In analogue mode there are 3 states.

Under the Low Voltage Threshold value, the input is considered 'Low'

Above the 'High Voltage Threshold' value the input is considered 'High'

A voltage between the high and low voltage is regarded as the 'idle' voltage. There should be a difference between the high and low threshold voltages of at least 2x the input hysteresis voltage which is typically 0.5V. Hence, when setting the upper and lower threshold voltages, ensure they are at least 1V apart.

The inputs can measure a voltage from 0V to 36V. By default, there is 0.5V of hysteresis on each input. This means the input will not retrigger until the voltage is more than 0.5V away from the threshold voltage. This stops a minor voltage fluctuation repeatedly triggering the input.

## Outputs

Standard DIN rail IloT systems feature 2 mechanical output relays with both 'Normally Open' and 'Normally Closed' terminals. We recommend a maximum terminal voltage of 50V with a current up to 2A.

The relays can be controlled at any time via the 'Live Screen' and can also be operated by SMS or dialling. Please see the supplementary 'SMS Programming and Operation' Quick Start Guide for SMS control.

To get or change the telephone number to dial for each output, click the telephone icon on the output card. This number can be changed to any one of our international telephone numbers. Each relay can have its own unique telephone number.



Click the telephone to change the number

If your number is present in two or more IoT devices, then you should select unique numbers for all relays as ringing this number will operate all relays where your phone number is valid. This may or may not be desirable.

Inputs 0-36VDC Max. >  
Switch/Relay Contacts >

Outputs (50V 1A Max) >



12-24V AC/DC  
< VIN – not polarity sensitive

## General Wiring

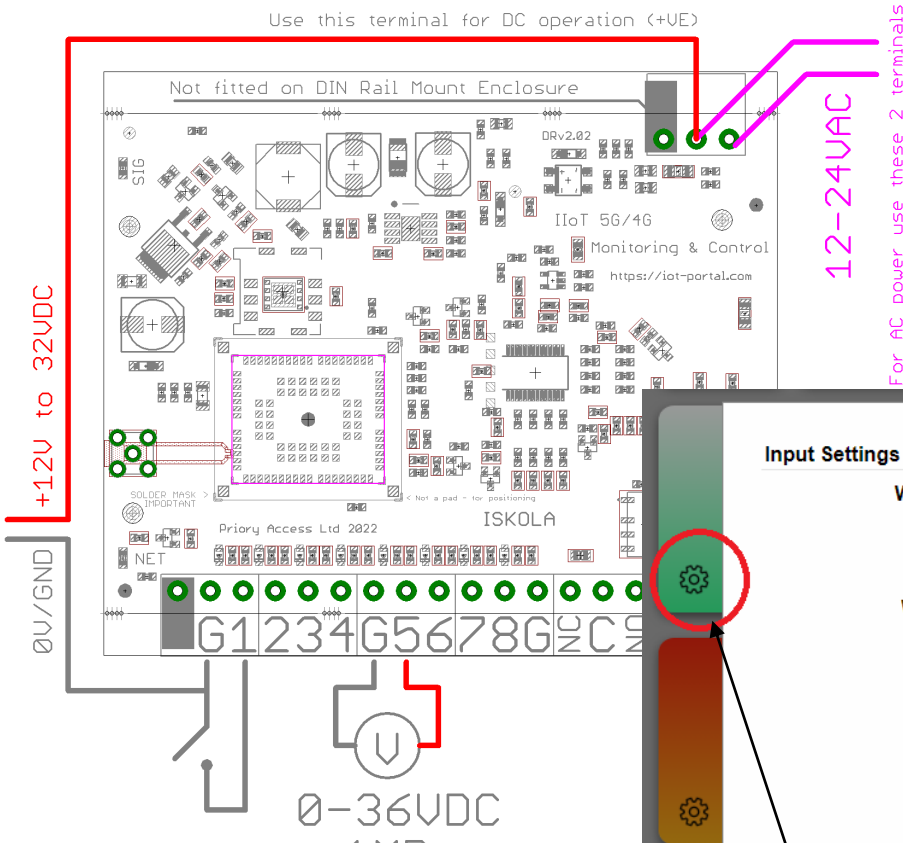
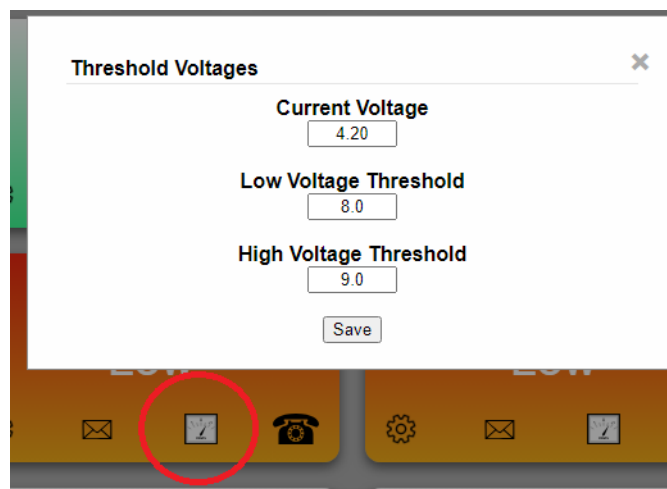
The input terminals 1-8 will measure a voltage of 0V to 36V DC. Do not apply AC to these terminals.

The device can be powered from an AC supply up to a maximum of strictly 24VAC! Please measure power supplies rated at 24VAC. In the UK they are often fed from a transformer wound for 220VAC operation resulting in AC voltages of about 28VAC.

A voltage source can be supplied to the inputs up to 36V. The input impedance is approximately 1MR. The high and low message trigger voltages can be set from 0V to 36V. There is 0.5V of hysteresis applied programmatically to the input. You should ensure the difference between the low and high voltage thresholds is at least twice the hysteresis value (i.e. 1.0V minimum)

### Example,

Low Threshold 8.0V, High Threshold 9.0V.  
(Low 8.1V, High 8.9v is invalid!)



### Input Settings for Input 1

When input 1 drops below 1.5V

- Send Text
- Make Call
- Send Email

When input 1 rises above 10V

- Send Text
- Make Call
- Send Email

Digital/not Analogue

0 Hold Time (s)

Choose between analogue and digital mode by clicking the gear wheel on the input card on the Live Screen  
Uncheck the 'Digital/not Analogue' check box for analogue

## Programming: User Enrolment

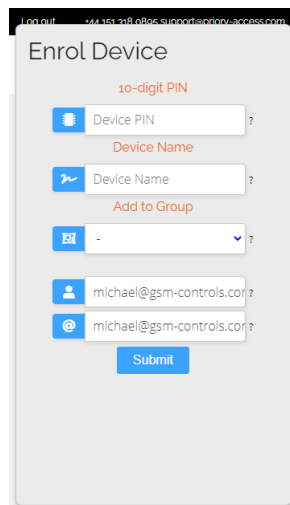
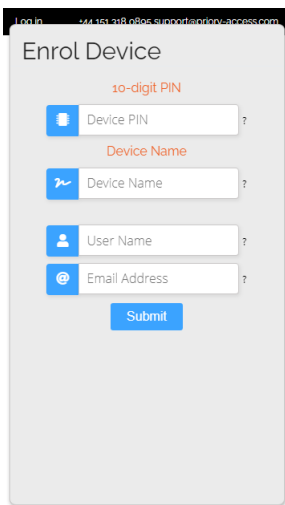
When first powered up, the signal LED (SIG) will initially flash. This will light permanently once a connection has been established. The SIG LED may continue to flash at a lower rate to display the unit is getting a poor signal. So long as the LED is not flashing the system will be operational.

The 5G model may take 5-10 minutes to connect to the network. These units are not intended to be moved very often and save power by storing network settings for the local base stations instead of loading them every time it is powered up. This is why they take time start up. They require extra synchronisation with the network to connect.

If you have access to a smart phone with QR code reader, you can get access directly to the Live Screen and Users page by scanning the **Live Screen QR code** (be aware we also include the 'View Screen' QR code label which gives unauthorised viewers read-only access) which contains a secret encrypted key. To use the QR code, scan the image and navigate to the Users page to add your number and email address. We recommend you add both your mobile number and email address.

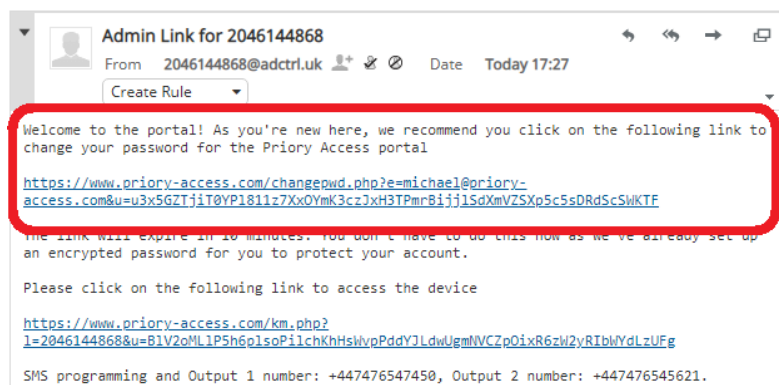
To add users without the QR code, the admin user must enrol himself/herself on the unit by visiting the following address

<https://iot-portal.com/enrol> (for this device ensure you use the iot-portal.com not priory-access.com)



Enter your name, your email address and click 'Enrol'. This will take you to the Live Screen for your device. You will receive an email with a link to the Live Screen. **If this is the first unit you have enrolled, you will receive a link in order to set a password on the portal. We recommend you use this link immediately before it**

**expires.**



It is possible to program the dialler using SMS text messages or via the online portal. To program the dialler via SMS, please see the "SMS Programming and Operation" Quick Start Guide.

**Users**

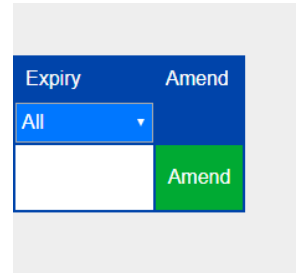
To access the telephone numbers and email addresses click the 'Users' button.

**New User** **Users**

User	Phone	Type	Email
All ▾	All ▾	All ▾	All ▾
Joe Bloggs		Master, Text, Call	joe@bloggs.com
Page ▾			

The 'Phone' column will be highlighted in red to indicate you should add your number by clicking the 'Amend' button. Please check your email address carefully for errors!

If you add yourself as a 'Master User' you will be able to recover your account if there is a problem with your email address. A Text number is sent an SMS text message when the inputs are triggered. A Call number is dialled with an input is triggered. During the call we will read out the message or can play an mp3 file



To add more users, click the 'New User' button at the top of the page. When adding a new user each column is optional. There is no need to add a number and email address for each user. Leaving a column blank is generally OK.

If you would like the user to have Full Access to all settings, then select 'Full Access' from the drop-down menu. Open/Close allows the user access to the 'Open Gate' page and 'None' removes all access without deleting the user.

**Events**

You can tailor specific email events for each user by amending the 'Events' box. There are some preset events for each system, such as, 'Alarm', 'Set/Unset'. To customise the email events the corresponding event number is required to be entered

Input 1 Low 40, Input 1 High 41  
 Input 2 Low 42, Input 2 High 43

**Expiry**

After the expiry date, the user will be deleted.

**Further help and information is available at: <https://iot-portal.com>**

## User Details

16:49

4G

Each section has a help pop-up box.

### Amend User

Click 'Help' for further information

User name should be entered here

User (Help)  
Andrew

For door readers with a keypad, optionally enter a keypad code here

Access Control Media

Keypad Code (Help)  
12345

Tag Code (Help)  
A18CD846

Save

If you would like the code sent to the user, check this checkbox and fill in the phone number below.

Send code to user in SMS

Void Tag

Mail My Tag

To disable the user's access but retain their tag ID (recommended), click void tag

Mail My Tag – clicking this box pre-fills the Tag ID box. Once the save button is pressed the administrator is directed to an address form for the mailing address of the user.

#### The tag ID is entered here

If you clicked on the tag ID on the Live Screen it will be pre-filled.

There are multiple ways of obtaining a tag ID:

- Priority Tag label
- Using NFC Tools
- Obtain from door reader
- Obtain from USB reader

#### Phone Settings

Phone (Help)	Order (Optional)
Type (Help)	
Admin	

The phone number can be added for a general user so they can receive their keypad code via SMS (Type should be 'User').

Admin users should add their number for important information from the controller such as void tag attempts or the controller needs attention.

#### Email Details

Email (Help)

Email Notifications (Help)

Permission (Help)  
Full Access

Email addresses should be added for Admin users so they can be sent a link to the door controller or log in to the group view via the [iot-portal.com](http://iot-portal.com) main page.

Admin users should have 'Full Access' selected from the permission drop down box.

If invalid/void tag events require email notification, select 'Full' from the email notifications drop down box.

#### Optional Time Settings

Start Time (Help)

End Time (Help)

Weekdays (Help)  
[X]S [X]M [X]T [X]W [X]T [X]F [X]S

Expiry Date (Help)

None

Each user can have time restrictions placed on their access for each door.

Daily start and end times can be specified in this section along with the ability to restrict access to specified days.

An expiry date may be added to ensure access is automatically removed for this user on the specified date.

When either 'Save' button is pressed, the cloud database is instantly updated. An attempt is made to contact the controller if it is available. If the controller is offline an attempt will be made at a later date until the data is confirmed.

Save  
New Key

Cancel  
Delete

Removes user from database

The 'New Key' button generates a new secure link for an Admin user if the original has been unintentionally shared



## SMS Programming and Operation

Whilst on-site it is often easier to program and operate the system via SMS. Both online and SMS programming/operation are available and can be used in conjunction with each other. There is a small charge made against your PAYG balance for receiving SMS messages. This is typically £0.01. Please check your 'Live Screen' for per unit pricing. The optional reply is charged at your standard SMS rate.

To enrol your phone via SMS you will need the 10-digit PIN number for your device shown above. Please send the following SMS to +44 7429 750 090:

### Enrol <pin>

For example, if your PIN is 0123456789 then you should send:

### Enrol 0123456789

The system will reply to your message with your Output 1 telephone number. This should be stored as your SMS programming telephone number. It is also the number for operating Output 1 by SMS and dial-in.

Output 2 has its own telephone number which is also contained in the message and can be found by sending the following message to your new Output 1/SMS programming number (obtained in the previous step):

### Output 2

To operate the output relay on your unit simply send the following commands via SMS to the corresponding telephone number

<b>On</b>	...active the output indefinitely
<b>Open</b>	...active the output indefinitely
<b>On 10</b>	...active the output for 10 seconds
<b>On 5m</b>	...activate the output for 5 minutes
<b>Close</b>	...deactivate the output
<b>Off</b>	...deactivate the output

Please note, it does **not** matter whether the message is in **UPPER CASE, lower case or a MiXtUrE** of both upper and lower case.

To **add** dial-to-open number the ADD command is used as follows:

**Add 07123456789.** ...adds 07123456789

To remove all occurrences of a number:

**Remove 07123456789.** ...removes 07123456789 (all occurrences)

To add numbers to call and text when the alarm sounds/inputs are triggered send the following commands:

**Call 07123456789** ...calls 07123456789 when the inputs are triggered  
**Text 07123456789** ...text message 07123456789 when the inputs are triggered

To add a master number (who can administer other users) send the following SMS:

**Master 07123456789** ...gives 07123456789 admin rights to the unit (along with the original enroller)

There is no limit to how many numbers of any variety that can be stored. We recommend only 1 or 2 master numbers as they are contacted when there is a problem or the accounts needs topping up.

To get a list of numbers associated with this unit send the following SMS

**List** ...returns a list of all of the numbers in the database



To access the Live Screen on a unit enrolled by SMS, send the following message:

**Get link** ...returns a clickable link to the 'Live Screen'

To check you PAYG Balance send the following SMS:

**Balance** ...returns your current balance (in GBP)

To check your current incoming and outgoing call charges send the following:

**Charges** ...return incoming and outgoing SMS and Call charges

#### List of Commands

	Additional Instructions		
<b>Add</b>	<number>		Adds a 'dial-to-open' number
<b>Balance</b>			Displays PAYG Balance
<b>Call</b>	<number>		Add number to call when input triggered
<b>Charges</b>			Displays usage charges
<b>Close</b>			Deactivates relay corresponding to number
<b>CSQ</b>			Returns signal strength out of 31
<b>Enrol</b>	<pin number>		Enrols a new phone
<b>Get Link</b>			Returns a clickable link for Live Screen
<b>List</b>			Returns numbers in database
<b>Master</b>	<number>		Adds admin phone number
<b>On</b>		<seconds> <minutes>m	Activates relay corresponding to number
<b>Open</b>		<seconds> <minutes>m	Activates relay corresponding to number
<b>Output</b>	<output>		Displays output information
<b>Pulse</b>			Pulses relay corresponding to number
<b>Remove</b>	<number>		Removes a number from the database
<b>Relay Time</b>	<seconds>	<minutes>m	Changes relay pulse time (dial-to-open)
<b>Reply</b>	<b>On</b>	<b>Off</b>	Switches SMS confirmation on and off
<b>Signal</b>			Returns signal strength out of 31
<b>Status</b>			Input and Output states

Further help and information is available at: <https://iot-portal.com/help>

## Email Programming and Control

Each device can be programmed and controlled by email. This is useful for adding multiple users at once or for activating the output relays by an automated email message. For example, you may get an automated email from a 3<sup>rd</sup> party and would like this to operate a light or motor for example.

For an email address to control or program the device, it must be known to the system. The operator should go to the 'Users' page from the 'Live Screen' and add a new user with the desired email address. The user must be set to an 'eReader' email address as shown below:

Amend User

eReader ?

+User Details

Phone ?

Order ?

User ?

! 1,2,3,4,5,6,7,8 ?

@ michael@iot-portal.com ?

eReader ?

! Email Events ?

+ Access Control Media

eReader email addresses show up on the Users page in purple. Emails sent from this email address will be able to change settings and control the output relays for this device. Emails are not as secure as phone numbers and can be easily spoofed, so ensure the eReader setting is only used during desired periods of programming and control. For extra security an email API key can also be generated which can be included in the email body. This will ensure spoof emails are disregarded.

To send commands to the device via email, messages should be sent to:

[things@iot-portal.com](mailto:things@iot-portal.com)

This is the standard email address for devices. The subject line of the email must contain only the 10-digit code for your device and nothing else.

## Email Commands

Multiple commands may be sent per email, each separated by a new line. Each command will be processed and a reply will be sent for each command in 1 email.

Most SMS commands are accepted by email along with the user command:

**User** *name,phone,type,email,events*

For example:

User Michael,07123456789,master,michael@iot-portal.com,12345678

The type field can be: *master, text, call* or *user* (for dial-to-open). If a field isn't required leave it blank but insert a comma:

User Michael,,,michael@iot-portal.com,12345678

The events are input numbers for inputs 1 to 8.

The '**delete users**' command can be used with the API key to remove all 'users' leaving any admin, call, text phone or Full Access email address.

## Controlling the output relays

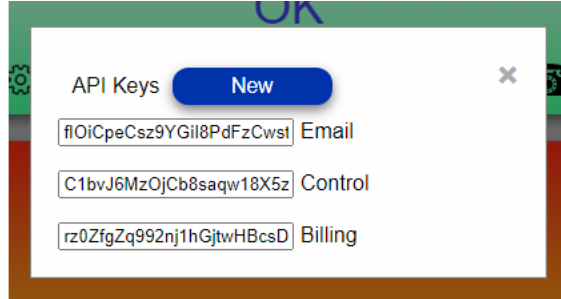
You should specify the output you would like to operate with the # or \* symbol as follows:

On#  
Off#  
Pulse\*  
Open\*  
Close\*

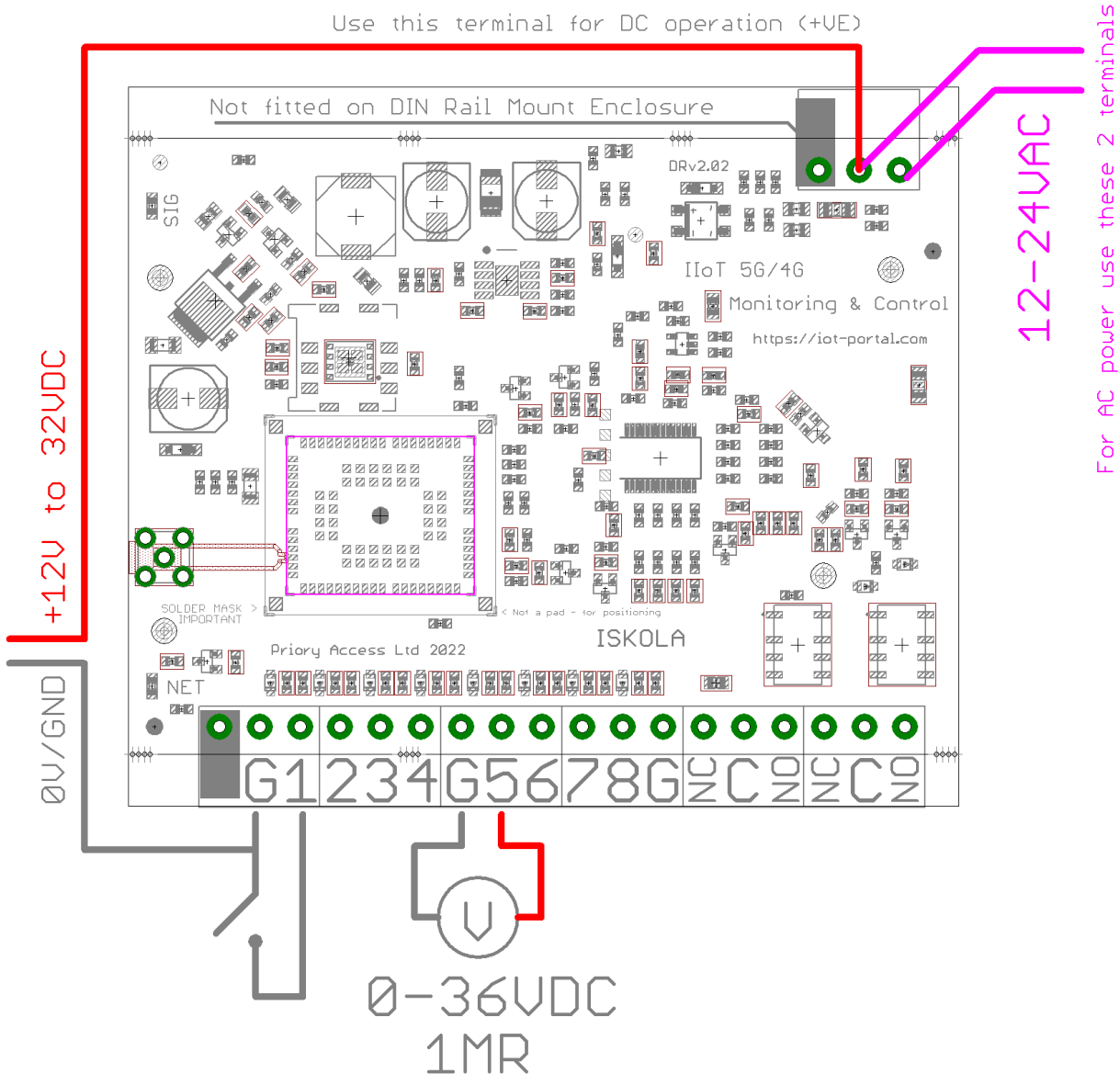
## Securing with an API Key

An API key can be generated on the Live Screen by clicking 'Show Tools'>'Create/View API Keys'.

If the email API key box is empty, click 'New'



To make use of the email API you should select 'eReaderAPI' as the user type. The API Key must be on the first line of the body of the email in order for eReaderAPI emails to be read.



## Declaration of Conformity

Document Number: DOC\_DR103\_DoC

Issuer's Name: Priory Electronics Ltd

Issuer's Address: 23 Goodlass Road, Liverpool, L24 9HJ

Object of the declaration: DR1.03

The object of the declaration described above is in the conformity with the relevant Union harmonisation legislation:

2014/108/EC The Electromagnetic Compatibility

Directive 2011/65/EU The Restriction of Hazardous Substances

Directive 2014/53/EU RED Art3.1 (b) Radio Equipment Directive Conformity is shown by compliance with the applicable requirements of the following documents:

Safety: EN 60950-1:2006+A2:2013

EMC: EN 301 489-1 V1.9.2 (2011-09) EN 301 489-7 V1.3.1 (2005-11) EN 301 489-17 V2.2.1 (2012-09) EN 301 489-24 V1.5.1 (2010-10)

Radio: EN 301 511 V12.0.0 (2015-02) EN 300 328 V1.9.1 (2015-02) EN 301908-1 V7.0.1 (2014-11) EN 301908-2 V6.2.1 (2013-10)

Technical Construction File required by this directive is maintained at 23 Goodlass Road, L24 9HJ UK

Signed for and on behalf of Priory Electronics Ltd

Name: Michael Beaver

Position: Director

Date: 02/06/2021

**Made in UK**