FutureNow FNIP-RGB/010

Installation and Operation Manual

rev 01.07.2020

4 Channel RGB(W) LED Dimmer

/Surface and DIN Rail mountable/

Figure 1. The FNIP-RGB/010 LED dimmer module

OVERVIEW

The FNIP-RGB/010 is used for switching and dimming low voltage LED strips using constant voltage PWM method. There is also a 0-10V analogue output for each channel that works alongside the PWM output.

The outputs can be controlled via the local inputs and through the network using TCP/IP commands or the built-in web interface.

The local inputs give the customer the ability of using the system even before a central controller is installed or the network is built, offering stand-alone operation. The home owner can decide later on what controller or system to use.

This also improves reliability since the operation of the outputs do not rely on any other device. If network or programming errors should occur, the lights still remain controllable.

The inputs can also be used as independent digital inputs for remote monitoring various sensors, such as water leakage sensor or door contacts, or even an output of a security system (armed/disarmed/in alarm).

The local inputs are usually connected to momentary wall switches and work similarly to traditional light switches.

The inputs can also be used to recall pre-defined scenes. See the **Scenes** section for more details.

The FNIP-RGB/010 connects to the network via an RJ45 Ethernet connector.

The outputs can be used individually or as RGB or RGBW depending on what types of LEDs are to be controlled. Low voltage single-colour LEDs or halogens are controlled by one output each. RGB LED strips use three outputs while RGBW LED strips need four outputs. The possible grouping of the outputs:

Output 1,2,3 – individual outputs or Red, Green, Blue of RGB

Output 4 – individual output or W of RGBW

Main features

- Ideal for dimming single-colour or RGB LED strips
- 4 x PWM outputs for switching and dimming 4 single-colour, 1 RGB or 1 RGBW LEDs or other low voltage PWM dimmable loads
- 4 x 0-10V outputs working alongside the PWM outputs
- 4 x optically isolated multi-purpose inputs for manual control or connecting digital sensors
- Toggling the outputs, recalling basic colours and choosing any colour can be done via the manual inputs
- 255 dim levels
- 24-bit colour depth
- Colour picker to set output colour easily
- Colour scroll with adjustable speed
- Preset dim level – outputs will go to that level when turned on
- Dim level memory – the outputs remember the last dim level. When next turned on, lights will return to the last remembered value
- Adjustable minimum and maximum dim levels
- Adjustable ramp rates
- Standard DIN rail mount

Enhanced Connectivity

- New TCP/IP interface offers remote control and advanced management
- Built-in web server for configuration, control and monitoring
- Remote control and monitoring from network enabled smart phones, tablets
- Multiple users with different user rights
- TCP communication with simple ASCII commands
- Automatic event reports about status changes of inputs and outputs
- Firmware upgrade via LAN

Industry-Wide Interoperability

- Integration with home controllers from most major vendors (Control4, AMX etc.)

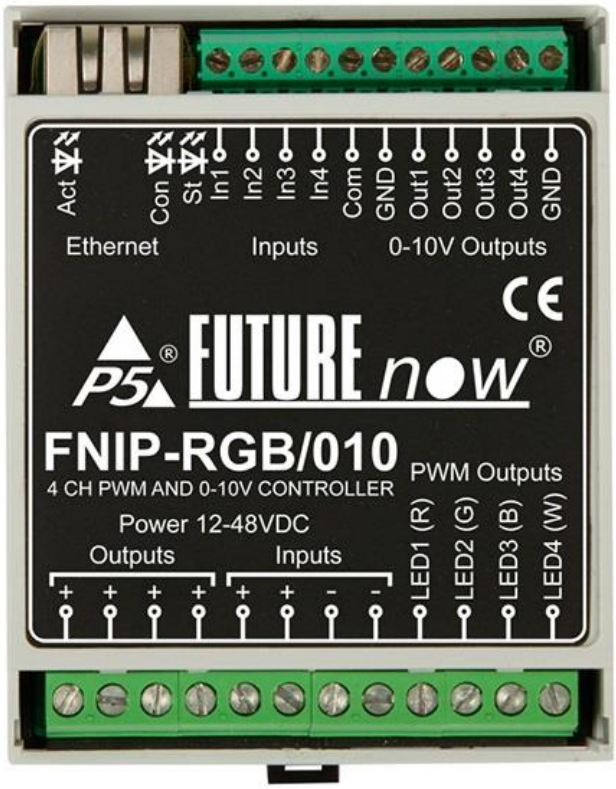
- Compatible with any momentary contact switch

Table of Content

INSTALLATION

Terminal connections

Each module has a wiring diagram on the front which can help the installer when connecting the modules at installation sites.



Wiring

A sample wiring diagram is shown in figure 3a. In this example an RGB and a single-colour LED strip are controlled. Both LED strips and the module are powered from the same power supply. Using separate power supplies is also possible.

Please note that the + and – terminals at the bottom of the module are connected together internally. The reason for multiple + terminals is to make

connections easier as all the LED strips have to be connected to +. The reason for two + and two – input terminals is to split current draw (one terminal is rated for up to 16A and if all the 4 channels are used with maximum load, the current draw can be as high as 32A so you must use two wires connected in parallel for the + and two other for the – power. You can also use separate power supplies. In Figure 3b where 3 separate power supplies are used. You can use separate ones for all LED strips and the FNIP-RGB/010 module or any combinations. Think of the PWM outputs of the FNIP-RGB/0-10V as active switches connected in series with the LEDs and their power supply.

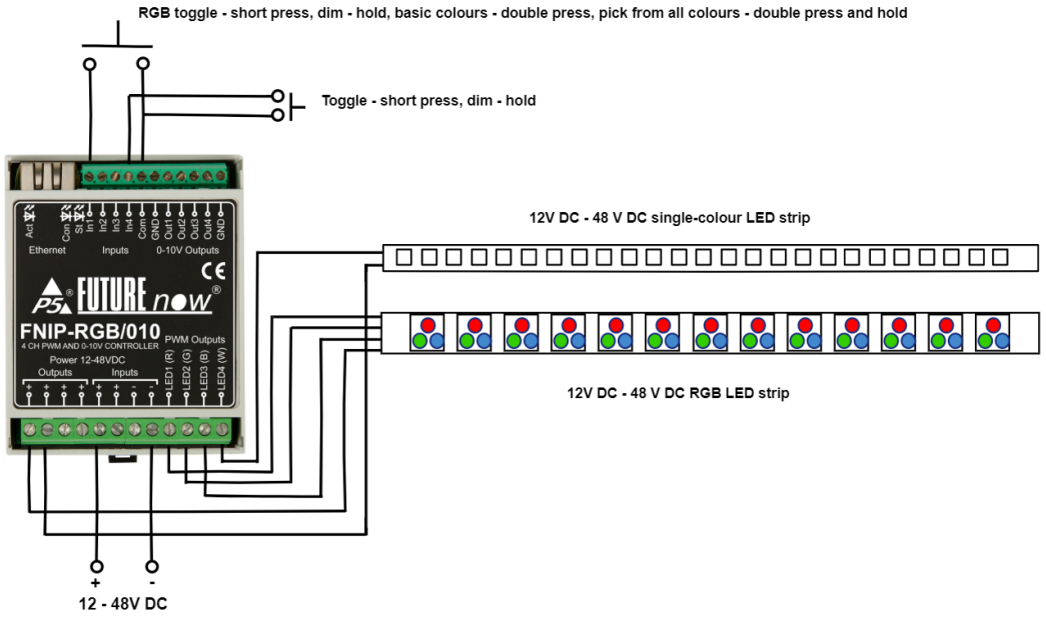


Figure 3a. Sample wiring diagram with a single power supply

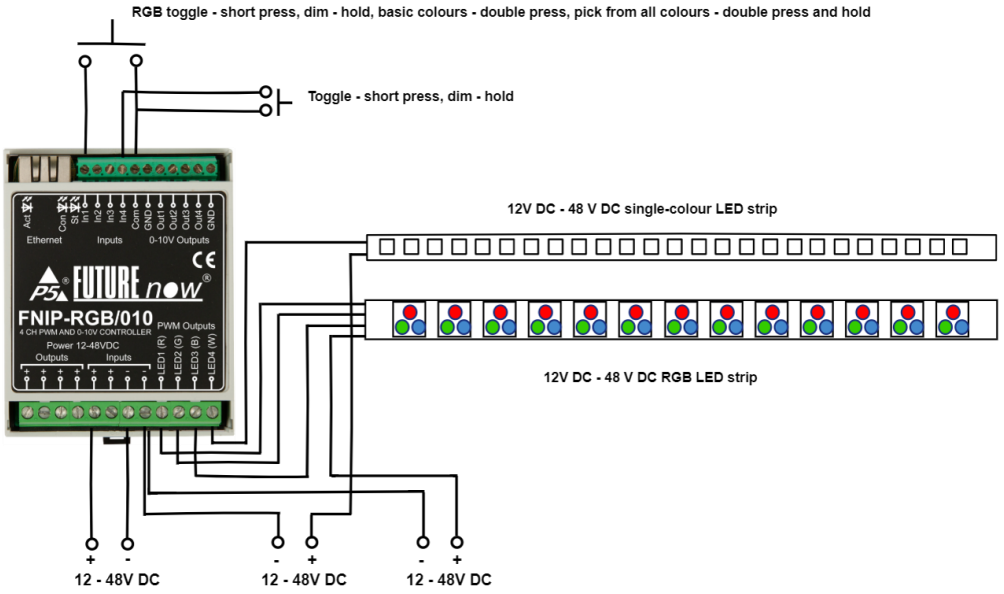


Figure 3b. Sample wiring diagram with separate power supplies

The 0-10V outputs are powered from the module's input power so no additional power supply is needed.

Please note that the 0-10V outputs and the PWM outputs are linked. The FNIP-RGB/010 is a 4 channel unit with a PWM and a 0-10V output for each channel. For each channel you can use either the PWM or the 0-10V outputs. If you use both they will change together when the dim level is changed.

Recommended wire types

- Ethernet cable: Twisted pair, CAT5 or better.
- Outputs: According to the loads attached to the outputs (current and voltage). **Please note that because of the low voltage, high currents are flowing through the wires that drive the LED strips, so to avoid high voltage drops and too much heat dissipating on the wires, make sure you use the correct wire gauge.**

- Inputs: A pair of low or high voltage cable. The inputs use low voltage signals.

Ethernet Connection

Connect the module to the LAN via the RJ45 Ethernet socket.

Local Inputs

For each output, there is a local input to allow manual operation. If you do not wish to use local inputs, this section may be skipped.

Connect dry contacts (pushbuttons, momentary switches, relay contacts, etc.) across the appropriate input terminals and the input common terminal.

WARNING! Avoid supplying voltage on these terminals!

All input ports are optically isolated to protect the unit against unwanted effects of ground loops, overvoltage or misconnections.

Three-way switches can be implemented by simply connecting multiple momentary switches in parallel.

Status LED Indicators

In order to make installation and debugging easier, communication and channel status are displayed via LEDs.

Input status LEDs

Each input has a dedicated status LED that illuminates solid green when the corresponding input is activated.

MCU live LED

When on, indicates that the FNIP-RGB/010 unit is running.

Con LED - green

The Con LED is on when the module is connected to the Ethernet network.

Act LED - yellow

It indicates that communication via Ethernet is in progress.

St LED - red

It is illuminated while the boot loader is active and it is blinking during a firmware upload procedure. This should only happen during hardware resets and in the second phase of firmware updates.

CONFIGURATION

Configuration can be done either via the built-in website or TCP/IP.

Configuration via the web interface

The FNIP-RGB/010 automatically receives an IP address from a DHCP server.

In the lack of a DHCP server or when DHCP option is disabled the default IP address of 192.168.1.25 will be assigned. The same IP address will be assigned when connecting the module directly to your computer using an Ethernet cross cable (no DHCP server).

Use the FNIP Network Discovery Utility or other network discovery software to find all FutureNow IP devices on your network.

Connecting to the web server of the module

Connect to the web interface of the module by using a web browser. Clicking on one of the units found by the FNIP Network Discovery Tool will automatically do that for you.

You can also access the web interface of the module via an internet browser using the hostname of the module (**FNIP-RGB/010** by default) or its IP address.

Once you are connected, you will be asked to identify yourself, as seen in Figure 5.

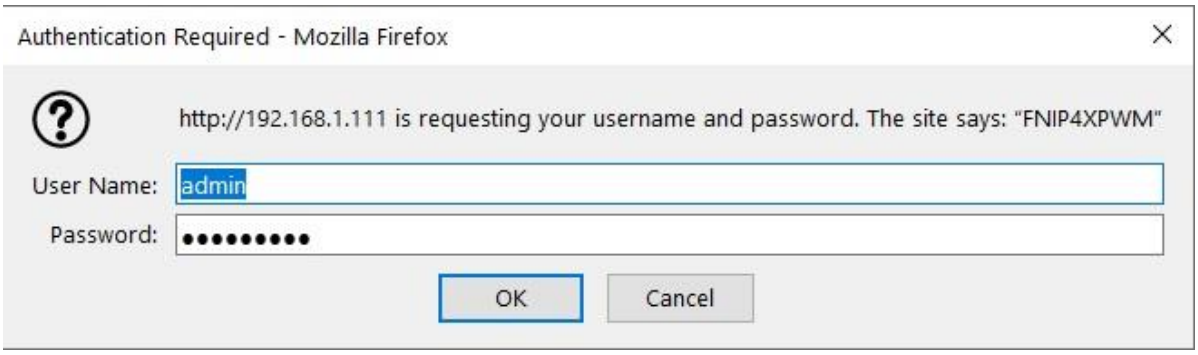


Figure 5. Authentication window

Default user name: **admin**

Default password: **futurenow**

You will be logged in as an administrator with access to all settings and functions.

Once logged in, you will automatically be directed to the **Control** page. You can use the tabs on the top of the screen to navigate between the different control and configuration pages.

Network settings

To make basic network settings click the **Network** tab. The network configuration page is shown in Figure 6.

You can choose between using DHCP or static IP address here.

Enable HTTP authentication

HTTP authentication can be disabled to make HTTP communication easier for third party applications.

Enable broadcast messages

All FNIP modules periodically send out heartbeat broadcast messages with basic information about themselves. This allows discovery tools and mobile apps to find them. These broadcasts can be disabled if constant traffic on the network is not desired.

Please note that disabling broadcast messages will stop the Discovery Tool and the mobile applications from discovering the modules on the network.

Multicast address

Used to create groups of FNIP modules that react to scene activation commands received from a module with the same multicast address.

More information about scenes can be found in the Scenes chapter.

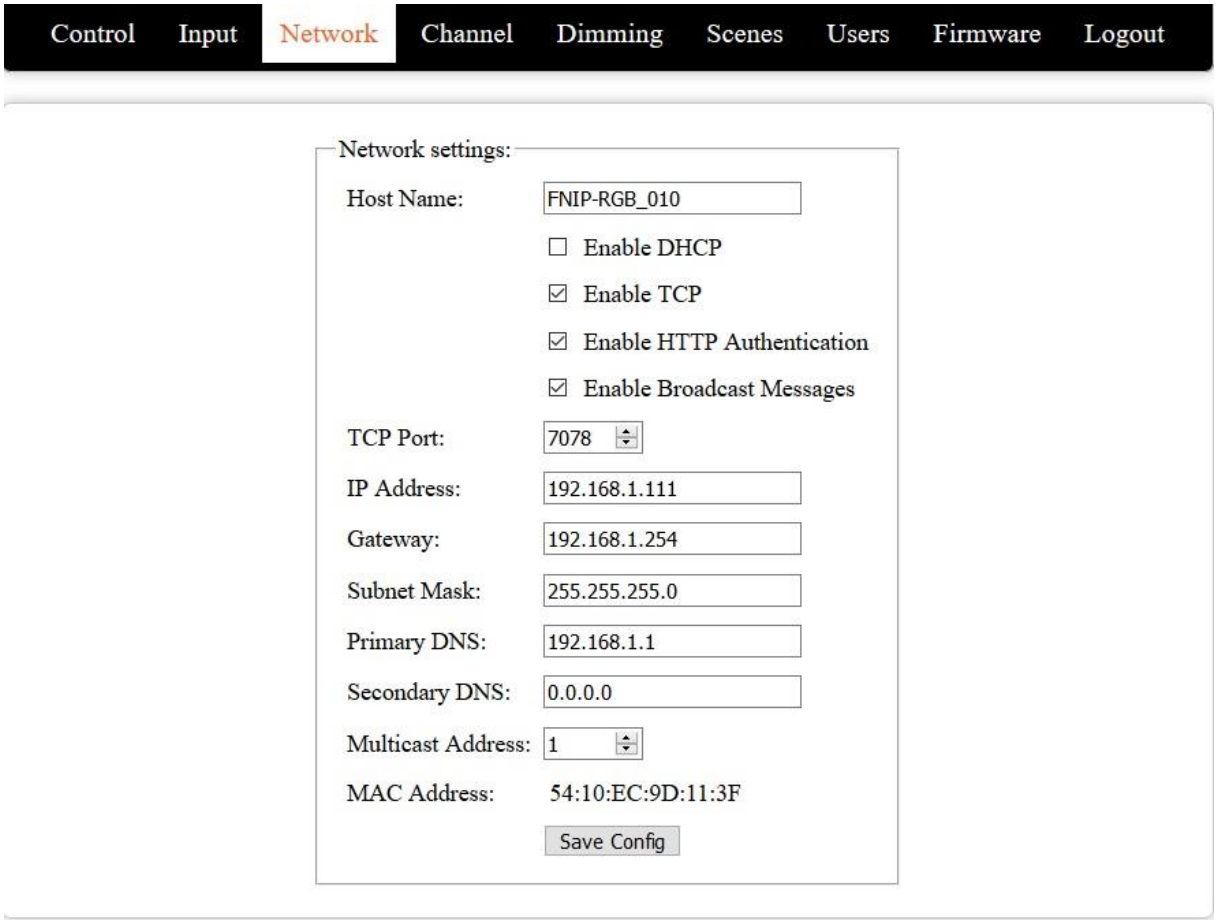


Figure 6. Network configuration page

Users and user rights

Three different users can be defined each with three different user rights: **admin**, **actor** and **observer**.

Admins have access to all functions, including control of the outputs, monitoring the status of the inputs and outputs and changing all the settings.

Actors are allowed to control the outputs and monitor the status of the inputs and the outputs, but are not allowed to change any settings.

Observers are allowed to monitor the status of inputs and outputs but not allowed to control the outputs, nor can they change any settings.

To change user settings, click on the **User** tab in the top menu. The user configuration page is shown in Figure 7.

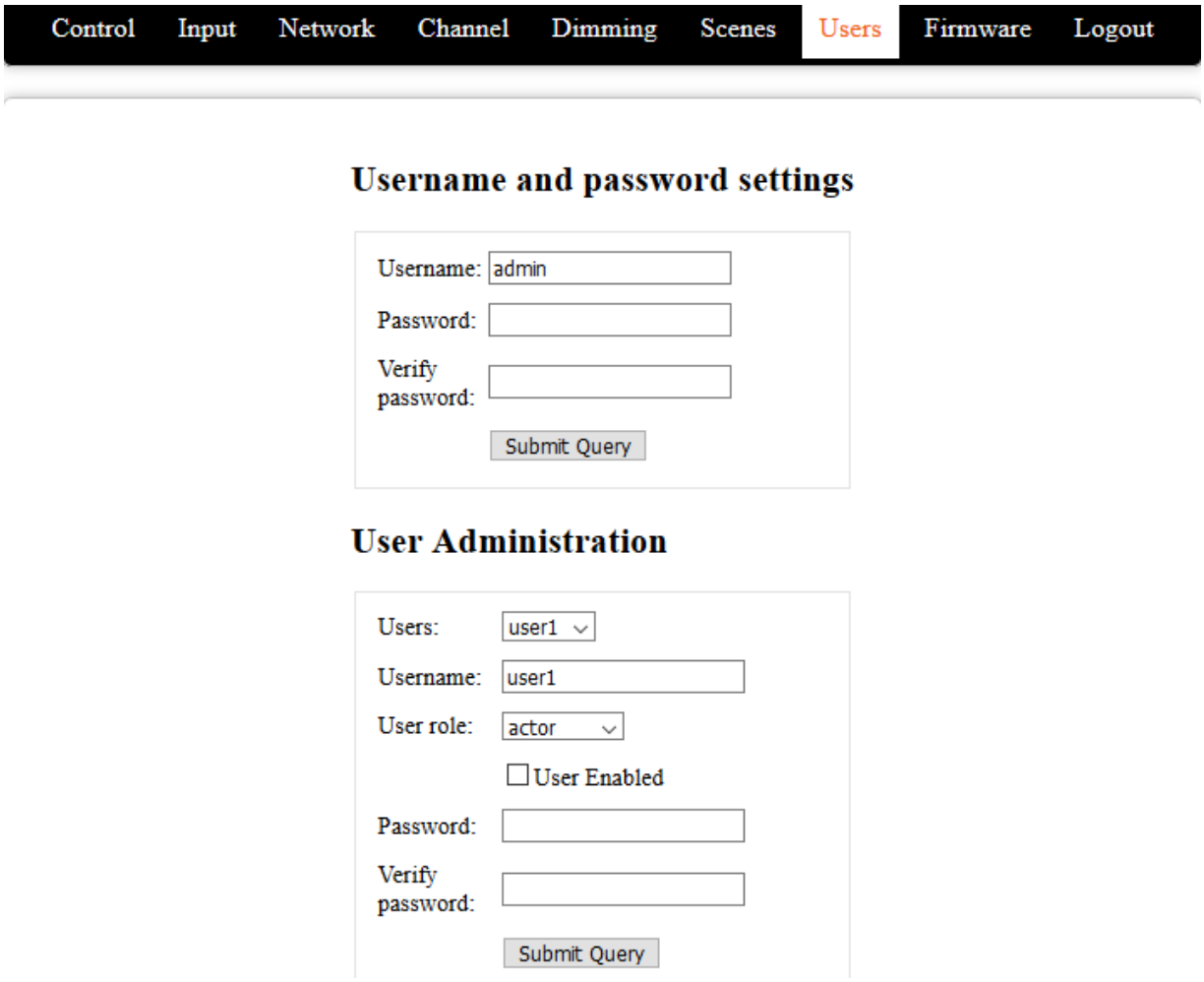


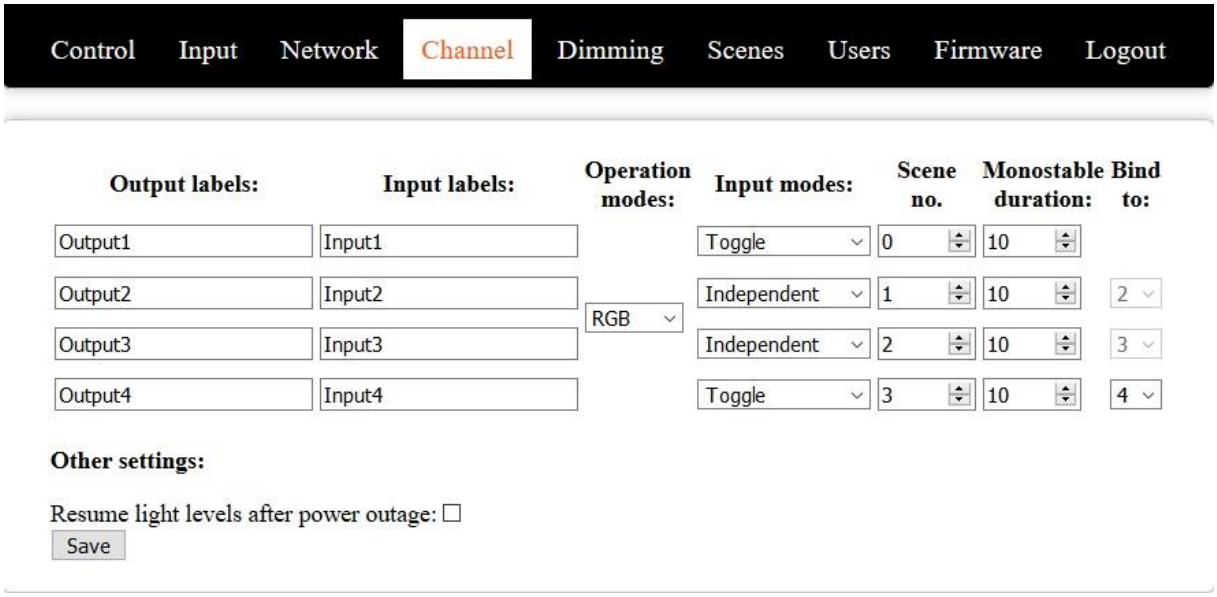
Figure 7. User configuration page

Channel settings

On the **Channel** page the outputs and inputs can be renamed. Operation and input modes can also be chosen here. The input mode determines the logical connection between the input and the output of the same channel. For details on possible input modes and how they work, see the Input modes section of this document.

The grouping of channels if using multi-colour LEDs can be done on this page. See next chapter.

Binding two or more channels is also possible. The bound channels will work together.



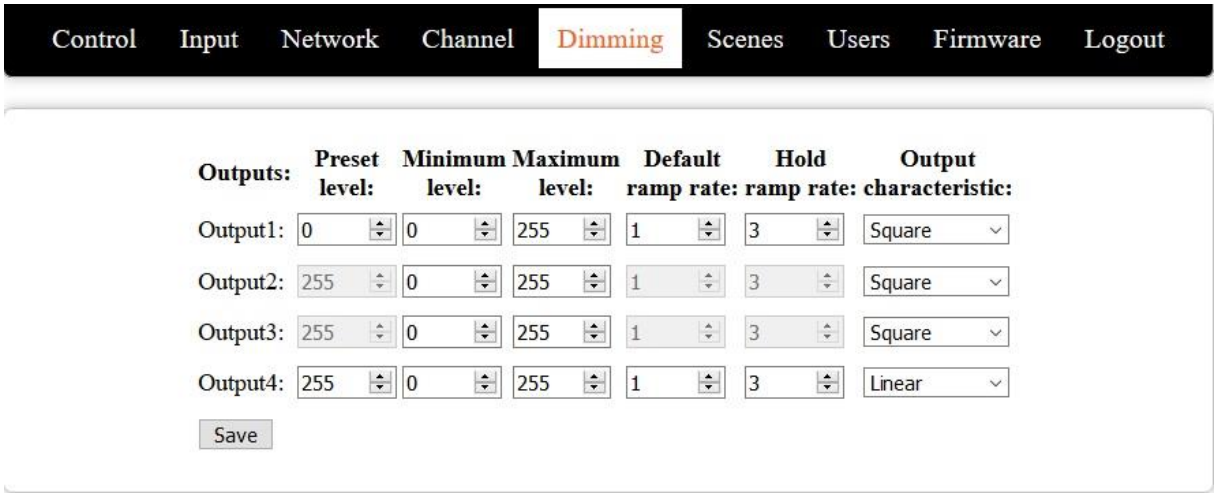
Grouping of the outputs

The outputs can be used individually or as a group of three or four depending on what types of LEDs are to be controlled. Low voltage single colour LEDs or halogens are controlled by one output each. RGB LED strips take three outputs while RGBW LED strips need four outputs. The possible grouping of the outputs:

Output 1,2,3 - single-colour outputs if mode set to Single or R,G,B if mode is set to RGB

Output 4 – single colour if mode is set to Single or RGB or W if mode is set to RGBW

Dim settings



Preset level:

If other than zero, the output will go to the specified level when turned on. Zero means the output will go to the last used dim level.

Minimum level

Some load types cannot be dimmed down all the way to zero. They cut off at some point and show some strange behavior (flickering or pulsing) below that dim level. Light bulbs also need a minimum dim level to produce visible light. Setting the minimum level slightly above these cut-off points makes these loads dimmable all the way down more smoothly.

Maximum level

The output will not go above this level. One reason may be to limit the brightness to suit the environment.

Default ramp rate

This is the time it takes for the light to go from zero to 100% when turned on/off via the inputs, via the website, or TCP commands. Shorter ramps will take a proportionally shorter time. For example, going from zero to 50% will take half the time than what the ramp rate is set to.

Hold ramp rate

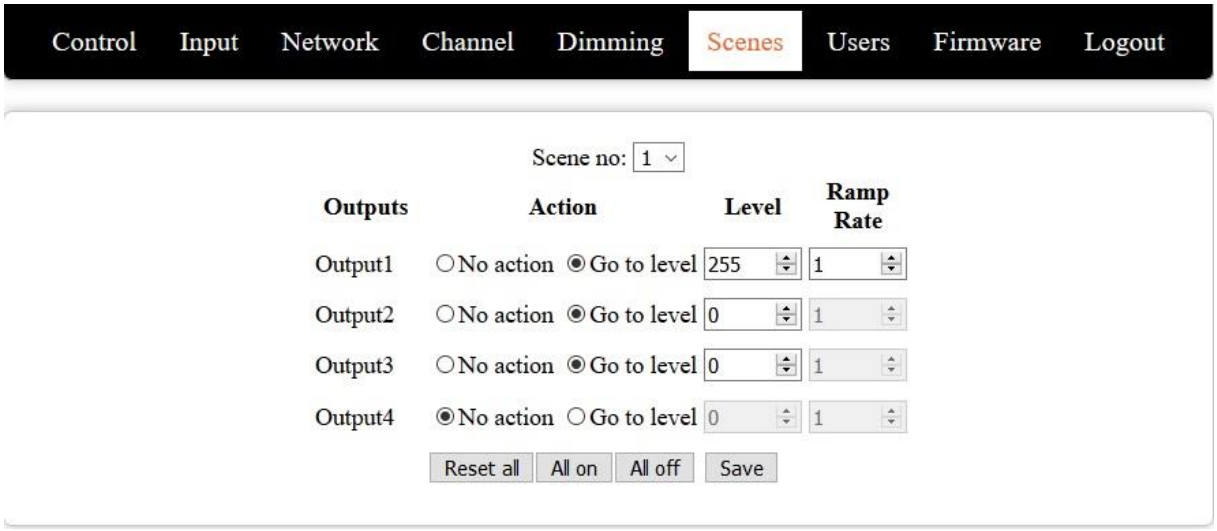
The time it takes for the light to go from zero to 100% when the corresponding input is held. Shorter ramps will take a proportionally shorter time. For example, going from zero to 50% will take half the time than what the ramp rate is set to.

Output characteristic

The way the outputs level changes by the % dim level. Use Linear for the PWM and Square for the 0-10V outputs.

Scenes

Scenes are predefined states of outputs included in a scene.



FNIP scenes can be used in standalone applications without any third-party controller. FNIP modules (module groups) support 9 scenes.

If a module receives a **S**cene **A**ctivation **C**ommand (SAC), the designated outputs will go to the pre-defined state. Any module in the group can send and receive this command. SAC can be triggered by an input change on this module, or on any module in the group

Each module in the group must have the same **Multicast address** set on the Network page. Modules in other groups will not receive the SAC.

Definition of the scenes can be done on the Scenes page using the following steps:

1. Select a scene using the Scene no scroll-down box
2. Define the action of the desired outputs using the Action, Level and Ramp Rate parameters
3. Save the settings (before selecting another Scene)

Firmware Upgrade

Figure 11. Firmware upgrade page

Upgrading the firmware in the module is possible via the network.

On the **Firmware** page click browse and find the new firmware on your PC. The latest firmware versions are always downloadable from P5's website. Then click **Upload**. The **St** LED turns on and stays on or blinks during firmware update. After uploading the new firmware – which takes about a minute – the module will automatically restart.

The version of the current firmware and the time since the last reset are also displayed on this page.

Resetting to factory defaults

Holding the reset button for at least 2 sec while powering up the module will set all the settings to factory defaults. **Please make sure you release the button when the red LED comes on or the unit will go into re-flash mode.**

OPERATION

Operation via local inputs

The inputs can be activated by shorting or opening (depending on the settings of the Channel Settings) an input terminal and the input common terminal.

Throughout this section it is assumed that momentary switches are connected to the local inputs.

Operation Modes via the inputs

Single mode

Each input controls the corresponding output.

In RGB and RGBW modes the first input will control the RGB or RGBW group.

- Each double press on the first input in RGB or RGBW mode will recall basic colours one after the other.

-Double press and hold on the first input will cause the output to swipe through all colours. This allows you to set the output to any colour you want. You simply have to let off on the input once the desired colour is reached.

Input 1 will automatically be set to toggle and inputs 2 and 3 will be automatically changed to independent mode if the mode is set to RGB. If RGBW mode is set input 4 will also be set to independent mode. They will stay in independent mode even after the RGB mode is changed.

Input modes

The inputs are factory defaulted to toggle mode and can be changed via the web interface or by TCP/IP commands. The input modes work as follows

1. Independent inputs

Inputs can be detached from their corresponding outputs, in which case they will have no direct effect on them. However, the status changes of the digital inputs

will still be reported via the open TCP/IP sockets and on the **Input** page of the built-in website. This can be used for monitoring the status of digital sensors connected to the inputs or to activate lighting scenes or macros whenever the input gets triggered.

2. Toggle mode single colour and RGB (factory default)

Each short button press toggles the corresponding output. Holding the button for more than 0.5s will dim up and down (always in the opposite direction then last time) the output until the button is let go of or the minimum or maximum dim level is reached.

In RGB and RGBW mode

Each double press on the first input of an RGB or RGBW group will recall basic colours one after the other.

Double press and hold on the first input will cause the output to swipe through all colours. This allows you to set the output to any colour you want. You simply have to let off on the input once the desired colour is reached.

3. Follow mode

The status the outputs will follow the state of the corresponding input. The output will be on while the momentary switch is pressed and off while it is released.

4. Monostable mode

The outputs can be programmed to turn on only for an adjustable amount of time when the respective input is triggered then turn off. An example is a staircase lighting. The duration of this interval can be set by the **Monostable Duration**.

5. Switch mode

This mode makes it possible to use maintained (standard light switches) instead of momentary switches on the inputs. Each trigger of the switch (On or Off) will toggle the outputs. Please note that the position of the switch – similarly to three-way switches – will not determine the status of the output.

6. Scene on open mode

If an input gets opened the **S**cene **A**ctivation **C**ommand assigned to the input on the channel configuration page will be executed.

7. Scene on close mode

If an input gets closed the **S**cene **A**ctivation **C**ommand assigned to the input on the channel configuration page will be executed.

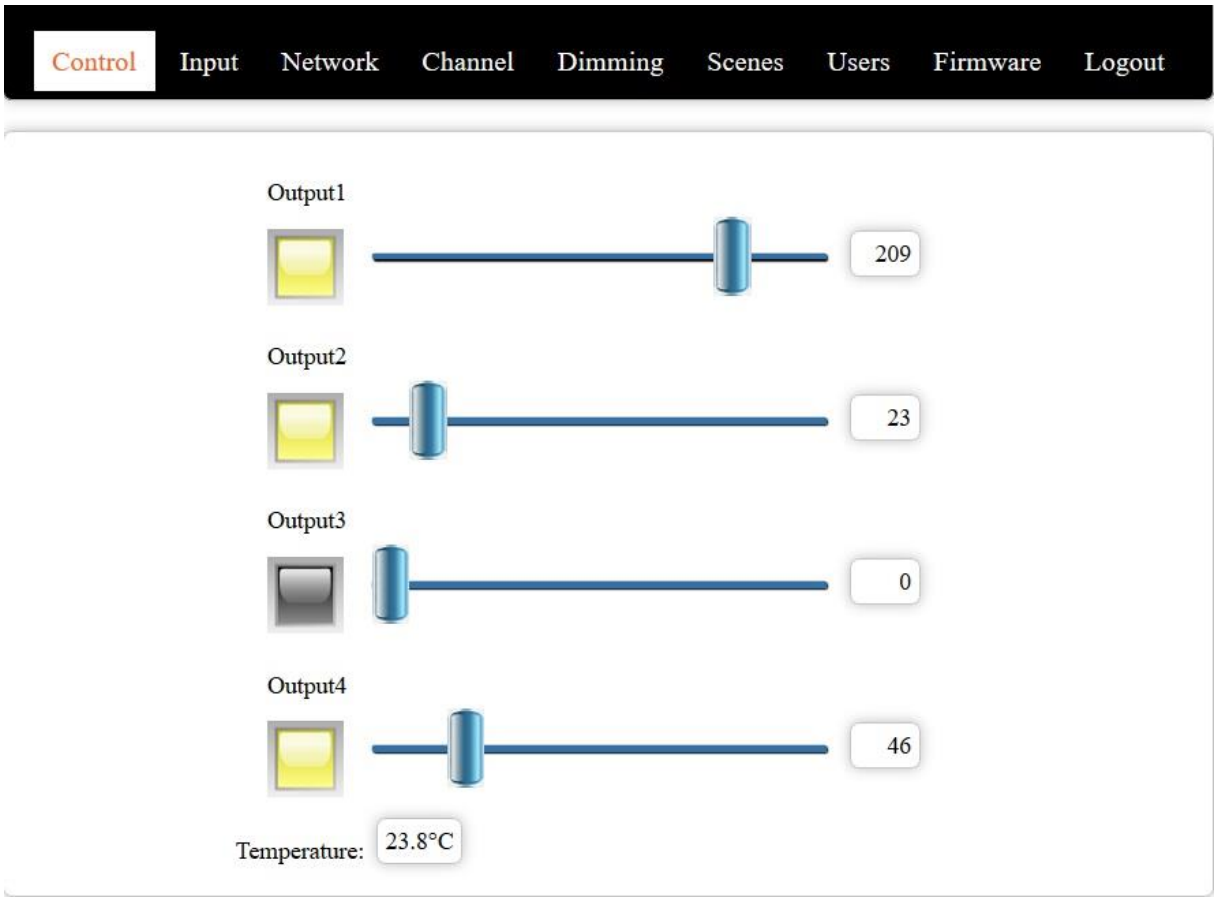
Scene no.

The selected **S**cene **A**ctivation **C**ommand will be sent to the other modules within the same group in case **Input Mode 6** or **7** is selected.

Operation via the built-in web server

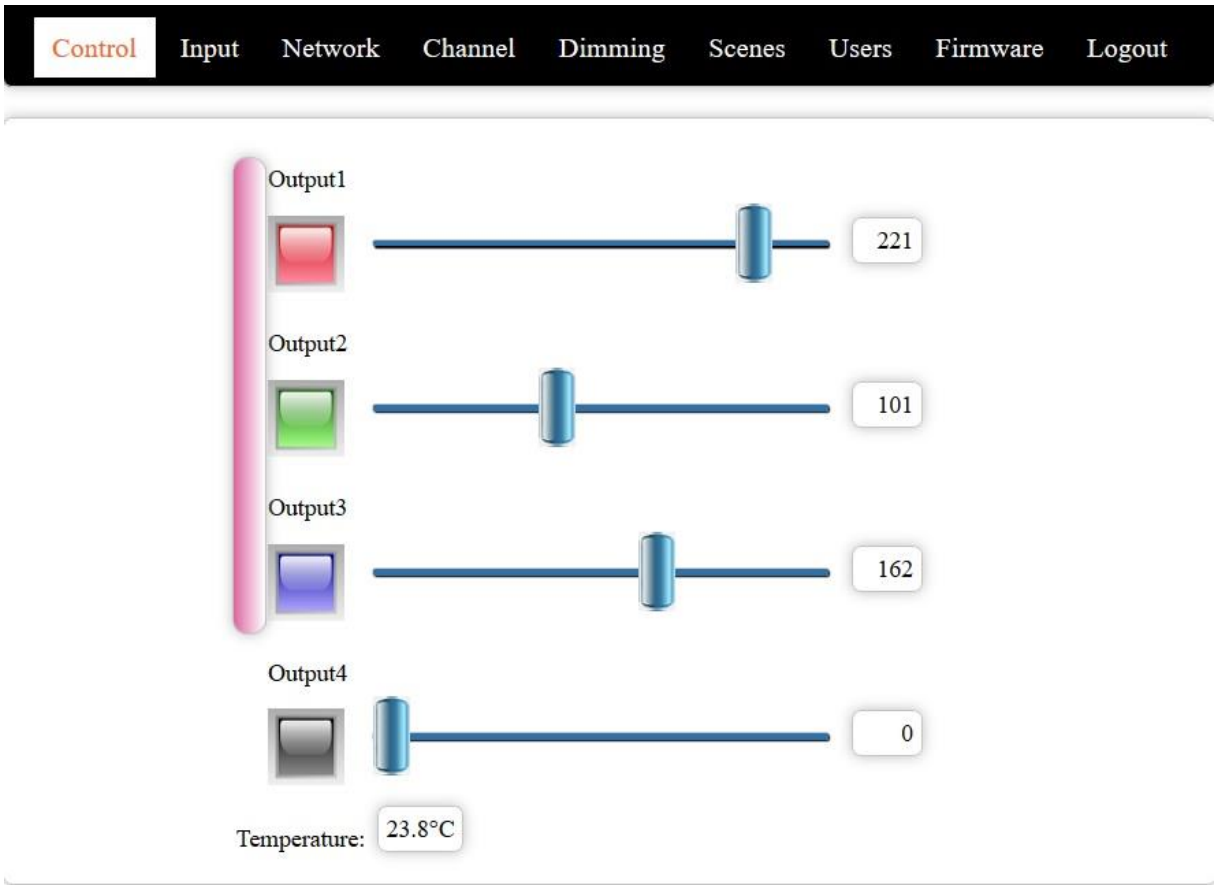
Control page

Single-colour mode



The outputs can be controlled on this page. Clicking the square channel icon will toggle, moving the slider will dim the outputs. A grey status icon means that the output is off. An active output is indicated by a yellow icon. The temperature of the module is also displayed.

RGB and RGBW modes

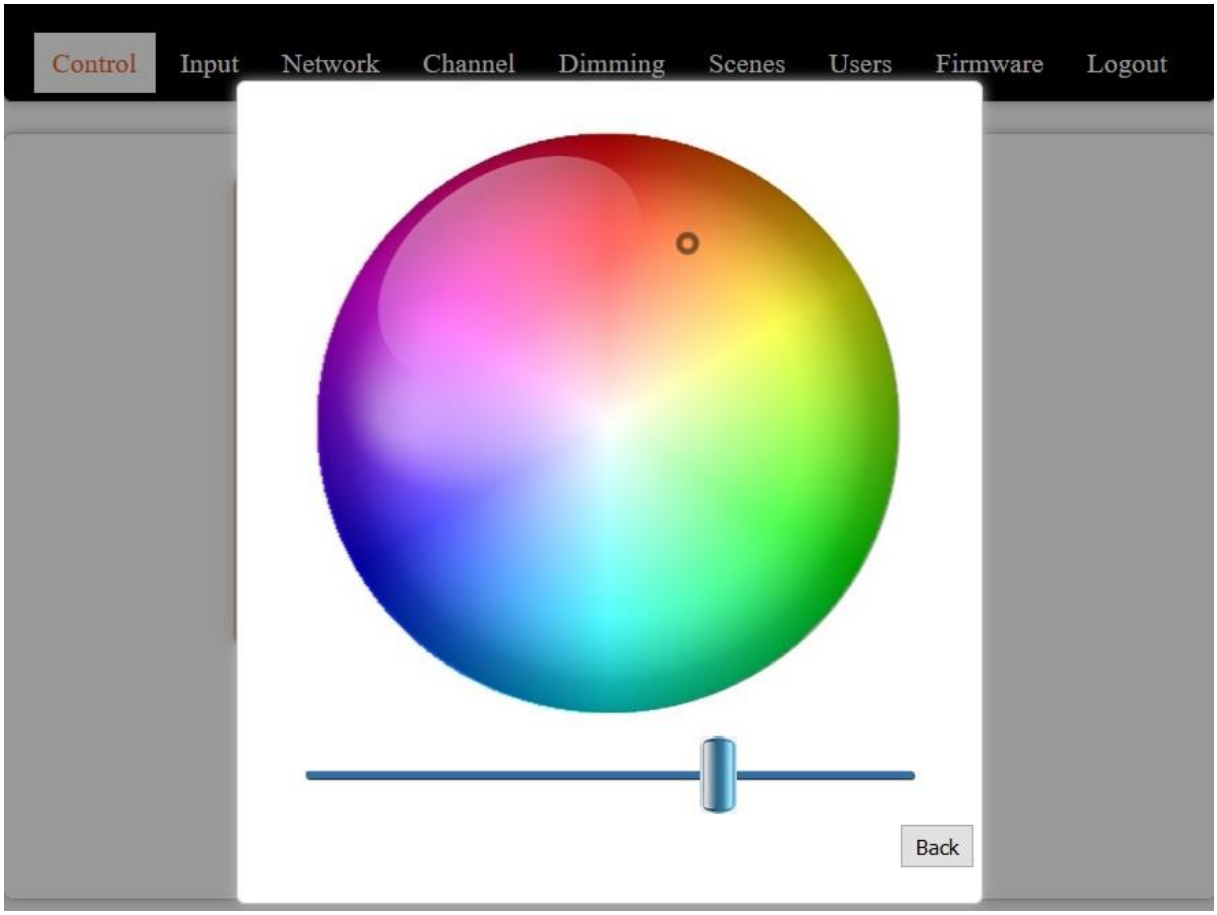


In this figure the mode is set to RGB.

You can adjust the colour using the R,G,B sliders or by using the colour picker which shows up if you click the vertical bar that groups the RGB channels.

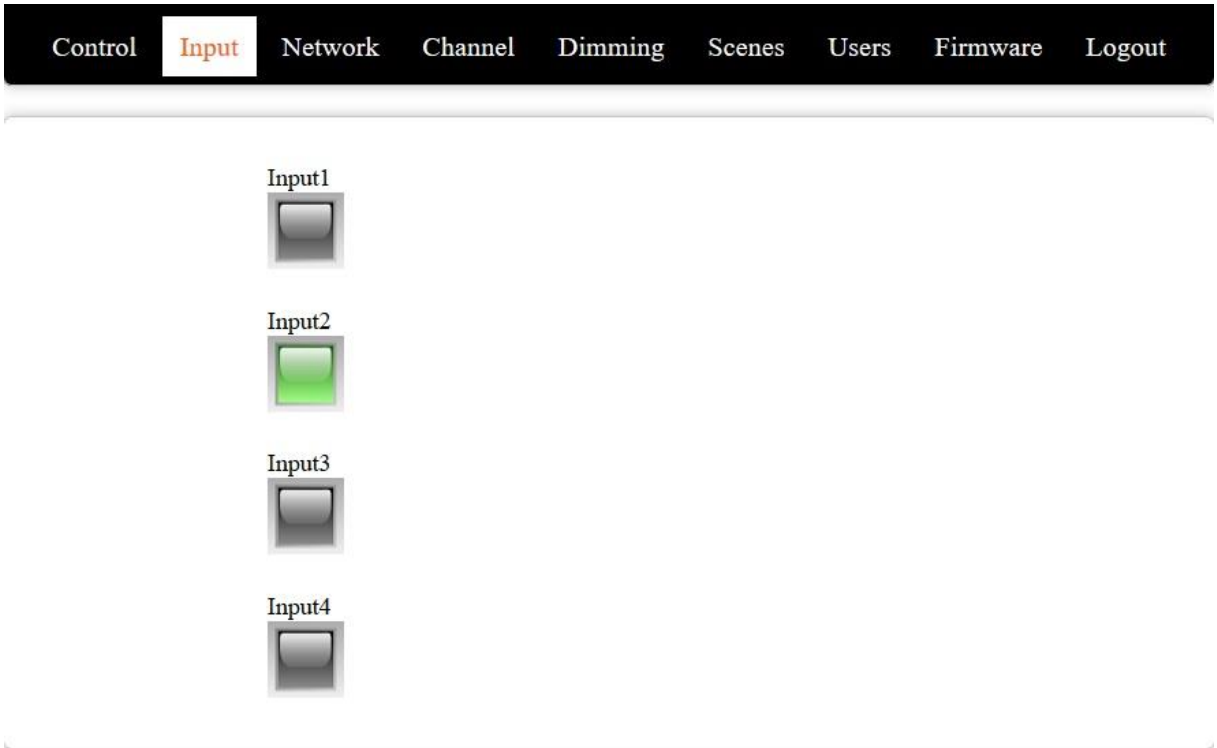
The colour of the vertical bar reflects the chosen colour.

The colour picker appears like this:



You can choose the desired colour by clicking on the circle. Use the slider to set the luminance.

Input status page



The status of the **local inputs** is displayed on the Input status page. A grey icon means that the corresponding input is inactive (input circuit open). An active input (input circuit closed) is indicated by a green icon.

Operation via the local network (TCP)

To achieve the easiest integration with most controllers used in home and commercial applications, the module can be controlled by raw TCP protocol using simple ASCII based commands.

The TCP Communication Protocol Description is available upon request.

Event notifications

There are automatic event notifications sent to clients via the open socket connections whenever the status of an input or output changes.

The TCP/IP communication can be enabled/disabled via the Network settings page.

Most third-party automation controllers that can implement the simple TCP/IP communication protocol can control the FutureNow FNIP-RGB/010. The following are the most widely used:

- AMX
- Control4
- Crestron
- RTI
- Savant
- Extron
- Neets

Software modules/plug-ins for the above controllers are available or P5 will provide full assistance in creating them.

Specifications

Power Requirement	
Main Power Input	12 – 48 VDC (10 - 60V DC), max 160 mA @ 12V, 97 mA @ 24V, 80 mA @48V
0-10V Outputs	
Load	Max. 20mA/Channel
RGB(W)Outputs	
Load	Max. 8A/Channel, 12– 48V DC
Inputs	
Type	4 x optically isolated, noise protected, common GND digital inputs
Communication	
Control	TCP (simple ASCII TCP commands) Build-in web server (HTTP) Local inputs for momentary switches
Mobile devices	P5 iOS/Android apps
Interoperability	Drivers available for most systems
Connectors	
Input terminals	1.5mm² screw terminals
0-10V control outputs	1.5mm² screw terminals
Power outputs	2.5mm² screw terminals
RGB(W) control outputs	2.5mm² screw terminals
Ethernet	RJ45 Ethernet Connector
Environmental	
Operating Temperature	0 ^{0}C – 40 ^{0}C (32 ^{0}F – 04 ^{0}F)
Storage Temperature	-20 ^{0}C – 60 ^{0}C (-4 ^{0}F – 140 ^{0}F)
Humidity	Up to 93% (non-condensing)
Physical	
Dimensions (H x W x D)	70 mm x 86 mm x 32 mm (4 DIN unit width)
Weight	0.096 kg
Installation	Standard DIN Rail Mount and Surface (with additional flaps) Mount

Approvals	Package Content	Warranty
CE	FNIP-RGB/010 Quick Installation Guide	2 years

CONTACT DETAILS

REFERENCES

FNIP Search Utility: FNIP Discovery Tool (Registration needed on www.P5.hu)

FNIP TCP Communication Protocol Description

(Please send an email to support@p5.hu)

CONTACT DETAILS

support@p5.hu

http://p5.hu/index.php/support/contact-technical-support