MaNima Magnus

Highlights

- Digital LED driver with 6 independent SPI outputs
- 2 DMX ports that can be independently configured as input or output
- 6 analog inputs for 4-20mA or 0-10V signals
- 5 digital inputs to interface with PLC or existing system
- Ethernet interface to configure, monitor and control remotely
- Art-Net input from mapping software like MADRIX® or ELM and many other that support outputting Art-Net data
- SD card storage to store scenes and settings
- Scenes can be started, stopped or paused using triggers from all inputs, even DMX channels
- Possible to configure DMX as input to output to Art Net (DMX to Art Net converter) or digital LED (DMX to SPI converter)
- Possible to configure Analog inputs to map to digital LED outputs to interface with sensors
- Several onboard built-in effects like snake, rainbow and more
- Support for over 50 digital LED protocols
- Outputs can be divided in Segments, with each segment displaying different input data
- Wide input voltage 12-48V
- Remote system monitoring using MaNima Cloud solutions

Applications

- Experience lighting like hallways, cinema's or high end buildings
- Industrial ArtNet player that plays on UDP control or PLC IO control
- Live ArtNet player using live PC

Description

The Magnus is a digital LED controller engineered for demanding professional environments, where versatility, reliability, and precision are crucial. Designed to meet the needs of complex lighting setups, the Magnus features a wide input voltage range of 12-48V, ensuring compatibility with a broad spectrum of power sources, making it ideal for use in both industrial and commercial applications.

The Magnus features support for over 50 different digital LED protocols, making it one of the most versatile controllers on the market. Whether you're working with WS2812, SK6812, or any other popular LED protocol, the Magnus has you covered.

It offers 6 outputs which can each output up to 6 universes or 3072 channels. That are 1024 RGB pixels per port or 768 RGBW pixels per port, with a maximum of 26 universes in total.

The Magnus is built with robust power protection features, including polarity protection and overvoltage safeguards, ensuring that your LED installations remain safe and stable under all conditions. The inclusion of an ethernet port enables fast and stable communication, and ensures seamless integration with other systems such as the MaNima Pollux for temperature monitoring or scene playback support to the Pollux.

For developers and integrators, the Magnus offers a custom UDP API, allowing for deep integration with third-party systems and enabling advanced control and automation possibilities. Furthermore, the Magnus supports remote management through the MaNima Cloud, providing real-time monitoring and control from any location, streamlining maintenance and optimizing performance.

Whether you're looking to control complex LED installations or require a reliable solution for large-scale lighting projects, the Magnus delivers the power, flexibility, and reliability you need to achieve your vision.

Contents

Revision history

Revision	Change	Author	Reviewer	Date
1.0	Initial release	MvdM		
2.0	Update to new lay-out	MvdH	NOo	Sept. 2024
2.1	Better explanation of triggers.	MvdH		June 2025

Electrical specifications

Absolute maximum ratings

Applying ratings above the following figures might lead to permanent damage which is not covered by warranty.

Absolute maximum rating	Min	Max	Unit
Power supply input	9	50	V
Analog 10V power output current		50	mA
Digital output voltage		5	V
Digital input voltage levels		VCC	
Cable length digital outputs [1]		10	m
Cable length power supply		3	m

[1]Digital output cable length can be extended using MaNima Extensa device

Electrical specifications

Specification	Min	Max	Unit	Condition
Power supply	12	48	V	
Idle supply input current [1]		75	mA	24V
		65	mA	48V
Idle power consumption [1]		1.8	W	24V
		3.1	W	48V
Operating temperature	10	50	°C	
Humidity	20	80	%	
IP rating	IP52			
Weight		360	grams	

[1]Idle means no inputs are driven, power being supplied and 6 digital outputs driven

Specification	Min	Max	Unit	Condition
Digital input high level Vih	2.0		V	
Digital input low level Vil		1.22	V	
Digital input current		1.4	mA	48V input
Analog input current (0-10V mode)[1]		0.3	mA	10V input

[1]Analog inputs have an overcurrent protection that disables 4-20mA mode on overcurrent

Specification	Min	Max	Unit	Condition
Screw terminal wire sizes	0.05	3.31	mm^2	Solid wire
	30	12	AWG	Solid wire
	0.05	3.31	mm^2	Stranded wire
	30	12	AWG	Stranded wire

Screw terminal torque		0.5	Nm	
		4	Lb.in	
Wire strip length		6	mm	

Input-output matrix

The strongest feature of the Magnus is the flexible input output matrix. The Magnus supports many inputs, but can output one output at the time (unless using segments). The input that is selected is done using priority settings. The following table describes these inputs.

Inputsource	Priority	Description
Blackout	Lowest	Blackout source outputs nothing, turning off all LEDs
Analog source		This source comes from the analog inputs when configured as inputsource
Art-net source		This source comes from Artnet and is always enabled in the background. Output is enabled when ArtNet data is received
DMX port 1 source		DMX 1 port source comes from DMX port 1 and is enabled when the DMX port is configured as inputsource
DMX port 2 source		DMX 2 port source comes from DMX port 2 and is enabled when the DMX port is configured as inputsource
Segment source		When segments are enabled, this source is automatically enabled
Player 1-5 source		Players 1 to 5 can be used to pre-load scenes. When a player is playing a scene, this sources becomes enabled
Sync player source		The syncplayer is used when using the Magnus in a master-slave function, and is enabled when slave data is received
Identify source	Highest	When identifying or testing the outputs, this source is enabled and overrules all other inputsources. It outputs an R-G-B-RGB effect

Inputsources are selected based on their priority and whether they are enabled.

LED chip support

The MaNima Magnus supports an extensive list of LED chips. They are all listed on the website here.

If in some case a digital LED chip is not in this list, contact us for the possibilities.

DMX ports

The MaNima Magnus supports two DMX ports which can be configured independently as input or output according the following table.

DMX Mode	Input/output	Function
Master	Output	Outputs configured universe as DMX master
Slave	Input	Receives DMX universe and triggers can be configured
Inputsource	Input	Received DMX data and outputs it to LED outputs
Disabled	Disabled	Port is disabled

SD card

The SD card, delivered together with the Magnus, contains settings and recording files. The settings are *.cfg files, which are JSON files and can be edited, copied or backed up on PC. Recordings are *.rec files, and can be copied or backed up, but not edited on PC.

When reformatting the SD card, it should contain a valid FAT32 filesystem.

Players

Recordings on the SD card can be played back using one of the 5 players. The filenames are pre-loaded and the start/stop/pause command can be given using triggers or the MaNima configurator.

Players can be set to start at boot, so they start immediately after the device is powered. Also, the amount of repeats can be setup.

Another feature is the loop method. These can be setup according to the following table.

Loop effect	Function
Default	Jump back to start after reaching last frame
Autoloop	Scan file and try to find a matching frame to the start frame, and jump to that when reaching last frame
Bounce	Reverse direction of playback when reaching last frame
Fader	Fade out and jump back to start after reaching last frame
Fade and Bounce	Fade out and reverse direction of playback when reaching last frame

Master-slave

When the application needs more outputs, the MaNima Magnus can be setup to function in master-slave mode. All Magnus's need to be in the same local network and on the same group (configured using the MaNima Configurator).

There is no virtual limit to the amount of slaves that can be added. Each device can be setup to be master, even after configuring and recording. The master is the device that gets the "start playback" command, not the start recording command, and it does not need to be the same device.

Triggers

Triggers are events that are coming from an outside source and will have the Magnus do something.

Trigger name	Remark
Player x Stop/pause/start	Depending on the input, when the input value is under 1/3th of the maximum value, the player is stopped. When it is above 2/3th of the maximum value the player is started. When in between 1/3th and 2/3th of the maximum value, the player is paused.
Player x Speed	Control the speed of the playback
Player x Start	Start the player, when the value is over ½ of the maximum input value, the player is started
Player x Stop	Stop the player, when the value is over ½ of the maximum input value, the player is stopped
Player x Select scene	Select another scene from the SD card. The scene selected is based on the value. Based on a 0-255 input, when the value is < 10, the player is stopped. Otherwise, a file is selected based on the filename X_Y.REC, where X is the start value and Y is the end value. For example: 10_20.REC will start playing when the DMX channel value >= 10 and <= 20. The channel is set together with the trigger in the configurator.
Global dimming	Global dimming means dimming of the whole system, including slaves (must be on the same device the synchronized playback is started)
Safety dimming	When using the Magnus in combination with a Pollux as temperature monitor, safety dimming is used to force dim the whole system based on this temperature, even when they are configured as slave in a master slave setup

The sources that can trigger these are:

- Analog inputs
- Digital inputs
- DMX port 1 or 2, configured as slave
- Configurator (UDP API)

Segments

Segments is a feature that can divide outputs in separate smaller segments. Each segment can display one of the following.

Segment effect	Function	Remark
Color	Displays a static color	The color is set using RGBW values
Rainbow	Displays a rainbow effect	The rainbow length and speed can be changed
Snake	Displays a snake effect	The snake's head and tail length can be configured. Also the break in between snakes, the speed of the snake, direction of the snake and the color in RGB fashion.
Art Net	Display ArtNet input	The universe and start channel can be configured

A segment is given a start led (position of the output fixture), a length (size of the segment) and on which output port the segment should be placed.

Some effects can create triggers, for example snake creates triggers for it's color and speed. This means that the color and speed can be controlled using one the sources from the list in chapter Triggers.

Effects can be added on request!

Analog inputs

The analog inputs are independently configured to be 0-10V or 4-20mA inputs. Also the mode can be set to Functions or LED data. When set to Functions, the analog inputs can trigger events according the table in Triggers chapter. When set to LED data, the universe and start channel (offset) can be setup. A universe is then simulated containing the values of the analog input ports.

Digital inputs

The digital inputs can be enabled or disabled, when enabled they can trigger events according the table in chapter Triggers.

Custom API

There is a UDP API available to control the Magnus using UDP packets, constructed according the JSON RPC protocol. An API document with an overview of the methods and their parameters can be get upon request. Some of these features are:

- Control output mapping or segments
- Control players and recorder
- And many more

Master-slave

When the application needs more outputs, the MaNima Magnus can be setup to function in master-slave mode. All Magnus's need to be in the same local network and on the same group (configured using the MaNima Configurator).

There is no virtual limit to the amount of slaves that can be added. Each device can be setup to be master, even after configuring and recording. The master is the device that gets the "start playback" command, not the start recording command, and it does not need to be the same device.

Groups

Devices can be grouped together and will only listen to synchronized playback commands from devices in the same group. This way, multiple master-slave setups can be used on the same local network.

Custom touchscreen control – HMI

MaNima can also supply a touchscreen running a custom Linux kernel that contains software to communicate with the MaNima Magnus. This software can be adjusted to have your company's logo.

The default functions the HMI can do are:

- Set global dimming with a slider
- Change playback speed with a slider
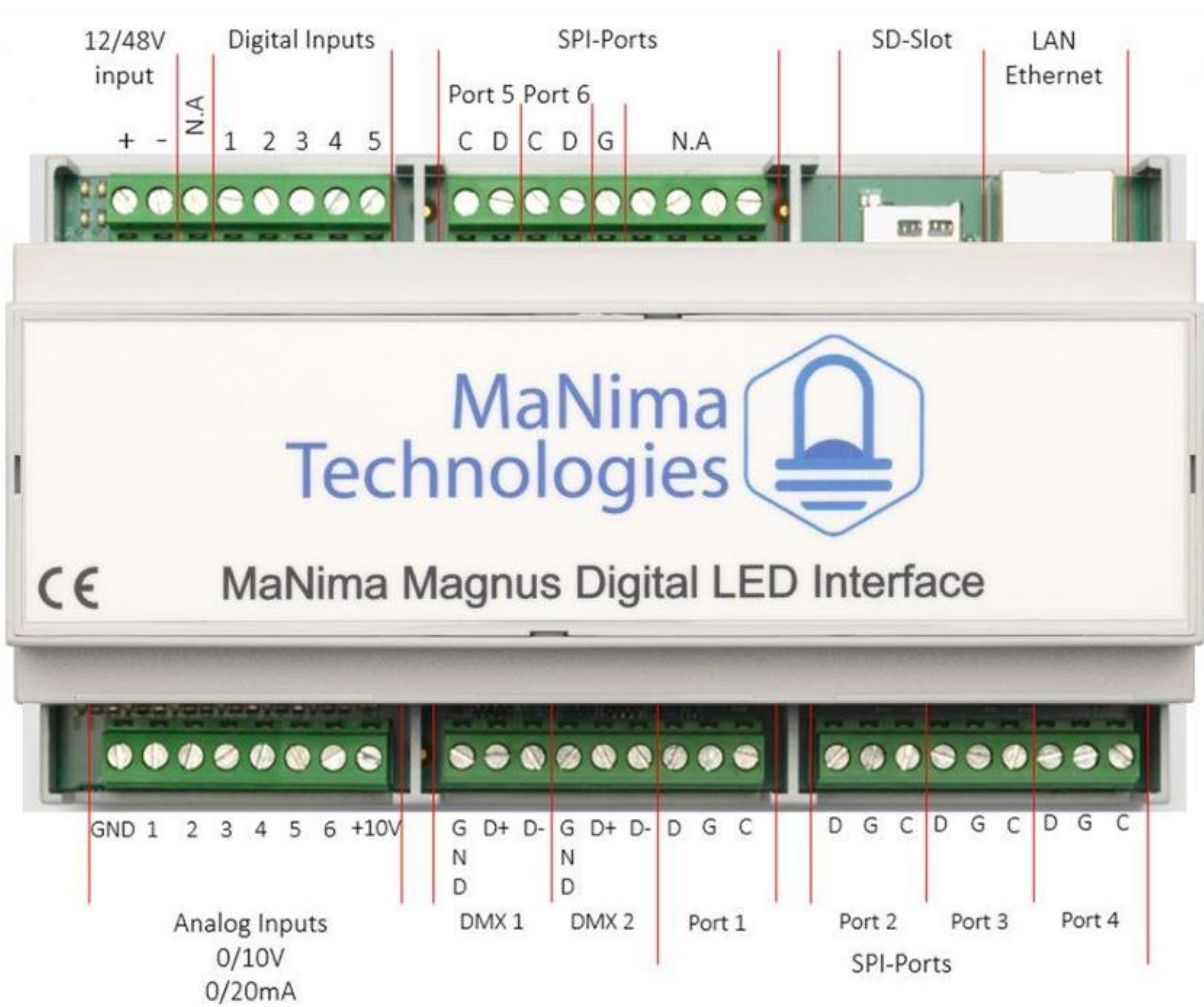- Select scene to play

There is nothing more but a settings menu, accessed by a fast tapping of the company's logo.

The logo can be set on request using the MaNima Cloud, or in an offline situation through an ethernet connected laptop.

Pinout

Connector	Pin	Signal
12/48V input	1	VDD (+)
	2	GND
	3	N.A.
	4	Digital input 1
	5	Digital input 2
	6	Digital input 3
	7	Digital input 4
	8	Digital input 5
SPI-Port (5, 6)	1	Clock port 5
	2	Data port 5
	3	Clock port 6
	4	Data port 6
	5	GND (keep close to data/clock lines)
	6	N.A.
	7	N.A.
	8	N.A.
	9	N.A.

Connector	Pin	Signal
Analog inputs	1	Analog GND
	2	Analog input 1
	3	Analog input 2
	4	Analog input 3
	5	Analog input 4
	6	Analog input 5
	7	Analog input 6
	8	+10V output to use with sensors
DMX ports	1	DMX 1 GND
	2	DMX 1 D+
	3	DMX 1 D-
	4	DMX 2 GND
	5	DMX 2 D+
	6	DMX 2 D-
	7	Data port 1
	8	GND port 1
	9	Clock port 1
SPI-Port (2 - 4)	1	Data port 2
	2	GND port 2
	3	Clock port 2
	4	Data port 3
	5	GND port 3
	6	Clock port 3
	7	Data port 4
	8	GND port 4
	9	Clock port 4

Typical applications

DMX control of digital LED system

In this case, the Magnus will be connected to LED fixtures on which a scene will be played. To control the playback of this scene, DMX is used.
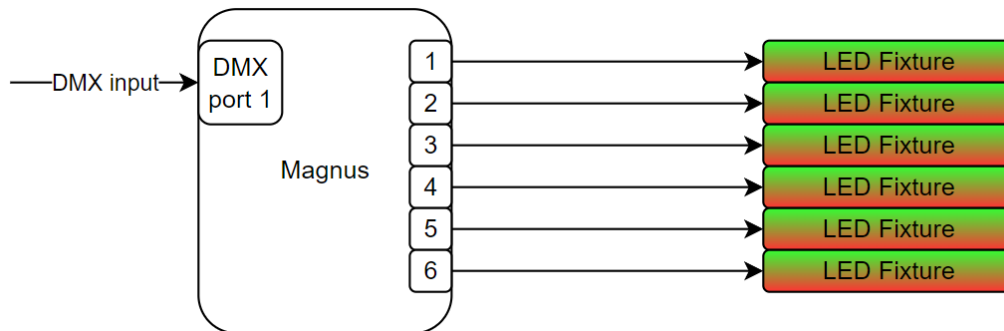
The DMX input is set to mode "slave", and setup to trigger start/pause/stop on player 1. The file in player 1 was preloaded.

Synchronized playback using multiple devices and DMX control

In this case, multiple Magnus devices are used to control more LED fixtures. The global layout is found below.
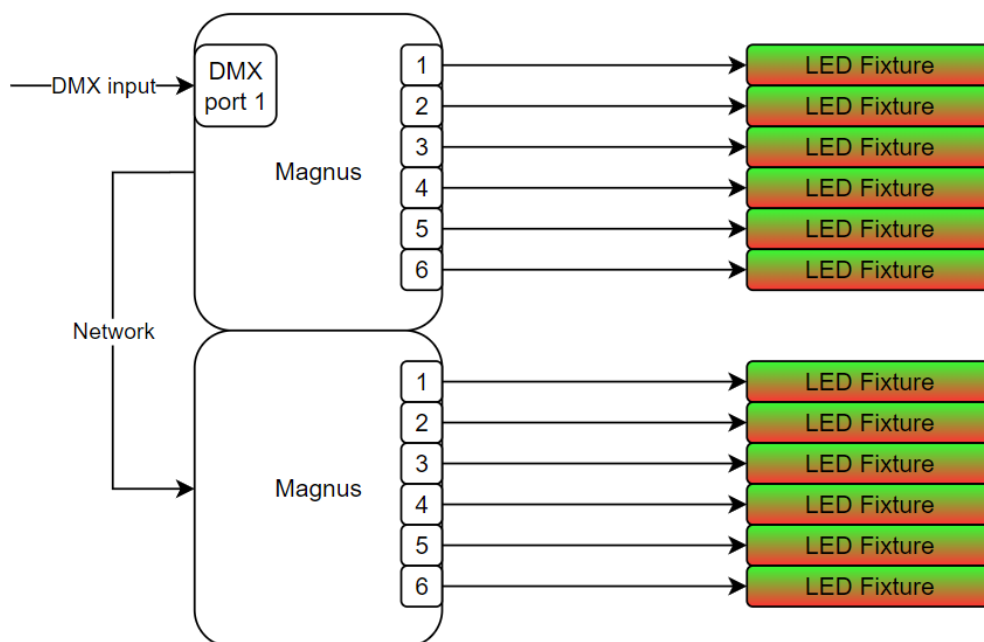
Both devices are on the same network. Using the MaNima Configurator, they are both set to group 1.

Since the upper Magnus is connected to the DMX bus, this Magnus will be the master in this synchronized playback setup. The player that is controlled is set to synchronized playback.

Make sure when recording the slave devices are also turned on and receiving their own data.

Temperature monitor using MaNima Pollux

Digital LEDs also tend to get hot, however, the MaNima Magnus cannot directly measure the temperature of the LED fixture. In these cases, the Magnus can cooperate with the MaNima Pollux.

In this application, the Pollux is used to measure the temperature of the LED fixtures.
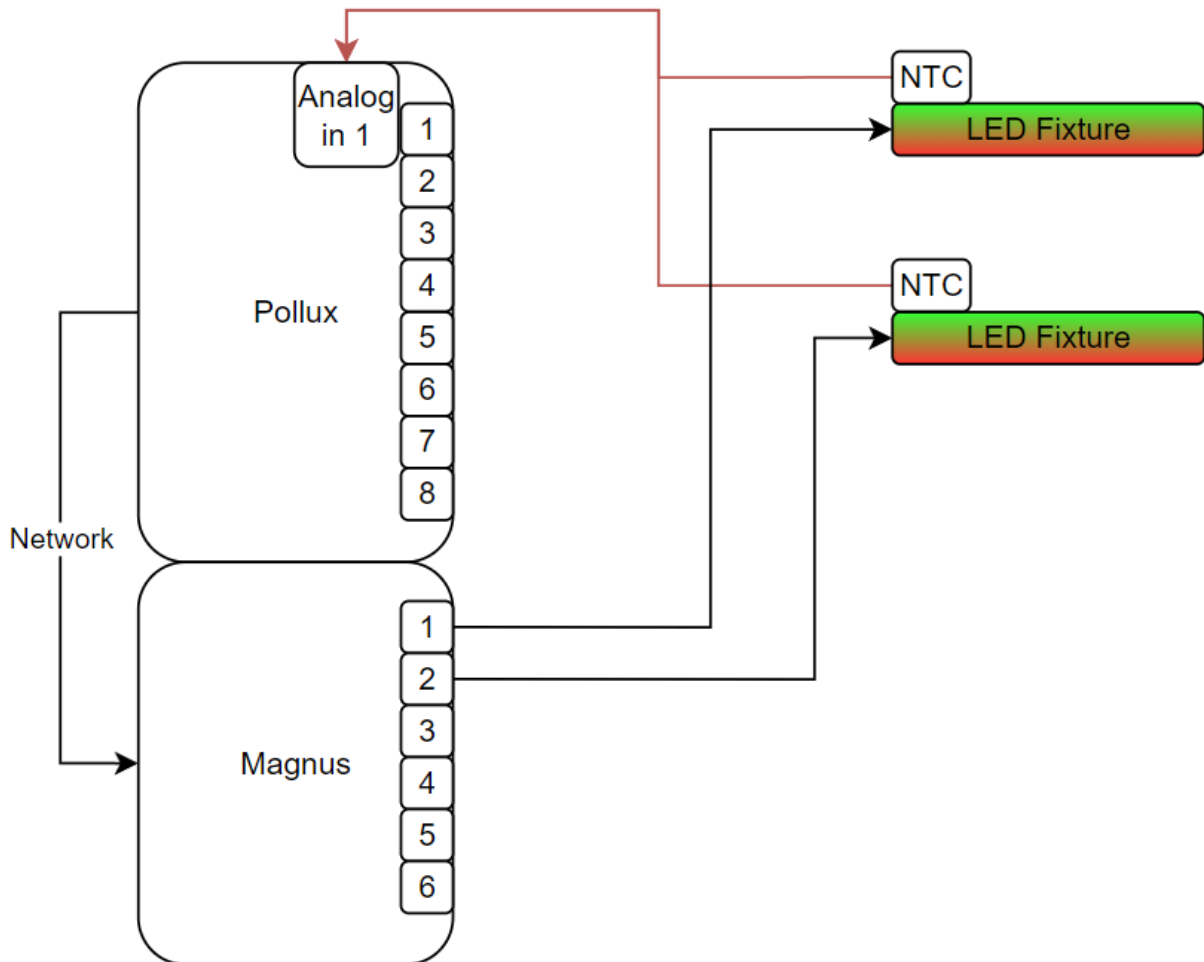
The Magnus and Pollux are connected through the network. In the MaNima configurator, the Pollux will be added to the Magnus as an extension.

After registering the extension inside the Magnus, triggers are added to different channels. In this case, NTC 1 temperature and NTC 2 temperature are both added and will be setup to change the global dimming of the Magnus.

The Pollux will transmit the dimming value according the NTC dimming values, and the Magnus will respond by dimming the output accordingly.

Note that the extension connection is based on a MAC connection. So when by any reason the IP address of one or both devices change, the connection will not fail.
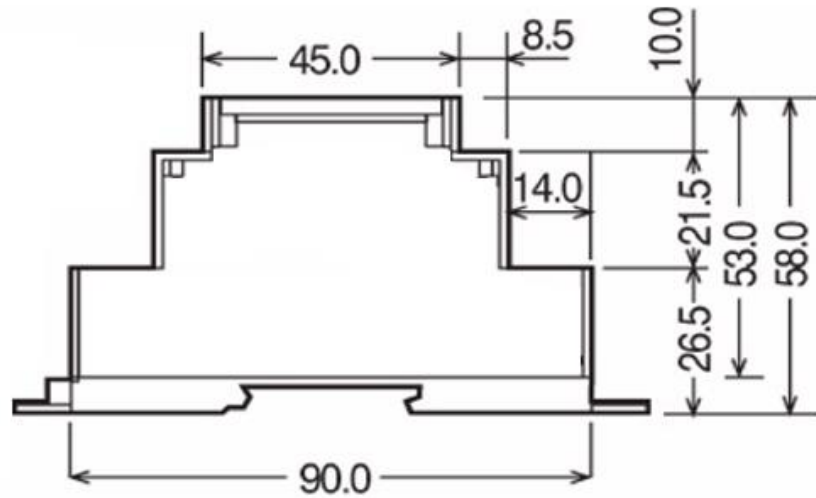
Mechanical specifications

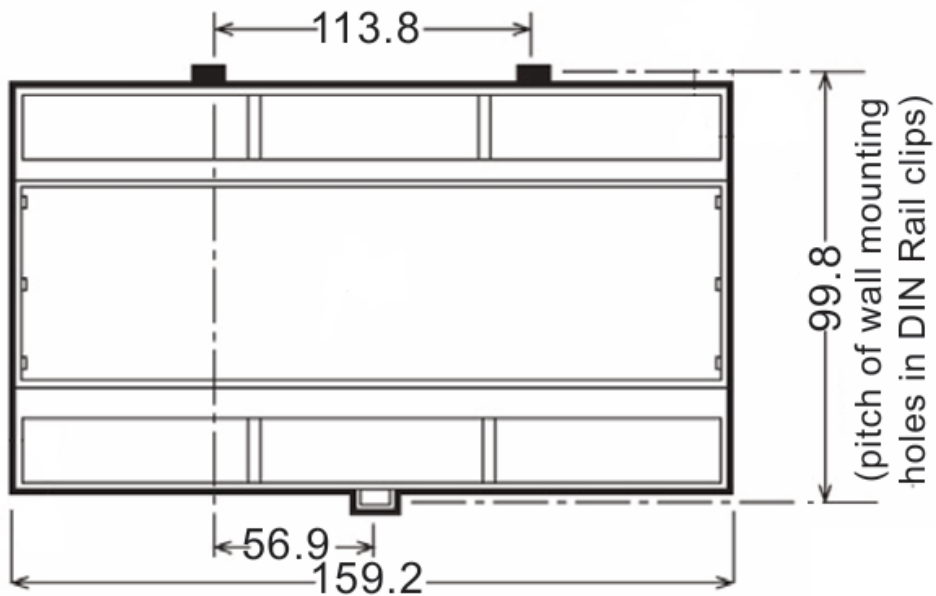The Magnus is fitted inside an DIN rail enclosure.

Dimensions are found in the image on the right. The width of the enclosure is found below.

- Desing meet requirements of DIN 43880
- Fits 35mm DIN rail or screwed to flat surface
- Durable Light gray Ul94-VO Flame retardant PC material
- 90mm long and 58mm high

Magnus

The enclosure of the Magnus is 3 units wide, or 159.2mm.

Ordering information

Order number	Type	Remark
MAGNUS	Magnus	In DIN rail enclosure
MAGHMI	HMI touchscreen	Default with MaNima logo
MAGHMICL	HMI touchscreen	With custom logo in software

All products are carefully handled and packaged in ESD safe methods.

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